



# Environmental Management – Our Vision

Toward a Sustainable Society



*Yoshinori Ida*

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.\*

\*Kaishu 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.

## ● Responsibilities for Environmental Conservation

I enjoy hiking in the mountains and if the weather is good on weekends, I often hike in the Tanzawa Mountains or the Hakone Mountains, which are close to my home. It feels refreshing and I can get back in touch with myself. It reminds me of the magnanimity of nature. But sometimes, people find themselves in the midst of a fresh snowfall in Hakone, even in early May. This reminds me how much I should be in awe of nature. I feel the greatness of nature and appreciate once again how dependent we are upon it. We must never lose our sense of responsibility for protecting the integrity of our environment, which we will hand down to our descendants.

Today, this precious Earth carries everywhere the marks and wounds of damaging emissions and discharges from human's activities. Our activities exert unexpectedly broad and complex effects, including climate changes due to global warming. One cause of global warming is the anthropogenic release of greenhouse gases. To cope with these changes on a global basis, the Kyoto Protocol to control greenhouse gas emissions was adopted at the Third Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) held in Kyoto in December, 1997.

Unfortunately, as of July 2003, the Kyoto Protocol has yet to go into effect. However, I think companies that consume a great deal of energy in their business must be aware of their own responsibilities as members of society and work proactively to conserve the environment. I also think that suppliers of products that emit carbon dioxide during their operation, like vehicles, must be more aware about their responsibilities and endeavor to reduce exhaust emissions.

## ● Isuzu's ELF-KR Series Meets the New Short-term Regulations ahead of Schedule

In June 2002, Isuzu became Japan's first truck manufacturer to launch the sales of the ELF-KR series, a new generation of environmentally friendly light-duty trucks that meet Japan's exhaust emission regulations taking effect in 2003.

The ELF-KR series was developed by integrating technologies for combustion, aftertreatment and electronic control, based on Isuzu's accumulated expertise in the development of clean diesel engines. These trucks are installed with the oxidization catalytic converter, to reduce particulate matter, as standard equipment. Due to their environmental performance, the ELF-KR trucks have been designated as super low-emission vehicles by a number of local governments. They also meet the stricter regulatory levels set by the Tokyo Metropolitan Government to enter into force in 2005.

Commercial vehicles are essential to all stages of logistics, including what is called "arterial logistics," such as parts procurement and product supply, and "venous logistics," such as disposal and recycling. They are operated all over the world, in both developing and developed nations. It is no exaggeration to say that our comfortable modern lifestyle is made possible by trucks, whose characteristics differ from those of passenger cars in several ways.

It's our responsibility and pride to work for improved performance of environment, economy and safety that support the important base of social activity.

## ● Shifting to New Mode of Logistics

Another social responsibility for a manufacturer of commercial trucks is to cope with the modal shift\*, the recent trend toward shifting to new modes of logistics. I expect commercial vehicle manufacturers to play parts in this, with their ideas for the modal shift. New vehicles will have lower environmental impact and offer the capability of high-efficiency, combined transport. Having compiled a great deal of know-how and technical information on combined transport between the Fujisawa Plant and Isuzu Engine Manufacturing Hokkaido Co., Ltd., we are confident that we will be able to significantly contribute to the modal shift. We will promote this for its lower global environmental impact and its meaning for the roles of trucks, railways and ships.

## ● Initiatives at the Manufacturing Phase

As a vehicle manufacturer, we have been working to reduce environmental impacts in our manufacturing processes and plants by various technical innovations, with the participation of all employees. However, our efforts remain yet to be improved, compared to those by other companies that are more advanced in environmental protection. Our experience demonstrates that technologies do not advance gradually but progress in distinct phases. There must be continual research and development. I believe we can catch up with the companies that are now ahead of us only by continuing our efforts and initiatives to develop technologies to reduce environmental impacts with unfailing enthusiasm and industry. We will do our best to accomplish the constantly advancing targets for zero emissions, energy conservation, and recyclability.



Monument in the Kawasaki Plant

## ● Going back to the Starting Point/ Isuzu's Vision

You can see in Isuzu's Kawasaki Plant a monument in honor of Rudolf Diesel, who invented the diesel engine. I think diesel engines are the key to the success of Isuzu in the future. Diesel engines are still developing as they have some drawbacks, as well as enormous potential and advantages. I see it as our mission to provide cleaner, further efficient diesel engines and diesel-powered trucks and contribute to create a sustainable society. We will make proactive efforts to protect the environment and welcome constructive criticism from other parts of society.

Isuzu's environmental management vision focuses on "providing the market with diesel trucks offering excellent environmental performance and economy."

## ● Message from Isuzu

This year's Isuzu Environmental Report primarily covers the environmental efforts conducted by Isuzu Motors Limited during the past year, describes our view of our social responsibilities as a manufacturer of commercial vehicles, and explains our approach to developing diesel engines. We value your comments and suggestions and seek to promote mutual communications in efforts to create a sustainable society.

\* Modal shift: Shifting to new means of mass-transport such as railways and marine transport in place of deliveries by vehicles on main roads, in order to promote combined transport with trucks.

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# Summary of Environmental Initiatives in Fiscal 2002

The major achievements of Isuzu's fiscal 2002 initiatives to protect the environment are summarized below. For details, please refer to the pages indicated.

## ELF-KR, The First Trucks that Meet the Toughest Emission Regulations

We introduced the ELF-KR series of trucks in June 2002, meeting the tougher 2003 exhaust emission regulations in Japan two years before they had been scheduled to go into effect. Since then, the ELF-KR trucks have earned high marks from our customers for their excellent environmental performance. They are running away at the top market share for their class of vehicles. An oxidization catalytic converter is installed as standard equipment to reduce particulate emissions. These trucks comply with the low-pollution vehicle regulations specifically set by eight 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.

In addition to the improvement to achieve cleaner exhaust emissions, this new series is available with reduced external noise and sophisticated transmissions.

Pages 13, 14 and 18



ELF-KR

## Clean Energy Vehicles

Following our ELF light-duty trucks, we introduced CNG-powered vehicles with further improved environmental performance in May 2003. These are the FORWARD medium-duty truck series, which emit almost no particulate matter or black smoke and dramatically reduced nitrogen oxide (NOx) emissions in their exhaust. The FORWARD series meet the exhaust emissions requirements equivalent to the "super-low exhaust emissions ☆☆☆ (in-house test values)," the strictest of the low exhaust emissions vehicle designation standards of Japan's Ministry of Land and Traffic. Since April 2003, Isuzu has been operating the "Shonandai Isuzu Eco-Station," a compressed natural gas filling station, at a site adjoining the Fujisawa Plant, in order to promote the spread of clean energy vehicles from the viewpoint of fuel supply.

Pages 15 and 18



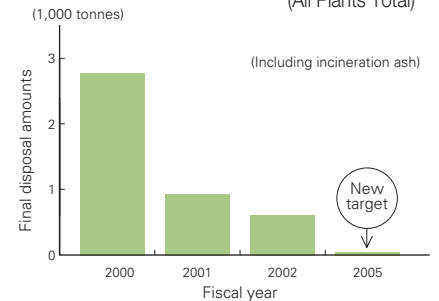
FORWARD CNG-powered Truck

## Zero Emissions: Towards Further Improvements

In fiscal 2001, Isuzu accomplished the goal of reducing landfill disposal of industrial waste by 95% compared to the fiscal 1995 level (excluding incinerator ash); the actual reduction was 97.6%. In fiscal 2002, we began further activities to clear the newly established final numerical target to reduce landfill disposal to one tonne or less per month per plant (including incinerator ash) by the end of fiscal 2005. We were able to achieve a 40% reduction compared to fiscal 2001.

Page 20

### Results and Targets in Reducing Final Disposal (All Plants Total)



## GIGA Series Heavy-Duty Trucks Boost Fuel Efficiency

In June 2003, Isuzu launched the GIGA series heavy-duty trucks, equipped with the "Smoother-G" mechanical fully-automatic transmission as standard equipment to improve economic performance through fuel efficiency. With this transmission, fuel efficiency is improved significantly because the shifting is fully automatic at every speed to maintain a range of engine RPM for high fuel efficiency. This automation of the shifting task enables the same level of energy-efficiency in driving as would be achieved by a skillful driver using a manual transmission. The GIGA series heavy-duty trucks are also equipped with a speed limiter as standard equipment to further improve fuel efficiency. The speed limiter is also expected to reduce the number of serious traffic accidents.

Pages 14 and 18



GIGAMAX Truck equipped with "Smoother-G"

## Reducing the Use of Substances with Environmental Impact

We are making proactive efforts to reduce the use of four heavy metals, lead, hexavalent chromium, mercury and cadmium. In compliance with the "Guidelines to Control the Four Heavy Metals" formulated in fiscal 2001, we are working toward a gradual phase-out, while calling for the cooperation of our suppliers at green procurement explanatory seminars and other occasions. Through these activities, we have complied with the European Union's ELV Directive, which bans the use of these metals from July 2003. We have also started operating the IMDS\*, in order to build a database for materials and chemical substances used in vehicle components.

Pages 15, 16, 17, 21 and 23

\* IMDS: International Material Data System



## Working to Reduce Environmental Impacts While Maintaining Communication with Customers

Isuzu is working to reduce its environmental impacts while promoting communications with our customers. Our systems include the "Mimamori-kun" vehicle diagnostic tool, which analyzes a range of driving data from our customers in order to provide diagnostic information and recommend appropriate ways to reduce fuel consumption and drive more safely, and the "Eco-Solution Plan," which provides diagnostic information on the impact of new tough exhaust emissions regulations and countermeasures. We also encourage driver training to improve fuel efficiency. The "Mimamori-kun" system went into operation in January 2001 and was operating on about 600 trucks at the end of March 2003. Customers reported an average reduction of 15% in fuel consumption and highly appreciated this service.

Page 25



Driver training to improve fuel efficiency using the "Mimamori-kun"

# Environmental Goals and Accomplishments

## Creating Environmentally Sound Products

Environmental Goals in Fiscal 2002	Achievement in Fiscal 2002	Self-evaluation	Mid-term target	Refer to
<b>Improve fuel efficiency to prevent global warming</b> - Launch new products with improved fuel efficiency.	- A new model of the GIGA series heavy-duty truck was launched in June 2003 with improved fuel efficiency by 11%, by adopting the "Smoother-G" fully-automated 12-speed mechanical transmission.	Target Achieved	Highest fuel efficiency in its class	Page 14 Page 18
<b>Clean exhaust emissions</b> - Advance launch of low emission vehicles	- The ELF-KR light-duty truck was launched in June 2002 to meet the 2003 exhaust emission regulations. - Low-pollution vehicles with reduced particulate matter emissions of less than 0.18 g/kWh due to the standard oxidation catalytic converter were launched in December 2002 for medium-duty trucks and June 2003 for heavy-duty trucks.	Target Achieved	Develop next-generation aftertreatment equipment	Page 13 Page 14 Page 18
<b>Reduce external noise</b> - Meet noise regulations set in 2001.	- ELF series light-duty trucks were launched in June 2002. - FORWARD series medium-duty trucks were launched in December 2002. - GIGA series heavy-duty trucks were launched in June 2003.	Target Achieved	Reduce external noise while idling in towns	Page 15 Page 18
<b>Low pollution alternative fuel vehicles</b> - To promote the development and sales of low pollution alternative fuel vehicles	- 1,655 units of ELF CNG-powered light-duty trucks sold. - 984 units of ELF LPG-powered light-duty trucks sold. - 62 units of FORWARD CNG-powered medium-duty trucks sold. - A CNG filling station was opened in the Fujisawa Plant in April 2003.	Target Achieved	Develop electric-diesel hybrid vehicles.	Page 15 Page 18
<b>Reduce use of substances with environmental impact</b> - Reduce use of lead to one-third or less of fiscal 1996 levels by 2005. - Implement a plan for gradual reduction and eventual ban of lead, mercury, cadmium and hexavalent chromium.	- Reduced use of lead to one-third of fiscal 1996 levels in GIGA heavy-duty trucks - Complied with the EU-ELV Directive - IMDS chemical substances control system introduced in May 2003. - Green procurement explanatory seminars held in Japan and Thailand.	Target Achieved	- Reduce use of lead to one-fourth or less from 2006 (heavy-duty commercial vehicles). - Ban the use of mercury from January 2005, cadmium from January 2007, and hexavalent chromium from January 2008.	Page 15 Page 16 Page 17 Page 23

## Creating Environmentally Sound Plants

Environmental Goals in Fiscal 2002	Achievement in Fiscal 2002	Self-evaluation	Mid-term target	Refer to
<b>Energy saving to prevent global warming</b> - Stabilize CO <sub>2</sub> emissions for a 30% reduction compared to fiscal 1990 levels by 2010.	- Reduced 55% compared to fiscal 1990	Target Achieved	30% reduction of CO <sub>2</sub> emissions compared to fiscal 1990 levels by 2010	Page 19
<b>Waste Reduction</b> - Further improvements for zero emissions Reduce landfill disposal of industrial waste to 615 tonnes (including incineration ashes) in fiscal 2002.	- 591 tonnes	Target Achieved	Reduce landfill disposal of industrial waste to 48 tonnes or less per year (including incineration ashes) by the end of fiscal 2005.	Page 20
<b>Reduce substances with environmental impact</b> - Reduce emissions of VOCs * (from painting processes) by 45 g/m <sup>2</sup> by the end of fiscal 2005.	- 45.4 g/m <sup>2</sup>	Target Achieved	45 g/m <sup>2</sup> or less by the end of fiscal 2005	Page 21

\* VOCs: Volatile Organic Compounds

## Environmental Management Systems and Logistics

Environmental Goals in Fiscal 2002	Achievement in Fiscal 2002	Self-evaluation	Mid-term target	Refer to
<b>ISO 14001 certification for environmental management systems</b> - DMAX, Ltd. (US): Obtain certification - Kawasaki Plant: Pass review for certification renewal - Fujisawa Plant: Pass review for certification renewal - Tochigi Plant: Pass review for certification renewal	- Certified in July 2002 - Certification renewed in April 2002 - Certification renewed in July 2002 - Certification renewed in February 2003	Target Achieved	Consolidation of group companies	Page 23
<b>Issuance of the Environmental Report (Japanese/English) in September/December 2002</b>	Japanese version was issued in September 2002; the English version was issued in November.	Target Achieved	Further improvement of the contents	Page 26
<b>Streamline Logistics</b> - Improve vehicle delivery mode (percentage of deliveries by human-driven vehicle 22.9% or less) - Boost the use of returnable and steel containers to 65% or more.	- 22.0% usage of human-driven vehicles. - 68% returnable/re-usable containers.	Target Achieved	Percentage of deliveries by driving the vehicle 20% or less in fiscal 2003	Page 24

## Community and Social Relations

Environmental Goals in Fiscal 2002	Achievement in Fiscal 2002	Self-evaluation	Mid-term target	Refer to
<b>Improve transportation efficiency.</b> - Support upgrading of energy efficiency of vehicles already in use.	- To help users improve fuel efficiency, the "Mimamori-kun" vehicle diagnostic system was brought into operation in January 2002. This system was loaded on GIGA series to the number of 598 trucks as of the end of March 2003. An average reduction of 15% in fuel consumption was achieved.	Target Achieved	—	Page 25
<b>Assist customers in improving exhaust emissions</b> - 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, and has been applied to more than 200,000 vehicles of 6,000 companies.	Target Achieved	—	Page 25



# Story of the Development of the ELF-KR Series

In 2002, the ELF-KR light-duty truck series took the No.1 share in the Japanese market for of 2-3-tonne vehicles for two consecutive years. Deserving the title "Next-generation, Environmentally Friendly Truck," this series offers excellent environmental performance, becoming the first to clear the new short-term exhaust emission regulations that came into effect in 2003.

This is an illustrated story of Isuzu's technicians who threw themselves into the task of developing the ELF KR.

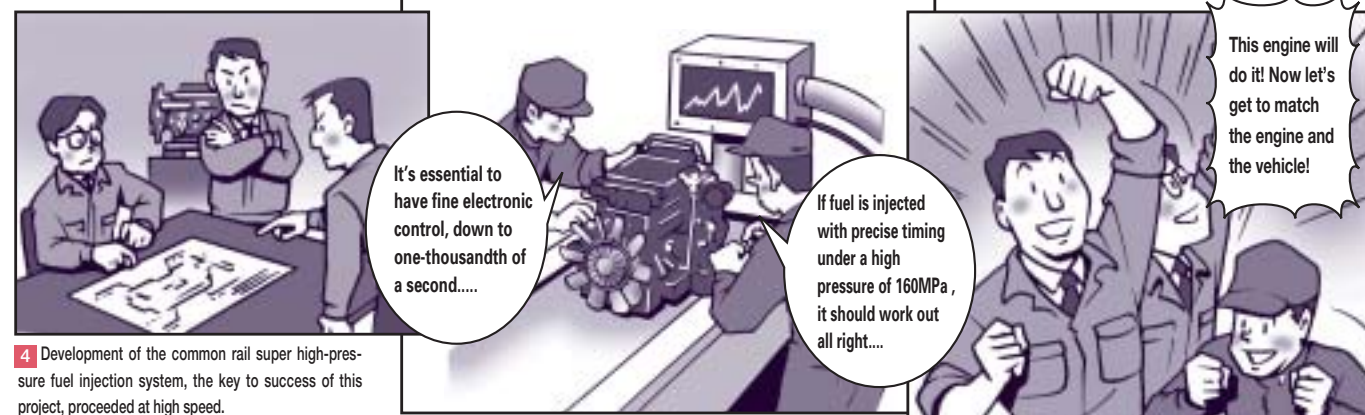


1 "Clear the new short-term exhaust emission regulation standards!" This was one of the high hurdles confronting the ELF development staff.



2 "Can we create a new truck that really satisfies its users on a schedule half the length of the ordinary development period?" All staff members realized how important this project was, but the afforded time was too short.

3 We knew exactly what our technical target was. However, no matter how high the added value of the technology was, we could not pass the resulting additional costs on to the user. The engineers began to work on this difficult challenge.



4 Development of the common rail super high-pressure fuel injection system, the key to success of this project, proceeded at high speed.

5 We needed to apply the common rail system that had been installed in medium- and heavy-duty vehicles in order to ensure precise fuel injection and high engine durability while achieving increased pressure. However, the size of our small engines could not be increased.

6 Development of the common rail system progressed steadily and the engine compartment was insulated to reduce noise; this enabled us to meet the first objective of this project of clearing the 2001 noise regulations standards.



7 However, it took longer than expected to match the engine to the vehicle, and it still remained to start road testing. Commercial production could not be commenced on schedule in fiscal 2002 unless cold weather testing is passed by January 2001. The staff was impatient.



8 Coming to the end of the year, the atmosphere in the office was glum. One of the leaders of the development project encouraged the staff: "I'm sure that this problem will not go on forever. Let's get back on it after the beginning of the new year. It'll be ok. I'm sure we have the skills to solve this." The feeling of desperation lifted, and the staff regained their unity in a common determination to do whatever it took to succeed."

# Next Generation Environmentally Friendly Trucks



9 Our cold weather test team had to fight for every success it scored. A great deal of test data was compiled, the causes of failures were identified, and improvements were refined. Eventually, every requirement for cold-region operation was satisfied - one great hurdle had been passed.



10 Another challenging issue was to demonstrate engine performance at high temperatures. The engine must be tuned so that coolant water temperature does not rise too far, reducing engine power, even when the gas pedal is floored while the truck is climbing a steep slope.



11 The test vehicle has passed both the cold weather and high-altitude testing! Now, all we have to do is the durability testing.



12 Bench testing on the new 4HL1 engine continued. Pattern driving was performed for 20 hours per day and durability was demonstrated for a distance of 83,000 kilometers. This is how we created the super clean diesel engine in Japan. The Ministry of Land and Traffic exhaust emission regulation standards were successfully cleared.

June to September 2001  
At the running test laboratory in Fujisawa Plant



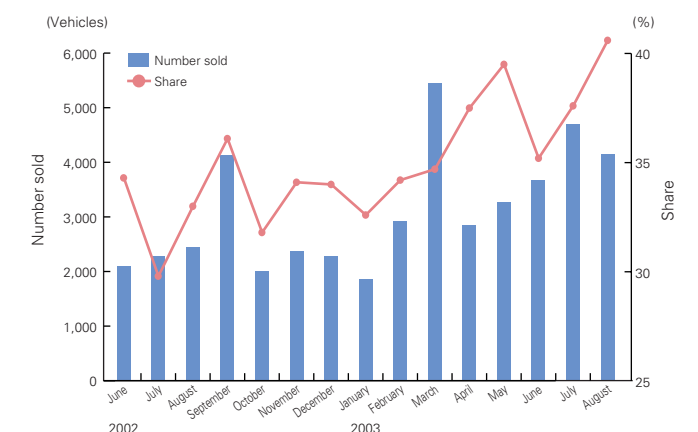
13 The ELF KR series "Next-Generation Environmentally Friendly Truck" has thus been completed, overcoming the numerous technical obstacles and the tight deadline of two years.

December 2001  
Certified for Ministry of Land and Traffic New Short-term Regulations



14 Boasting a commanding technical lead in environmental performance, the ELF-KR has taken a higher and higher market share for its vehicle class since the launch of the series. In December 2002, the ELF-KR series light-duty trucks were ranked top in the Japanese market for the second consecutive year. We at Isuzu are immensely proud of our record and determined to continue providing top-of-the-line diesel vehicles.

Sales and Market Shares of The ELF





# Isuzu's Clean Diesel Engines — At Work

# Around the World

## ● In Europe Diesel Engines Earn High Reputation for Reduced CO<sub>2</sub> Emissions



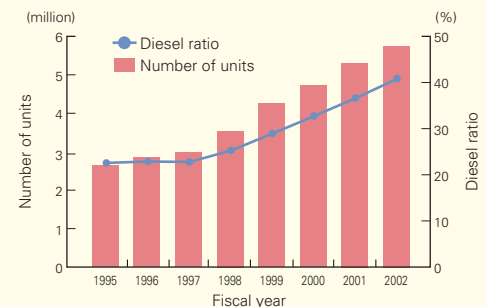
**Jun Arimoto**  
President  
Isuzu Motors Germany GmbH

Diesel engines are well appreciated for their high fuel efficiency in Europe, where people's awareness about environmental conservation has grown ahead of the Japanese. All passenger cars sold in 2008 and after are required to have reduced CO<sub>2</sub> emissions, 140 g/km or less, calculated as a weighted average. Diesel engines are essential to meeting this regulatory standard.

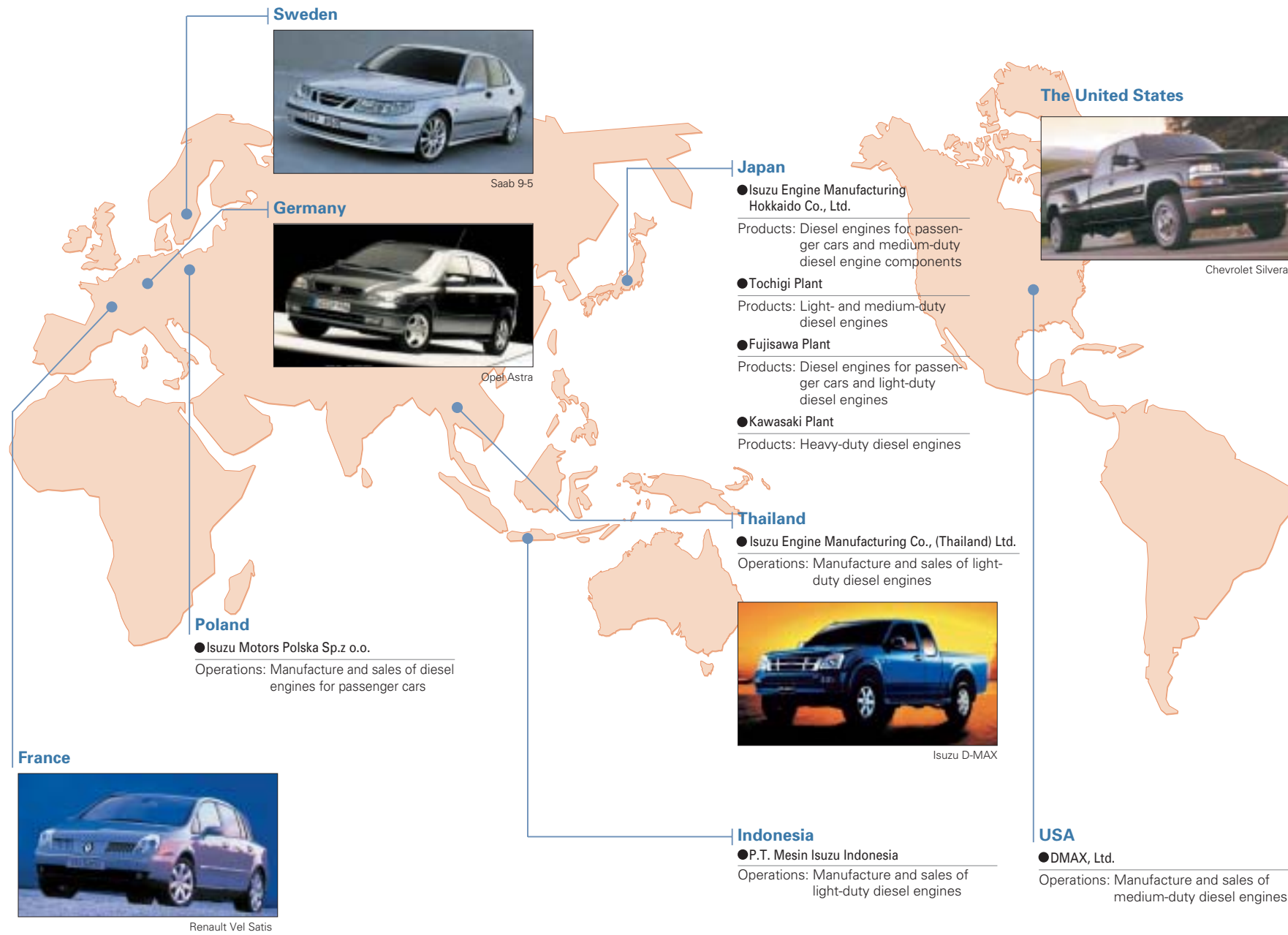
In 1986, Isuzu became the first vehicle manufacturer to introduce a two-stage valve opening nozzle, resulting in direct injection diesel engines with reduced vibration and noise.

Based on these and more recently achieved technical innovations, Isuzu was able to develop outstandingly fuel-efficient diesel engines, including the 4EE2 and 6DE1-V6 engines, which offer high performance comparable or superior to that of gasoline engines. In 2003, ten models equipped with the 4EE2 and five models of luxury cars with the 6DE1-V6 were launched in the market worldwide. Adopting the 4EE2 engine, the Opel Astra became the first vehicle in the world to clear the EURO IV exhaust emissions regulations, contributing to improving the global environment.

### ■ The Shift Toward Diesel Passenger Vehicles in EU Countries



Source: AAA (Association Auxiliaire de l'Automobile)



## ● Isuzu's Diesel-Powered Vehicles Earn High Reputation in Thailand, Ranked Top in Market Share in Commercial Vehicle Class for 20 Consecutive Years



**Kunikazu Ishiwatari**  
Vice President  
Tri Petch Isuzu Sales Co., Ltd.

The Isuzu brand has earned a high reputation in Thailand. Isuzu's commercial vehicles and pickup trucks have ranked first in market share for twenty and seven consecutive years, respectively. With their tall, tough bodies adaptable for multiple purposes, pickup trucks are best suited for use in this tropical country, where roads are often flooded with heavy rain. In Thailand, farmers account for half the nation's total population, and many people have independent businesses. I think vehicles like Isuzu's D-MAX, which can carry cargo for work, and which can be used for leisure on holidays, are likely to be well accepted in this country. The great popularity of Isuzu's vehicles in Thailand is also attributable to the customer-oriented marketing and services provided by our company, Tri Petch Isuzu Sales Co., Ltd. (TIS). Before we began operations, we have conducted in-house durability testing locally based on the actual uses we expect for the D-MAX. We have identified problems and reported them to the Isuzu engineering and manufacturing departments for further improvements.

As of May 2002, a total of one million units had been produced since Isuzu Engine Manufacturing Co., (Thailand) Ltd. started operations in 1988. As of May 2003, more than 100,000 units of this model have been sold in one year after its launch, representing the first such case of vehicle sales in Thailand. We look forward to further progress.



D-MAX Gains Popularity in Thailand

### ● Germany and The United Kingdom

The Opel Astra and Corsa models and the Honda Europe Civic are equipped with Isuzu's compact diesel engine 4EE2, which features high fuel efficiency, high output and clean exhaust emissions. Since the engine offers comprehensive completeness and high potential, it is highly appreciated in Europe. In March 2003, Opel Astra adopted the new 4EE2 engine, which was the first engine to clear the EURO IV exhaust emissions regulations in the world. Currently, this engine is produced and supplied in large numbers. This Astra received the "German Best Small and Compact Car of the Year 2001 Award" from "MOT," one of Germany's top motor vehicle magazines.



4EE2

### ● Sweden and France

The Saab 9-5 luxury sedan, the Renault Vel Satis luxury sedan, and the Renault Espace multi-purpose vehicle are equipped with an Isuzu-made 6DE1 V6 direct injection diesel engine. Developed for use in next-generation passenger cars and sport utility vehicles, this engine offers light weight and compact size thanks to the adoption of the world's first closed-deck cylinder block made of die-cast aluminum. It also features outstanding acceleration and excellent driving economy with its second-generation common rail fuel injection system and 24 valves. The engine is widely accepted for use in luxury cars, demonstrating Isuzu's reputation as a diesel engine manufacturer. It received the "Executive Car of the Year 2002" prize from a British diesel car magazine.



6DE1

### ● The United States

GM's full-size pickup truck, the Chevrolet Silverado and GMC Sierra, is equipped with a direct injection diesel engine developed with more generous power performance that was developed by Isuzu for the new generation of sport utility vehicles. The Duramax 6600 (8GF1) engine features high output, low fuel consumption, and low noise and vibration comparable to those of gasoline engines. It has dramatically changed the consumer image of diesel-powered vehicles and is highly appreciated as a clean diesel engine in the United States, the world's biggest automobile market. The Duramax 6600 received Ward's "Ten Best Engines Award" for two consecutive years in 2001 and 2002, as well as Motor Trend's "Truck of the Year 2001 Award".



Duramax 6600 (8GF1)

### ● 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. Offering novel styling and equipped with a new type of powerful and environmentally friendly direct injection diesel engine, the Isuzu D-MAX is highly appreciated for its comprehensive performance. It is gaining a status surpassing that of passenger cars. More than 100,000 units of this model have been sold in less than one year after its launch, representing the first such case of vehicle sales in Thailand. The current market share is no less than 45%. The Isuzu D-MAX received the "Best Four-Door Pickup Truck Award," "Best Technically Innovated and Designed Pickup Truck Award," in the Thai Car of the Year 2003 accolades.



Isuzu D-MAX

# Environment Committee Chairpersons' Policies

Here are messages on Isuzu's environmental conservation policy from the chairpersons of the sub-committees of the Isuzu Global Environment Committee, which started its operation in August 1990.



**Kozo Sakaino**

Chairperson of the Global Environment Committee  
Executive Vice President and Director

**My eco-friendly life**

"It's my policy to preferentially buy products with the Eco Mark and avoid unnecessary idling of electrical appliances at home. I try to use the bus whenever I can."

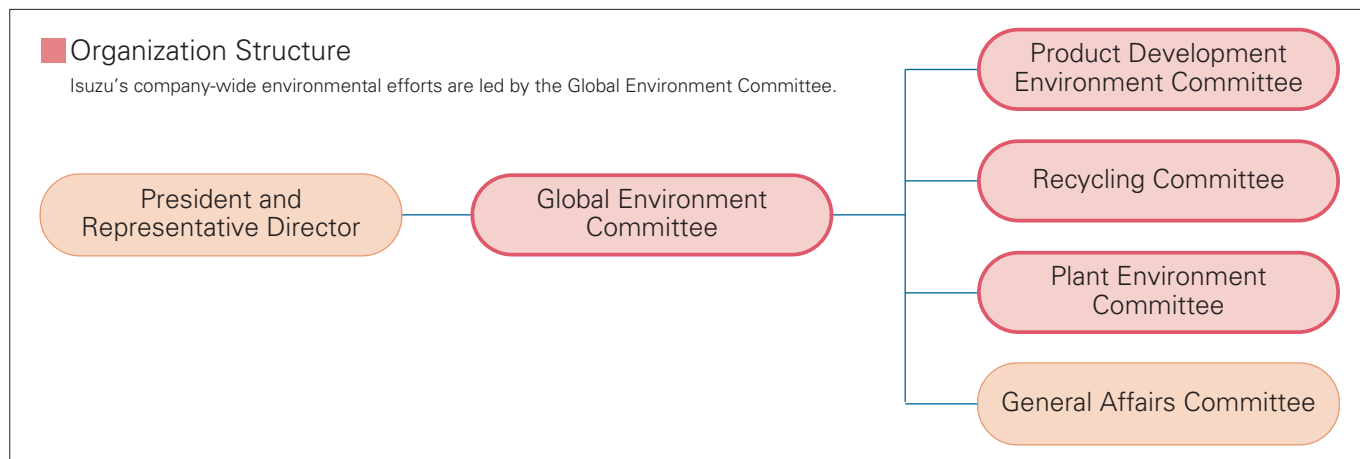
Our environmental activities are intended to accomplish two objectives. One is to develop cleaner vehicles and the other is to minimize the environmental impacts of our plants. I believe Isuzu will not be able to be a corporate citizen that is well accepted by society for long time unless we implement these bilateral strategies further than our stakeholders expectation.

Of the environmental activities of vehicle manufacturers, actions to meet exhaust emission regulations and other legal standards may be viewed as "passive" activities. While Isuzu certainly fulfills such obligations, we are not reluctant to make other "active" efforts.

For example, we manufacture our truck chassis and bodies on a custom-made basis to meet customers' specific requests. In this process, we do extensive investigations to avoid useless structural design, use of unnecessary

parts, and other undesirable features, under test conditions that simulate the actual operation of the vehicle by the customer. Based on the findings, we suggest better specifications for the truck chassis and body to the customer. By continuing these initiatives, we will be able to dramatically improve vehicle economy indices, such as transport efficiency, fuel economy and vehicle life, not only on the user's side but also in society as a whole. I think it's Isuzu's responsibility to be a service company that contributes to creating a sustainable society, by proposing more efficient use of vehicles that places less load on the environment.

Our aim is to be an excellent service company that contributes to society by fulfilling the binary objectives of protecting the environment and improving driving economy in the cargo transport.



## 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."



**Yoshihiro Tadaki**

Director  
Chairperson of the Product Development Environment Committee

In Isuzu's product development activities, we emphasize the three factors of safety, economy and the environment. Development of new technologies is especially concerned with the protection of the environment.

Although diesel engines offer the key advantage of emitting less CO<sub>2</sub> than gasoline engines, they have the drawback of producing more noise, vibration, nitrogen oxide (NOx) and particulate matter (PM). Throughout the life cycle of diesel-powered vehicles, from manufacture and actual operation to disposal, we seek to reduce environmental impacts in seven major areas, including fuel efficiency, exhaust emissions and external noise. We have been able to solve technically difficult problems by combining new technologies, including super high-pressure fuel injection, exhaust gas recirculation and an oxidization catalyst. We launched the ELF-KR light-duty truck series in June 2002, complying with tough new exhaust emission regulations that come into force in 2003. In June 2003, we introduced heavy-duty trucks and other vehicles equipped with the "Smoother-G" fully automatic mechanical transmission, which offers significantly reduced fuel consumption.

We are also meeting the social needs for the development and sales of an add-on kit \* to reduce particulate matter (PM) emissions for installation in vehicles already in use.

We will continue our efforts to develop cleaner diesel engines with an emphasis on both cleaner exhaust emissions and higher fuel efficiency.

**My eco-friendly life**

I enjoy gardening and am moved by beautiful greenery and the abundance of nature. It feels as restful as if I lived in the countryside.

\* Add-on kit to reduce particulate matter (PM) emissions: Oxidization catalytic converter



**Kuniharu Nakagawa**

Executive  
Chairperson of the Recycling Committee

I have been the chairperson of the Recycling Committee since the spring of 2003.

I feel our customers such as logistics companies and cargo owners have recently become increasingly aware of the issue of protecting the environment. Today it's a major concern of customers whether the vehicles they have operated are appropriately recycled after being transferred to buyers.

Recycling of used vehicles and sales of new vehicles can be compared to the two sides of a coin. It is important for the new truck salesperson to accurately understand the objective and necessity of recycling vehicles and to provide our customers with a full explanation about the current status of Isuzu's recycling efforts. This allows our customers to feel easy in purchasing our vehicles, thus earning their trust. I realize it's my duty to sincerely accept customers' comments, and accurately implement what is required for Isuzu to do.

We will work to establish an internal system that ensures the creation of easily recyclable vehicles, provision of a recycling system, and expansion of employee training to facilitate sales personnel's communication with customers concerning vehicle recycling.

**My eco-friendly life**

I enjoy trekking with my camera. It's my policy to bring back the trash I have generated.



**Hiromasa Tsutsui**

Executive Director  
Chairperson of the Plant Environment Committee

In each plant, we work to reduce the company's environmental impacts, with the aim of having "environmentally sound plants that are open to their communities." Our efforts include energy conservation, resources conservation, recycling vehicles, and pollution prevention.

In environmental activities at our plants, it is necessary to take basic radical actions courageously, backed with everyday efforts by all employees. As these efforts are made on a plant-by-plant basis, what to do varies according to products manufactured; collaboration with local recycling companies is of paramount importance in recycling our products. We must take carefully thought-out measures.

First, each plant must be well accepted by local communities in order to make local contributions. To this end, we will make efforts, not only to reduce our environmental impacts, but also to share ideas and information on environmental conservation with local communities. I believe these efforts are of great significance and high values as the public realizes more and more that such environmental initiatives comprise the essential part of our business.

**My eco-friendly life**

I enjoy gardening with my family, appreciating the beauty of flowers of each season. Recently, I have grown European bulbous plants. On holidays, I work out weeding my garden.



# Outline of Isuzu's Environmental Activities

Isuzu was the first company in Japan to manufacture a diesel engine and launch a diesel-powered vehicle. We are working hard to accomplish our goal of improving the driving economy and environmental quality of vehicle transport.

Diesel engines offer many advantages, including high fuel efficiency, excellent endurance and durability, and low CO<sub>2</sub> emissions. With these features, diesel engines represent an essential driving power-source for trucks that repeat high-load, long-distance operation with heavy cargo, and buses that transport a large number of passengers. The illustration below depicts Isuzu's business activities, including vehicle development, material procurement and vehicle manufacture, and the life cycle of a vehicle, from actual operation to disposal.

Trucks, buses and other commercial vehicles support our life, thus contributing significantly to society. It should be noted, however, that the image of diesel vehicles emitting black smoke and NO<sub>x</sub> still persists in Japan.

Isuzu has been working to develop cleaner diesel engines with reduced exhaust emissions; in June 2002, we launched the new ELF light-duty truck series, the first in Japan to comply with the new short-term emission regulations effective in 2003.

We are also taking various approaches to reduce the environmental impact of vehicles at every stage of the life cycle, i.e., procurement of materials and components, manufacture, disposal and recycling. For details of our proactive environmental activities by stage of Isuzu's business, please refer to the pages indicated in the illustration below.

### INPUT

Note: Figures in parentheses are for FY 2002

**Total Energy Consumption**

115,000 kl (109,000 kl)  
(crude oil equivalent)

- ⚡ Electricity 66% (66%)
- 🔥 Gas 19% (20%)
- 🛢️ Petroleum 15% (14%)

**Water consumption**

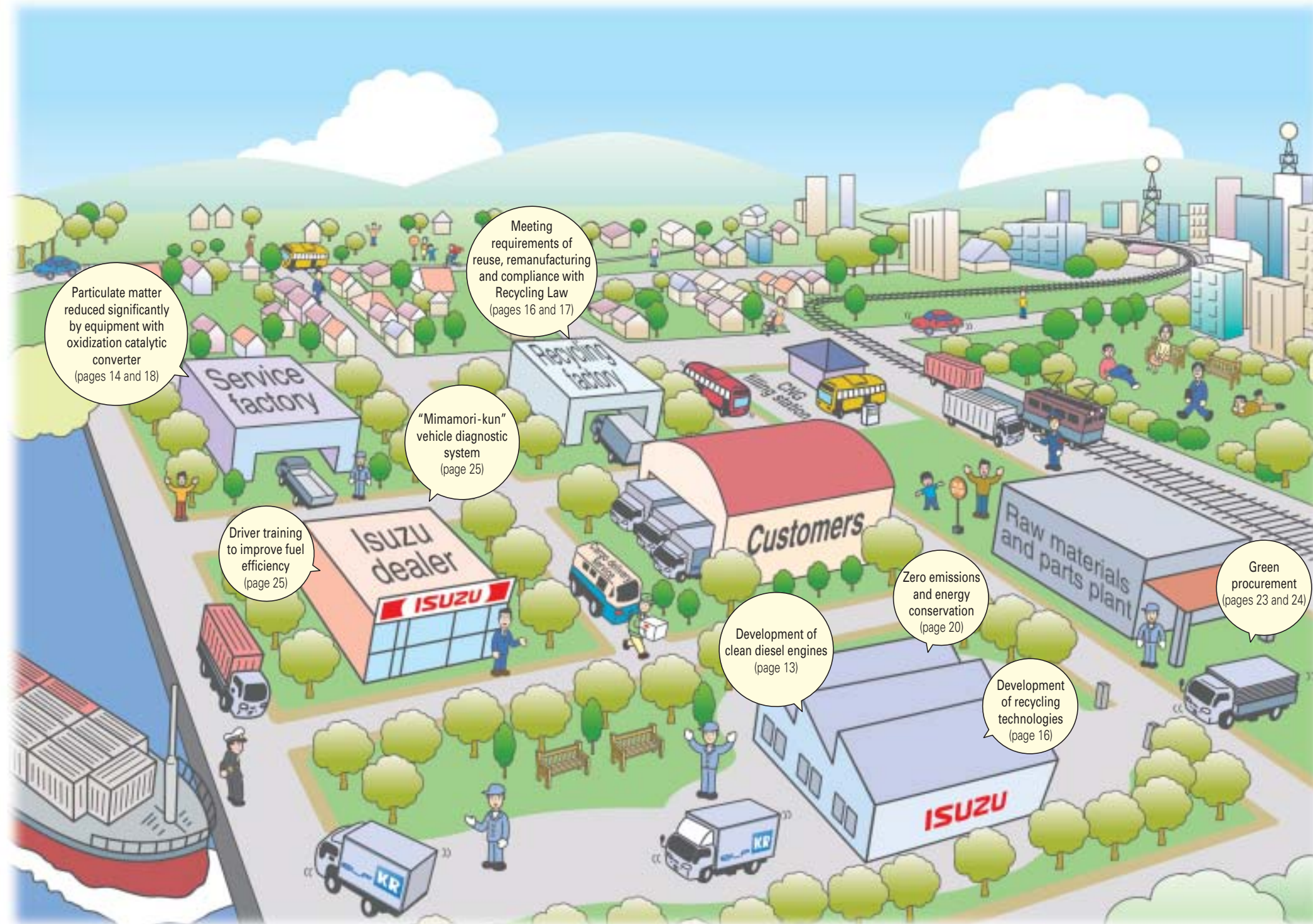
💧 2,320,000 m<sup>3</sup>  
(2,240,000 m<sup>3</sup>)

**Material suppliers**

🏢 Major suppliers 440 companies (470)

🏭 Manufacturing sites in Japan: 4 plants

👤 Employees in Japan 7,634 (11,226)



### OUTPUT

Note: Figures in parentheses are for FY 2002

**Products**

Sales: ¥760.6 billion  
(¥761.9 billion)

- 🏠 Domestic Sales 60,000 units (64,000 units)
- 🚢 Exports 173,000 units (162,000 units)

**Air**

- 🌫️ CO<sub>2</sub> emissions 197,000 tonnes (184,000 tonnes)
- 🌫️ NO<sub>x</sub> emissions 52.7 tonnes
- 🌫️ SO<sub>x</sub> emissions 16.4 tonnes

**Waste**

- 🗑️ Total generated 59,100 tonnes (60,600 tonnes)
- 🗑️ Landfill disposal 600 tonnes (990 tonnes)

**Waste water**

- 💧 Water discharge 2.14 million m<sup>3</sup> (2.18 million m<sup>3</sup>)
- 💧 COD (Chemical Oxygen Demand) 30 tonnes (30 tonnes)



# Creating Environmentally Sound Products

## Development Approach/Developing Eco-friendly Vehicles

### Development Approach

Isuzu is working to develop technologies to minimize the environmental impacts of our engines and vehicles. We emphasize the seven key issues of creating environmentally sound products in the context of the life cycle assessment of vehicles. These include fuel efficiency, exhaust emissions and external noise (see figure at right). For example, total mileage of heavy-duty commercial vehicles often reaches 1.2 million kilometers during its lifetime; better fuel efficiency could result in significant differences in total energy consumption and CO<sub>2</sub> emissions over the vehicle lifetime. Efficiency is a critical issue for reducing the environmental impacts of commercial 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, including the launch of the ELF-KR light-duty truck series which comply with tough new exhaust emission regulations before they take effect; we 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, such as further reductions of external noise, a shift to more environmentally friendly materials, lower use of refrigerants in air-conditioners, and improvements in recyclability.

### Key Issues of Developing Environmentally Sound Products

- 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 usage of substances with environmental impact
- 6 Improve recyclability
- 7 Reduce volume of refrigerants in air-conditioners

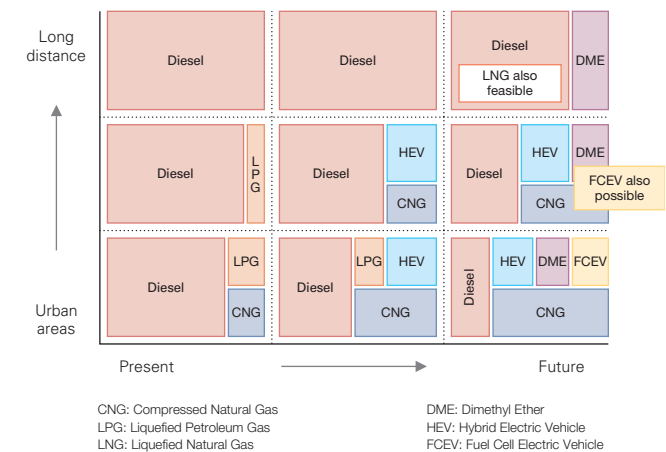
### Developing Eco-friendly Vehicles

Diesel-powered vehicles play a central role in all road transportation today, from short to long distances. Eco-friendly diesel powered vehicles that are adapted to a range of uses are appearing. 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 relatively short and air pollution should be reduced significantly. These vehicles have rapidly increased in recent years and are expected to increase in the future.

Regarding hybrid vehicles, not only passenger cars but also commercial vehicles will increase with the expected development in the near future. In addition, today the automobile and related industries are also researching and developing low-pollution vehicles and alternative fuels. Fuel cell-powered vehicles are drawing attention today for their potential in passenger cars; they are also considered promising for use in commercial vehicles. There are great expectations of dimethyl ether (DME), a fuel synthesized from natural gas etc. Commercial vehicles will be developed for a broad range of purposes, from short- to long-distance transportation.

Isuzu is working to develop next-generation eco-friendly vehicles, built on the foundations of our technical know-how, which we have accumulated over many years in the manufacture of diesel engines.

### Trends in Development of Eco-friendly Vehicles



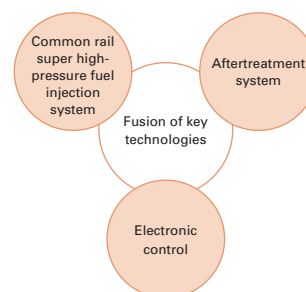
## Creating Environmental Technologies

### Cleaner Diesel Exhaust Emissions

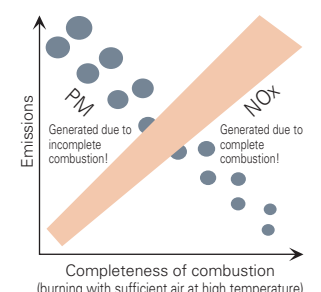
It is difficult to clean diesel exhaust emissions. This is because nitrogen oxides (NOx) are generated due to complete combustion of fuels at high temperatures, whereas particulate matter (PM) is generated due to incomplete combustion at low temperatures, and also because commercial vehicle engines are operated under severe conditions with the engine load changing depending on the amount of cargo they carry.

Isuzu has been able to elucidate the detailed mechanism of generation of NOx and PM in relation to fuel combustion and to establish clean technologies, thus achieving significant reductions in exhaust emissions. These state-of-the-art technologies include a precisely controlled common rail super high-pressure multi-stage fuel injection system per 1/1000 second, synchronized with four intake and exhaust valves for optimal

### Isuzu Diesel Technologies and Expertise



### Correlation of PM and NOx Emissions from Diesel Engines



## Creating Environmental Technologies

combustion, a cooled exhaust gas recirculation (EGR) system, and an oxidation catalytic converter for aftertreatment. The ELF-KR series was equipped with the newly developed engines, meeting the tough new short-term emission regulations in advance.

We are working to achieve cleaner engines by controlling fuel injection at super-high pressures exceeding 200MPa.

Now we are working to develop a new-generation aftertreatment system that combines a urea agent type NOx catalyst and a continuously regenerating diesel particulate filter (DPF) system with a catalyst to significantly reduce particulate matter and black smoke emissions. This system should comply with the tougher exhaust emission regulations (new long-term regulations) to become effective in 2005.

For diesel-electric hybrid vehicles, which are in actual operation, we are working to reduce exhaust emissions and improve fuel efficiency by providing a driving power in the starting and low-speed ranges with a battery and by allowing the vehicle to run on the diesel engine alone in the middle- and high-speed ranges.

### Technologies to Boost Fuel Efficiency and Reduce CO<sub>2</sub> Emissions

With their efficiency in converting fuel into driving power, diesel engines are environmentally friendly as they can obtain 20 to 40% lower CO<sub>2</sub> emissions than in gasoline engines. Isuzu is working to improve the fuel economy of the engine itself as well as that of the vehicle as a package. In fiscal 2002, we introduced the newly developed "Smoother" fully automated transmission in the G, F and E series, which combines the easy operation of automatic transmission and the economy of manual transmission.

#### ● Smoother-G

"Smoother-G" is a 12-speed fully automated mechanical transmission installed in the GIGA series heavy-duty trucks. Shifting is fully automated for starting, changing and stopping. We have also introduced the "Eco Mode" in the "Smoother-G" a shifting mode that is programmed with data from fuel economy consultation we have compiled using the "Mimamori-kun" system. In this mode, shifting is automated to maintain an engine rotation rate that constantly maximizes fuel efficiency, thus enabling fuel-efficient driving, irrespective of the driver's skill. With this new transmission we achieved a remarkable 11% improvement in fuel efficiency compared to the 7-speed manual transmission model. This was accomplished by increasing the number of speeds and reducing the scatter in fuel consumption. With the addition of a speed limiter and other innovations, we achieved an average of 25% improvement in fuel efficiency.

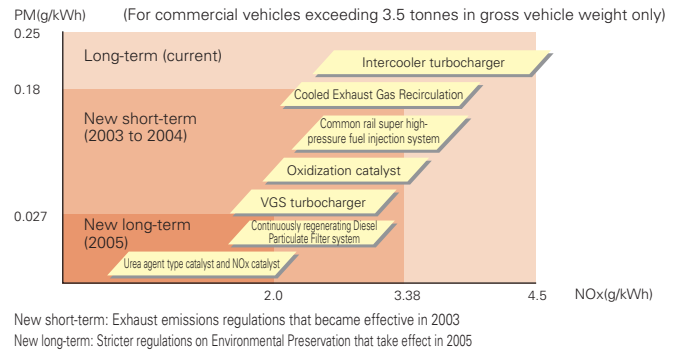
By combining an automatic cruising system and the Smoother-G, we were also able to prevent vehicle speed fluctuations that make fuel efficiency worse; this made a significant contribution to fuel efficiency.

#### ● Smoother-F and -E

With the new "Smoother-F and -E" transmissions, we have eliminated the clutch pedal from the manual transmission, by employing a combination of a fluid coupling and a wet multi-disc clutch. The vehicles equipped with this transmission enables the driver to accurately control the speed by the fluid coupling, while shifting and accelerating in the same manner as with conventional manual transmission vehicles. These vehicles may also be operated by drivers with a license limited to driving with automatic transmissions, so are open to a broad range of vehicle drivers. Because these transmissions allow engine braking and exhaust braking, as with conventional models, speed control on descending slopes is of no concern.

Introduced in the FORWARD medium-duty trucks, the "Smoother-F" has earned a good reputation in the market, and in May 2003, it received the "Technical Innovation Award" in the 53rd annual awards from the Society of Automotive Engineers of Japan. The ELF light-duty trucks are equipped with the "Smoother-E" type, equivalent to the "Smoother-F" in durability and reliability.

### Major Technologies for Complying with Exhaust Emissions Regulations



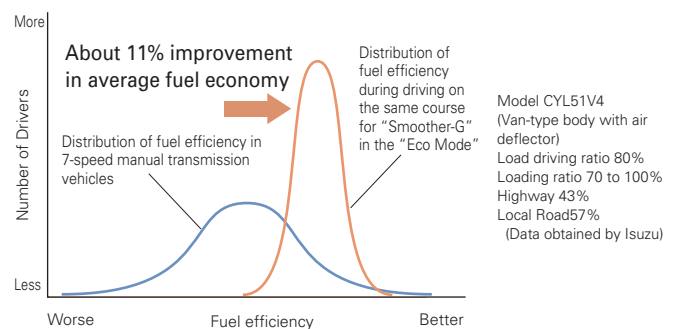
#### Topics

### JSAE Technical Innovation Award

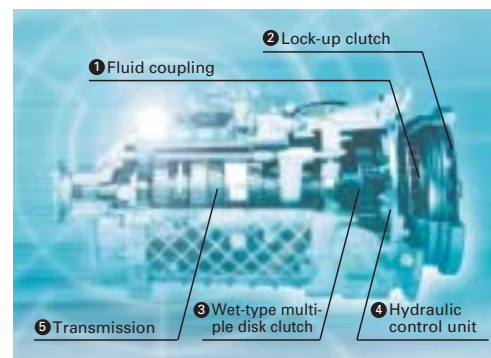


Isuzu's "Smoother-F" received the Technical Innovation Award from the Society of Automotive Engineers of Japan for the 53rd annual awards.

### "Smoother-G" Model Driving Patterns



### "Smoother-E" Transmission Mechanism





## Creating Environmental Technologies

### Development and spread of Clean Energy Vehicles

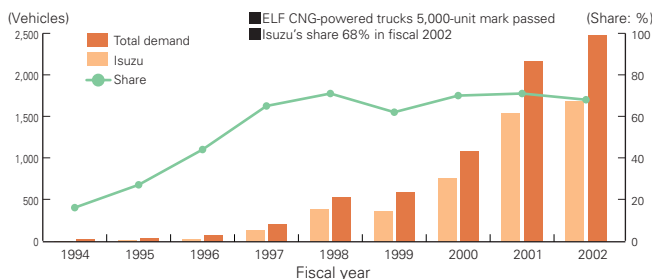
Isuzu is actively carrying out research and development of alternative-energy vehicles to find solutions for the problems of world's dwindling petroleum resources and air pollution in large cities.

We have already developed, and are now manufacturing and selling CNG-powered trucks and buses and LPG-powered trucks.

In recent years, we find that interest is especially growing in CNG-powered vehicles for city transport. Isuzu has started line production of the CNG-powered ELF and FORWARD series in response to growing demand, and has been working to stabilize their quality and reduce prices for further expansion. These trucks have been designated as super low-pollution vehicles by eight Tokyo-area local governments (including the Tokyo Metropolitan Government), demonstrating their outstanding environmental performance.

We are also developing diesel-electric hybrid ELF light-duty trucks to make the most of 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.

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



### CNG-Filling Station "Shonandai Isuzu Eco-Station" Opens

In April 2003, Isuzu began operating "Shonandai Isuzu Eco-Station" the first compressed natural gas filling station to be established in the northern area of Fujisawa City, at a site adjoining the Fujisawa Plant in Kanagawa Prefecture. In response to the growing demands for low-pollution vehicles, the number of owners of CNG-powered vehicles, including local governments, has recently been increasing. The "Shonandai Isuzu Eco-Station" offers plenty of space to ensure easy filling of compressed natural gas, contributing to the convenience of this fuel for nearby local governmental and private customers.



Shonandai Isuzu Eco-Station  
Facility area: 996m<sup>2</sup>  
Filling capacity: 250m<sup>3</sup>/hour



CNG-filling stand

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

#### 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 to have a soundproof structure.

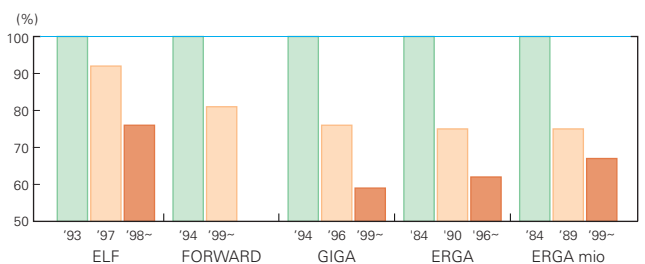
The common rail fuel injection system and sound insulation cover made for a much quieter ELF; engine combustion noise itself was reduced, and idling noise was found to be two decibels lower than previous models.

#### 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 eventually be phased out. Thus, Isuzu has been working to reduce its consumption by 10% compared to 1995 levels, and has been able to achieve a reduction of more than 20% for all of its vehicle models, well beyond the target.

Currently, we are working to develop air conditioners using other refrigerants such as CO<sub>2</sub>.

#### Reducing the Use of Air-conditioner Refrigerant in Each Isuzu Vehicle



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

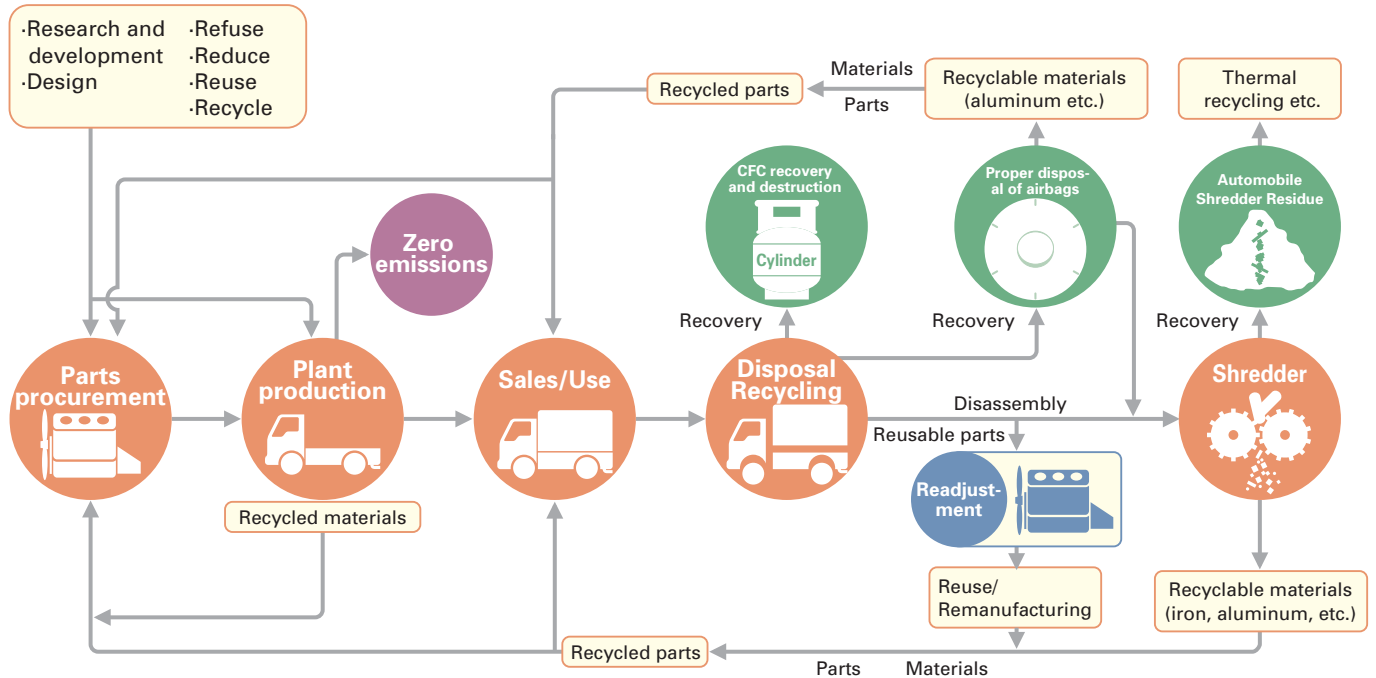
Isuzu is actively working to reduce our use of four major substances: lead, hexavalent chromium, cadmium and mercury. To accomplish the specific goals we established in fiscal 2001 for each model and type of equipment we produce, we are working at a gradual phase-out with the cooperation of our suppliers.

For examples of actual reductions we achieved, please refer to pages 16 and 17; for details of the cooperation our suppliers, please see page 23.

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 new models after January 2005, when the Automobile Recycling Law will go into effect, excluding some lighting equipment and indicator devices.

Recycling Initiatives

Vehicle Life Cycle



Concept of Vehicle Recycling

● Preparing for Complying with the Automobile Recycling Law

In Japan, the basic law concerning the promotion of establishing the recycling-based society went into force in June 2000, the recycled resource use promotion law as amended went into force in April 2001, the CFC recovery and destruction law was formulated in June 2001 (went into force in October 2002 for air conditioners for vehicles), and the automobile recycling law was formulated in July 2002 and will become effective in January 2005. As legislation pays increasing attention to issues relating to recycling, the expectations for manufacturers to respond grow steadily. Isuzu and its group companies are working in preparation for complying with the Automobile Recycling Law. 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, automobile manufacturers face a growing role in addressing this issue. 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. We feel a civic and moral duty to be a company that seriously observes all present and future regulations on vehicle recycling and 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 phases, — and are carrying out research to promote recycling. We will keep a global viewpoint as we study easily-recyclable materials, designs that allow easy dismantling, and the proper processing of the substances released during dismantling and recycling.

Our Voluntary Action Plan

Isuzu has established a voluntary action plan with specific targets and guidelines in compliance with the "Voluntary Action Plan for Vehicle Recycling Initiatives" and the "Reducing the Use of Substances with Environmental Impact — JAMA Voluntary Initiatives," both formulated by the Japan Automobile Manufacturers Association, the EU-ELV Directive, and other regulations. We are working to reduce the use of substances with environmental impact and improve recyclability in new vehicle models, and to promote the proper processing and recycling of vehicles at the end of their lives.

In April 2003, we organized the "Recycle Promotion Group" in the Sales Promotion Dept., in preparation for complying with the Automobile Recycling Law. Its responsibilities include contacting with regulatory authorities, arranging in-house organizations, working with recycling companies, and holding explanatory seminars.

● Improving Recyclability Rates

In fiscal 2001, Isuzu accomplished the goal of boosting the recyclability of new vehicles to over 90% for all vehicles it produced (calculated by Isuzu's independent criteria, on a weight basis) on and after 2002. We will work to achieve further improvements, including improved dismantlability of vehicles and optimization of materials. Our next goal is to boost the recyclability to over 95% for new vehicles by fiscal 2015.

● Reducing the Use of Substances with Environmental Impact

We have formulated a voluntary plan for reducing and phasing-out the use of lead, hexavalent chromium, mercury and cadmium, as well as air conditioner refrigerants, based on the respective targets. We were able to develop an alternative material to replace lead; it is already used in new vehicles and new equipment. In the new 10-tonne model we launched in June 2003, we achieved the 2005 goal of reducing the use of lead in new vehicles to one-third or less of the fiscal 1996 level or less. We will work to achieve further cuts in the use of lead, and to completely phase-out hexavalent chromium, mercury and cadmium.



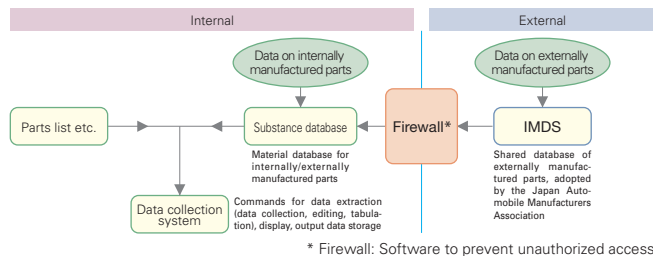
## Recycling Initiatives

### Initiatives at the Research and Development Phase

#### ● Chemical Substance Control System

Isuzu started in 1998 to research the ease of dismantling its vehicles and recycling the materials. 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 removing 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. We also started operating the International Material Data System (IMDS), a globally introduced and operated system developed in Europe, in order to build a database for materials and chemical substances used in vehicle components. This database keeps track of which materials and substances are used in which amounts in each vehicle.

#### ■ Chemical Substance Management System (Future Environmental Management System)



### Initiatives at the Engineering and Manufacturing Phases

#### ● Training Engineers

To facilitate vehicle engineering that ensured easy recycling, Isuzu is providing actual practice training programs for engine and vehicle on vehicle dismantlability and optimization of materials. Isuzu has introduced ISO 14001 to its Engineering departments, and is providing on-the-job training for their members, with an emphasis on vehicle design that enables easy recycling of vehicles, as part of our ISO 14001 environmental management system.

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

We made our internally manufactured components and major externally manufactured components lead-free paint by August 2003. After many cycles of trial-and-error investigations, we were able to develop alternative rust- and weather resistant pigments and top-coat color pigments, with all the appropriate properties. We also repeated a variety of trials to determine the best painting and drying conditions for the painting process. We will complete the shift to lead-free paint, for a totally lead-free product line by the end of 2004. Other initiatives include phasing out the use of lead in battery cable terminals and fuel tanks for the GIGA series heavy-duty trucks and other vehicles, and a shift to cadmium-free wax for brazing of SUS stainless steel pipes in some parts that had required this heavy metal. For vehicles to be released to EU countries, we began using lead-free vinyl chloride or rubber parts and hexavalent chromium-free surface-treated steel plates.

#### ● Developing Applications of Recyclable Materials

Isuzu has expanded the applications of recyclable resins and alternatives for South Sea lumber to vehicle parts. Specific efforts include the collection of used plastic bumpers and waste plastics from the molding process for



Training on Actual Practice

use in wheel well liners, and a shift to steel cargo deck joists. We will go towards shifting to Scandinavian birch lumber and Japanese cypress lumber from thinning as alternatives for South Sea lumber. We believe these initiatives are important in reducing our environmental impacts because the cargo decks of commercial vehicles have traditionally been made of a large volume of South Sea lumber.

### Recycling Initiatives at the Disposal Phase

#### ● Legal Compliance

Following the entry into force of the CFC Recovery and Destruction Law in Japan, starting on 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 entered a subcontracting agreement with the Japan Automobile Recycling Promotion Center. We are working to secure the recovery and destruction of automotive CFCs from our vehicles.

The Automobile Recycling Law, which will go into effect in January 2005, covers airbags and shredder dust, as well as CFCs. We hold explanatory seminars for the concerned companies and in our company. We are making proactive efforts to secure complying with the Automobile Recycling Law and to improve the recycling rate, with relevant issues discussed by experts from individual departments.

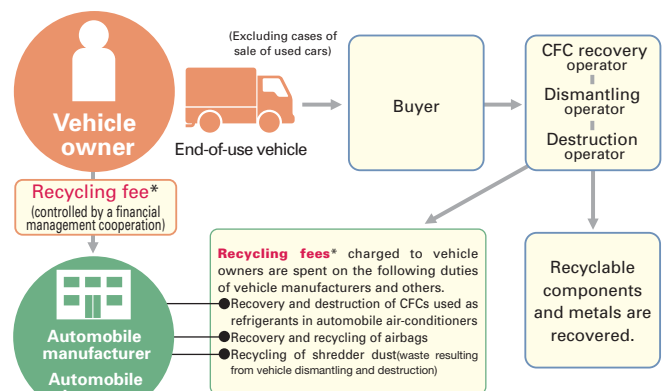
#### ● Initiatives for Reuse and Remanufacturing

To promote the reuse of parts from vehicles at the end of their useful life, our domestic sales division is linked with the domestic dealers through an intranet network called "Remani Net" (Remanufacturing Network). Through this network, we exchange information concerning unnecessary and reusable parts in dealer stock and, in order to use them more efficiently. Items posted to the system range from remanufactured diesel engines to powertrain components and other parts. In fiscal 2002, we sold 433 units of remanufactured diesel engines. We will work to promote its utilization, moving toward being a recycling-based society.



Powertrain components collected for reuse

#### ■ Vehicle Recycling System Complying with the Automobile Recycling Law



Takes responsibility

Sources: Japan's Ministry of Economy, Trade and Industry, and Ministry of the Environment

\* Recycling fees collected are securely managed, with high transparency and public accessibility, at a third party finance management cooperation designated by Japan's national government, until they are spent. As a general rule, the Automobile Recycling Law covers all models of four-wheeled vehicles, including heavy-duty and commercial vehicles such as trucks and buses.

# New Products in 2002

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

## ● GIGA Heavy-Duty Truck Series

- On June 2, 2003, Isuzu launched the new GIGA series heavy-duty trucks equipped with the Smoother-G (see page 14), a fully automatic mechanical transmission that enables energy-efficient shifting. It offers better fuel economy and high economic performance.
- Non-aspirated engines were completely replaced with an intercooler turbo engine that offers high fuel efficiency and low CO<sub>2</sub> emissions. The new engine produces high low-end torque, resulting in significantly improved fuel efficiency and high performance that has not been achieved in conventional turbo engines.
- Basic specifications for the chassis and suspensions have been improved to ensure better rough road performance, reliability and body installation.
- As a result of addition of sound-insulation plates to the engine and transmission and the adoption of a large muffler, the new GIGA series trucks comply with the 2001 noise regulations. The standard speed limiter improves safety.
- Exhaust emissions have been cleaned by introducing a new oxidization catalytic converter and other equipment, clearing the regulated level of 0.18 g/kWh in the new short-term regulations.



GIGA

## ● FORWARD CNG Trucks

- On May 6, 2003, we introduced the FORWARD CNG medium-duty truck series with further improved environmental performance, following the ELF CNG.
- CNG-powered vehicles emit almost no particulate matter or black smoke and are suitable for such purposes as cargo deliveries and garbage collection in cities suffering air pollution.
- By precisely controlling the air-fuel ratio of the 6HA1 engine to maximize the performance of three-way catalytic converter in the engine, the new FORWARD CNG trucks meet the exhaust emissions requirements equivalent to the "super-low exhaust emissions ☆☆☆ (in-house test values)," the strictest of the low exhaust emissions vehicle designation standards of Japan's Ministry of Land and Traffic.
- The FORWARD CNG offers remarkably improved environmental performance with reductions of about 95% in nitrogen oxide (NO<sub>x</sub>), about 70% in carbon monoxide (CO), and about 95% in hydrocarbons (HC), compared to the 1998/99 exhaust emissions regulation standards (NO<sub>x</sub> is reduced by about 80%, CO, by about 40%, and HC, by about 80%, compared to existing CNG-powered vehicles).



FORWARD CNG-Powered Truck

## ● FORWARD Medium-Duty Truck Series

- On December 24, 2002, we introduced the FORWARD medium-duty truck, featuring significantly reduced particulates matter as well as improved driving economy and safety.
- Models equipped with the 6HL1 or 6HH1 non-aspirated engine, which are expected to serve well in urban transport, were equipped with the oxidization catalytic converter to clear the regulated particulate matter (PM) level of 0.18 g/kWh in the new short-term regulations. Use of the converter as standard equipment reduced costs compared to aftertreatment equipment.
- Isuzu's oxidization catalytic converter has been certified by local governments to reduce particulate matter. The new FORWARD series trucks will continue to operate in central Tokyo even after the stricter regulations of the Tokyo Metropolitan Ordinance on Environmental Preservation take effect in 2005.
- For models equipped with non-aspirated engines, an idling stop/start system was made available as optional equipment.
- The 6HK1 turbo-charged engine, which is suitable for medium-distance transport, cleared the regulated particulate matter (PM) level of 0.18 g/kWh in the new short-term regulations.
- The models mounted with the 6HL1 engine were equipped with the new "Smoother-F" clutch pedal-free mechanical transmission as standard equipment to improve driving economy and safety.
- Compliance with the 2001 noise regulations was achieved for all models of this series.



FORWARD

## ● ELF-KR Light-Duty Truck Series

- On June 5, 2002, Isuzu launched the ELF-KR series, the first generation of environmentally friendly trucks in Japan which comply with the new short-term exhaust emission regulations taking effect in 2003 for the first time in Japan.
- Developed with the aim of taking first rank in environmental performance and equipped with a standard oxidization catalytic converter, all new models of the ELF-KR (equipped with newly developed 4HL1 or 4HL1N engine or improved 4HJ1 engine) have been designated as low-pollution vehicles by eight Tokyo-area local governments (including the Tokyo Metropolitan Government) and six Kansai-area local governments (including Osaka.)
- 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. Thanks to the adoption of a common rail super high-pressure fuel injection system and additional sound-insulation plates, external noise, which is a characteristic of diesel engine due to combustion, was significantly reduced.



ELF-KR



# Creating Environmentally Sound Plants

## Policy for Creating Environmentally Sound Plants/Energy Conservation/Effective Use of Resources

### Policy for Creating Environmentally Sound Plants

Vehicle manufacturing has environmental impacts that range from the local area of the plant, all the way up to the global scale. Bearing this in mind, we are based on the policy "think globally, act personally" in creating environmentally sound plants. If we are to be successful in our environmental initiatives, priorities must be based on an accurate grasp of the facts. We also engage in environmental communications with local residents and are strengthening our collaboration with suppliers and customers in Japan and overseas as part of our commitment to "open" plants.

Led by the Plant Environmental Committee, we promoted the initiatives to consider the environment in all manufacturing activities, in order to accomplish our top goals of reducing generated industrial waste, conserving energy and controlling and reducing substances with environmental impact.

### Energy Conservation Initiatives

In our energy conservation efforts, we have given a high priority to both routine activities, including reconsidering the work procedures to avoid air leakage and idling of equipment, and drastic initiatives, including production efficiency improvements by changing manufacturing processes and integrating production lines to accommodate production fluctuations. At our plants, energy conservation committees have had good results using "energy conservation patrols," which identify and rectify areas needing improvement.

In fiscal 2002, CO<sub>2</sub> emissions from our manufacturing activities increased by 7% compared to the previous year, with an actual figure of 197,000 tonnes. This is because our production increased to meet the increased demand. However, we achieved a 55% reduction in CO<sub>2</sub> emissions, more than the numerical target of a 30% reduction.

#### Examples of Successful Initiatives

- Improved production efficiency by integrating production lines and simplifying manufacturing processes
- Avoidance of steam leakage, air leakage, machine idling, etc.
- Installation of inverters on pumps to optimize efficiency
- Reduction of compressor operation loss by changing the lubricant
- Stopping air blows in mechanical washers

### Effective Use of Resources

#### Initiatives for Near-Dry Cutting Process

We spare no efforts to ensure continuous improvement in the reduction of environmental impacts, within the framework of our ISO 14001 environmental management systems in each plant. Examples of these efforts are given below.

In machining plants, cutting lubricant coolants account for a significant percentage of energy and industrial waste at 30% and 60%, respectively. Bearing this fact in mind, we worked to bring into actual application the "Near-Dry Cutting Process based on vegetable oil micro-mist feeding" and achieved remarkable results with optimized machining conditions.

- 1) Significantly reduced cutting lubricant consumption.
- 2) Significantly improved production capacity (cycle time improved by 30% to 80%).

#### Efforts 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 applying the "fracturing split method" to engine connecting rods to eliminate the cutting process and reduce cutting dust.

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

Waste reduction

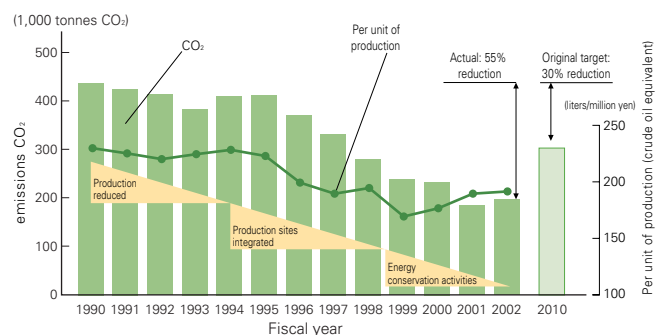
Energy conservation

Control and reduction of substances with environmental impact

Prevention of air and water pollution, compliance with laws

Effective use of resources

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



By these energy saving activities, we have already achieved our energy-related CO<sub>2</sub> emissions reduction target for the year 2010. These achievements include effects of fluctuations of domestic production, as well as the improvements above.

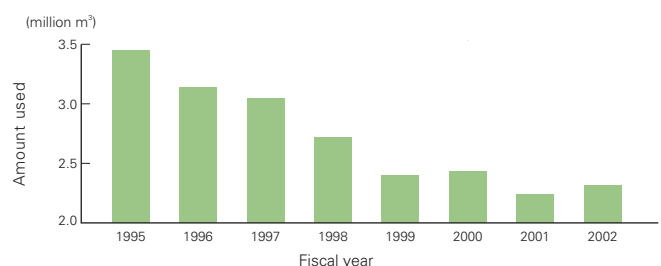
#### Topics

### Receives the Director-General's Award from the Kanto Bureau of Economy, Trade and Industry

Isuzu's Kawasaki Plant received in February 2003 the Director-General's Award from the Kanto Bureau of Economy, Trade and Industry of Japan's Ministry of Economy, Trade and Industry, for energy conservation initiatives. Led by the Plant Environmental Committee, the Kawasaki Plant has been working to conserve energy, and its efforts have produced this result. The Kawasaki Plant also received the Excellent Plant Award in fiscal 2000 and the Best Plant Award in fiscal 2001.



#### Water Usage (Total)



Waste Reduction Initiatives

Zero Emissions: Initiatives Towards Further Improvements

Led by the Plant Environment Committee, Isuzu established the target of reducing waste volume (excluding incinerator ash) sent to landfills by 95% compared to fiscal 1995 levels, by the end of fiscal 2001; the final reduction was 97.6%, which we achieved the target. This was the fruit of proactive efforts by the employees at all plants, starting with sorted collection of waste, and represents an important milestone toward achieving zero emissions.

Always seeking further improvements, we have set a final goal to reduce landfill waste to less than 1 tonne (including incinerator ash) per month, per plant, by the end of fiscal 2005. Future activities will contribute to plant management through approaches to cutting waste disposal costs.

Accomplishments in Fiscal 2002

In fiscal 2002, the starting year for the "Further Improvements" slogan, we worked to reduce waste volume by 1) increasing the percentage of recycled incinerator ash and 2) reducing costs for recycling incinerator ash, in addition to continued efforts that had been made. We were able to reduce the volume of waste going into landfills (including incinerator ash) by about 40% compared to the previous year. The actual figure was about 600 tonnes.

Using the previous index (excluding incinerator ash), the volume of waste going to landfills was reduced by 99% compared to the fiscal 1995 level. Isuzu waste was no more than about 40 tonnes per year.

We have found it is feasible to recycle incinerator ash into road bed materials and other applications.

We are working to increase the percentage of incinerator ash recycled, a key to achieving further improvements for zero emissions. The key issues here are:

- 1) to reduce the volume of waste going into incineration so as to reduce incinerator ash, and
- 2) to seek cost performance of recycling.

Below are examples of our activities in fiscal 2002.

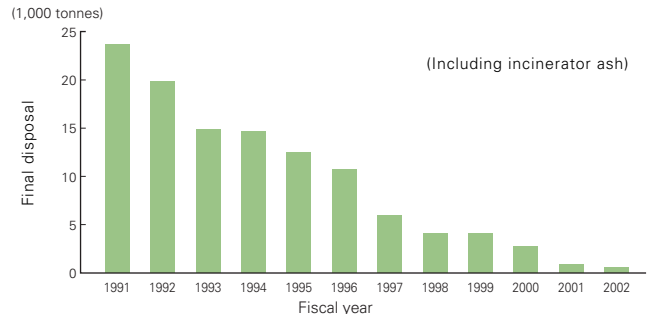
1) Reducing packaging lumber for components that are procured overseas  
 We conducted a survey on the breakdown of industrial waste that goes into incineration, and the departments from which it is generated. This revealed that packaging lumber for components supplied from overseas accounted for the largest percentage. In cooperation with the companies involved in material procurement and logistics, we are achieving a significant reduction in this item by increasing the percentage of internally manufactured parts, changing packaging styles, and changing over to steel crates.

2) We are also working to reduce recycling costs. In one project, we set out to reduce the costs for used of grindstone as a component of concrete. Previously, the recycle cost had been high and we had found few dedicated contractors for handling grindstone. Another problem was that each piece of used grindstone had to be broken into fist-sized pieces with a sledge hammer, in order to lower the unit cost; this is time-consuming and dangerous work, if done manually. We set up one of our unused pressure attachment machines for milling used grindstone for ourselves. This significantly shortened the milling time and secured procedure. The cost for grindstone recycling was decreased to one-third that of the previous process.

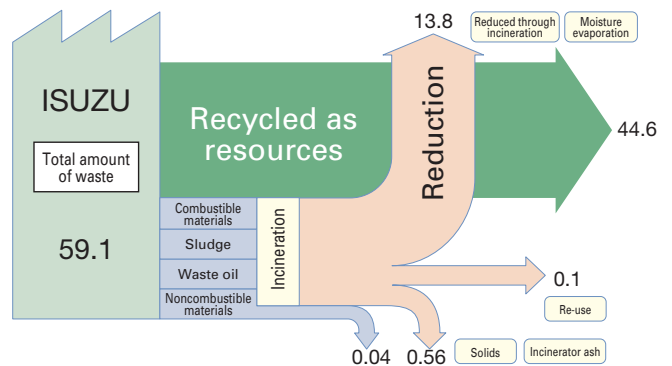


Custom-made milling work bench

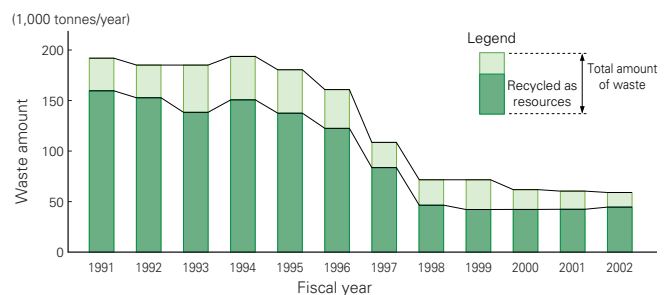
Reductions in Final Waste Disposal from All Plants



Waste Treatment and Disposal for fiscal 2002 (Unit: 1,000 tonnes/year)



Amount of Waste and Recycled Resources



Major initiatives

- Activities to reduce incineration and packaging lumber
- Investigation on incinerator ash recycling
- Activities to reduce recycling costs
- Sorted collection
- Resource-recycling by dismantling and disassembling.
- Adoption of polyethylene bucket collection method
- Acting on employee's suggestions led to the development of new equipment to crush used grindstone
- Sharing strong motivation about zero emissions activities: publishing of "Environmental News", Zero Emissions Reports
- Cooperation with suppliers
- External cooperation: signing "joint environmental declarations" with buyers of waste materials, participation in "Zero Emissions Network".



## Reducing the Use of Substances with Environmental Impact/Preventing Air and Water Pollution

### Reducing the Use of Substances with Environmental Impact

#### Initiatives to Comply with the PRTR Law\*

Although chemical substances significantly contribute to improving production technologies and materials performance, their use involves risks to man and other organisms if they are released into the environment. 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 our own "Management Regulations on Regulated Substances," the target substances are classified into three grades (use prohibited, use conditional, and use with caution acceptable). We are working to properly manage, control and reduce their use, within the environmental management system of each plant. The results from the Fiscal 2002 PRTR Compliance Survey for Isuzu as a whole are shown in the table below, covering five substances. The use of toluene and xylene in the painting process accounts for a major proportion of the chemicals we use. We are working to reduce usage by raising the recovery rate of cleansing thinner and switching to paints that require less thinner.

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

#### Banning the Use of Lead in Paints

In fiscal 2002, we completely phased out the use of lead compounds in paints for our vehicles. The use of electro-deposition coatings containing a lead compound, which are widely used to prevent rust in passenger cars and light-duty trucks sold in Europe, will be banned from July 2005. Electro-deposition coatings for truck frames, in particular, had lagged in shifting to a lead-free coating, since they need to have weather resistance not required for truck bodies. Starting in 1999, Isuzu achieved in 2002 a complete shift to a lead-free electro-deposition coating for truck frames.

#### Results of the Fiscal 2002 PRTR Compliance Survey

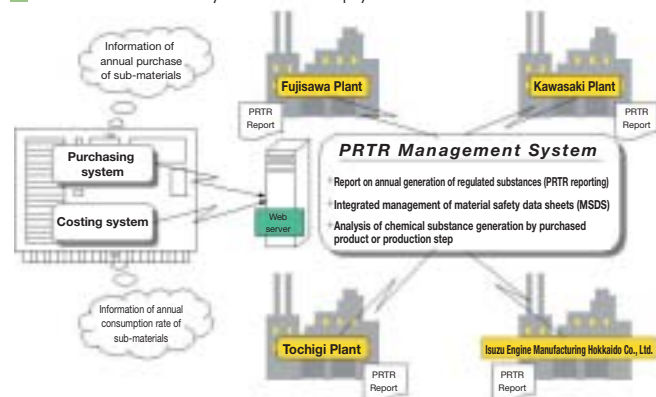
(substances handled in amounts of 5 tonnes or more are listed)

(Unit: kg)

Name of substance	Substance number	Amount handled	Amount released					Amount transferred	
			Air	Public water	Soil	Landfill	Sewage water	Others	
Ethylbenzene	40	145,938	48,000	0	0	0	0	81	
Xylene (isomer mixture)	63	196,819	93,700	0	0	0	0	180	
Ethylene glycol	43	726,453	0	0	0	0	0	8	
Toluene	227	142,074	53,000	0	0	0	0	190	
Dioxins	179	—	170*	0	0	0	0	2,701*	

\* Unit: mg-TEQ

#### Outline of Isuzu's System to Comply with the PRTR Law



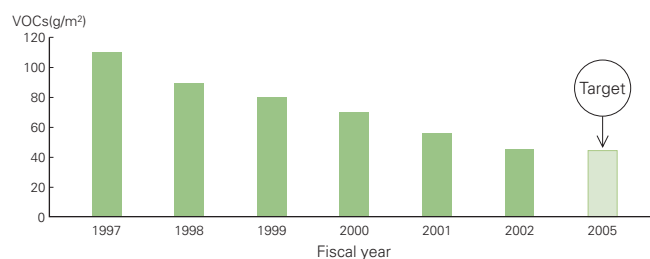
### Preventing Air and Water Pollution

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

VOCs are substances used mainly in the vehicle body painting process. In fiscal 2002, Isuzu's rate of use was 45.4 g/m<sup>2</sup>, representing a 59% reduction compared to the fiscal 1996 level. Our major efforts for their reduction included an improvement of the cleaning thinner recovery rate and the proactive introduction of paints which require less solvent. Since we have already achieved a monthly reduction of 35.3 g/m<sup>2</sup>, we are confident that the target of achieving 45 g/m<sup>2</sup> by the end of fiscal 2005 will be accomplished ahead of time.

We are also working to reduce the use of VOCs in small parts by adopting spray guns of high painting efficiency and improving the skills of painting workers through visual training.

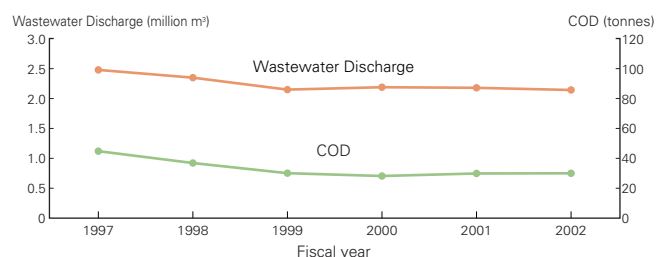
#### Use of VOCs in the Painting Process



#### Air and Water Pollution Prevention

Placing an emphasis on the prevention of air and water pollution in our activities to protect the environment, we have established voluntary targets stricter than the legal regulations. Under our environmental management systems, the statuses of waste management and legal compliance are constantly monitored and reported to the Plant Environmental Committee. While working to meet our targets by multi-focal approaches, we are also endeavoring to reduce the use of harmful substances.

#### Wastewater Discharge and COD\* Levels



\* COD: Chemical oxygen demand

#### Control of Dioxins

Currently three Isuzu plants in Japan are equipped with an incinerator. Two of these have already been shut down, complying with the dioxin emissions regulation standards. In these two plants, we were able to reduce the amount of industrial waste generated, and waste treatment is 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 (10 ng-TEQ/m<sup>3</sup>), with the actual measured value being 1.7 ng-TEQ/m<sup>3</sup>. The plant will make continued efforts, precise control of combustion and reductions of the amount incinerated.

# Activities at Isuzu Engine Manufacturing Hokkaido Co., Ltd.

This report features Isuzu Engine Manufacturing Hokkaido Co., Ltd., which supplies diesel engine components to Isuzu's overseas plants in Europe and the United States.

(Isuzu's Hokkaido Plant became a subsidiary, Isuzu Engine Manufacturing Hokkaido Co., Ltd. in November 2002)



**Kenzo Takami**  
President

Isuzu Engine Manufacturing Hokkaido Co., Ltd.

Appointed as General Manager, Tochigi Plant Manufacturing Dept.; Plant Manager, Tochigi Plant; Plant Manager, Hokkaido Plant; appointed to current position in October 2002.

## ● "Active Plant" to Achieve Good Results

Isuzu's Hokkaido Plant, the predecessor of our company, opened its operation in 1985 as the first of automotive manufacturers' plants to be based in Hokkaido. Currently, we have the initiative in the industrial sector in the Tomakomai district as we manufacture advanced diesel engines for the European and American markets with a large number of employees that have been increased with the growth of our production. This is also true for environmental initiatives. We were quick to be ISO 14001 certified in May 1998. I think these achievements owe everything to our attitude toward an "active plant" that is positive in all aspects of environmental conservation.

## ● Zero Emissions - Landmark of High Productivity

We started our zero emissions efforts in the summer of 2000 and met our initial goal in November 2001. We have also cleared a subsequent goal of waste reduction to one tonne or less (including incinerator ash) per month per plant. All of our employees realize that zero emissions represents a landmark of high productivity, and that efforts to achieve this goal are essential to us as a production base and should lead to business profits.

Some of our efforts for zero emissions are described below.

- Beverage vendors are required to bring back empty bottles and recovery operators are required to collect aluminum and steel cans as valuable resources.
- Electric wire waste, another valuable resource, is collected by recovery operators. The copper and coating are recycled into the bins for scrap metal and for materials to be recycled into signposts, respectively.
- Waste plastics and sludge from wastewater treatment are recycled into cement materials.
- Garbage from the cafeteria and kitchen is mechanically

processed into fertilizer, which is applied to plants in the plant area.

Additionally, we internally manufacture equipment that facilitates the recycling of industrial waste, based on our employees' original ideas. A typical example is a "dokan press". In our company, polishing dust have accounted for a significant percentage of the volume of industrial waste. For it to be recyclable, its moisture content must be reduced to less than 10%, a level that cannot be reached by conventional methods. We have built "dokan press" made of earthen pipe and cylinder which expels enough water to reach the 10% level. Currently, we are able to recycle polishing dust into steel rods for concrete. In addition to "dokan press", our zero emissions know-how is open to the local communities, since we think sharing such information contributes to the establishment of a recycling-based society. To accomplish our numerical targets, we conducted energy conservation efforts, from enhancement of routine management to improvements in production line efficiency, including integration of equipment and production lines. CO<sub>2</sub> emissions in fiscal 2002 decreased by 2.3% compared to the previous year as a result.

## ● Communications with Local Community

Our success in achieving the zero emissions goal resides not only in being an "active plant" but also in our efforts to maintain close communication with the concerned companies, including participation in the Tomakomai Zero Emissions Network. Joining this network, we exchanged environmental information, investigated recycling technologies, and cooperated in waste collection and transport. We have communicated closely with waste disposal operators who have business relationship with us for more than ten years. They understand our zero emission efforts and have signed a joint declaration of environmental conservation.



Our custom-built "dokan press"

## ■ DMAX, Ltd. – A Model Site Overseas

### ● Initiatives at DMAX, Ltd.

DMAX, Ltd., a joint corporation of General Motors and Isuzu based in Moraine, Ohio, The United States, produces 130,000 units annually of a 6.6-liter V8 diesel engine named Duramax 6600 and supplies them to General Motors for installation in full-size pickup trucks. The facilities obtained ISO 14001 certification in July 2002.

We have established our own environmental conservation policy, identified activities with a serious environmental impact in our business operation, and organized a team to grasp the issues of concern. We have made commitments to comply with relevant laws, prevent environmental pollution, and improve our environmental conservation systems, with specific goals and targets set to achieve improvements.

One of our initiatives is to reduce harmful waste. This has spurred us to conduct a broad range of activities and some of our equipment will be re-designed. These activities include uses for recycled lubricant, coolants, corrugated cardboards, rubber products, and plastics from production lines. We are also promoting the sorted collection and reuse of dust from cutting of raw materials. Regarding the use of harmful substances, we are working to begin controlling the use of hexavalent chromium in our 2004 models and achieve complete phasing-out in 2006 models.

ISO 14001 certification represents a result of cooperation of all employees and our proactive initiatives. We will conduct further efforts under the environmental management system, including the re-design of all manufacturing processes, in order to facilitate the reduction and reuse of industrial waste.

Meantime, we are conducting philanthropic activities, including visits to local ele-

mentary and middle schools. In these visits, we teach the children about the environmentally friendly nature of diesel engines and the mechanism by which the engine transmits its driving force.



ISO 14001 certificate



DMAX, Ltd.



**Naotoshi Tsutsumi**  
President

DMAX, Ltd.

Primarily engaged in production technology and manufacturing. Appointed as manager of Manufacturing Dep. IV; manager, Kawasaki Plant; director, Isuzu Motors Ltd.; appointed as president of DMAX, Ltd. in June 2001.



# Environmental Management Systems/Logistics

## Environmental Management Systems/Green Procurement

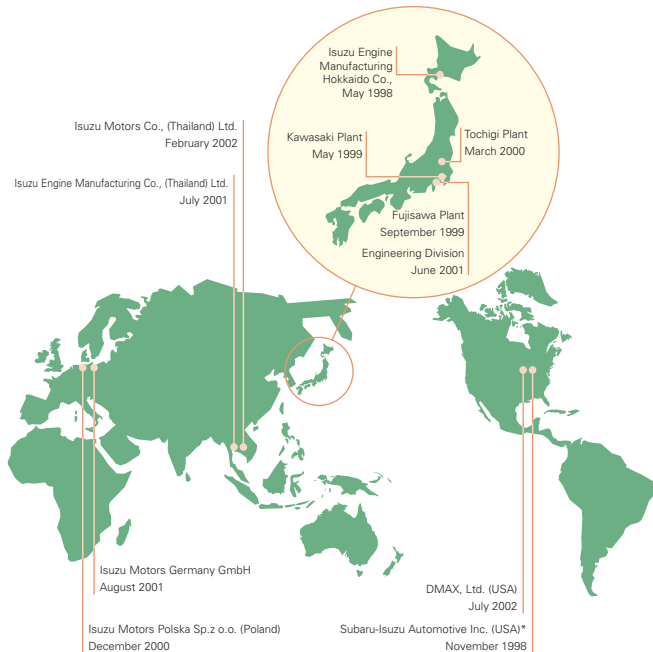
### Establishment and Operation of the Environmental Management System

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 for the engineering division by June 2001.

With the July 2002 certification of DMAX, Ltd., a joint corporation with General Motors, our introduction of environmental management systems in major overseas plants has been completed. For environmental initiatives at DMAX, Ltd, please refer to "DMAX, Ltd.— A Model Site Overseas" on page 22.

We will work to achieve gradual consolidation of environmental management systems in Isuzu group companies in Japan that have manufacturing departments with major environmental impact, as well as sales and service dealers in Japan.

#### ISO 14001-Certified Plants and Divisions



\*Note: On January 1, 2003, joint management with Fuji Heavy Industries Ltd. was liquidated and SIA became Fuji's 100% subsidiary company and changed the name to Subaru of Indiana Automotive, Inc.

### Environmental Audits

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

In fiscal 2002, we were able to secure our environmental management systems while a review for ISO 14001 certification renewal was completed for all the four plants in Japan. 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.



Internal environmental auditor training session

### Compliance with Environmental Laws and Regulations

Isuzu works hard to go beyond merely complying with environmental laws and regulations; we seek 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 a regular basis in each 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 and Suits for Environmental Reasons

In fiscal 2002, there were no environment-related recalls from Isuzu. We have some environmentally related lawsuits under way on the health effects of exhaust emissions. The decision on the first trial of the First Tokyo Air Pollution Lawsuit was made on October 29, 2002. This case is under way in an intermediate appeal. The second and following trials are under way in the first trial.

### Promoting Green Procurement and Responding to EU-ELV Directive

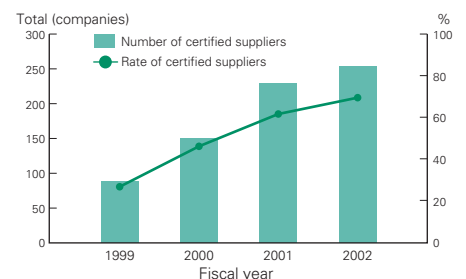
In line with the Isuzu Green Procurement Guidelines we released in November 2000, we hold several types of explanatory seminars for our suppliers. We urge our suppliers to obtain ISO 14001 certification or to establish an equivalent environmental management system which will control and reduce the use of substances with environmental impact.

In fiscal 2002, Isuzu held seminars entitled "Guide to Green Procurement" and "Guide to Isuzu's Policy on Purchasing Materials" in support of 230 suppliers in Japan in July and 122 vendors in Thailand in November. We also responded to the EU-ELV Directive to completely phase out the use of lead, hexavalent chromium, mercury and cadmium on schedule. In addition to the promotion of ISO 14001 certification of our suppliers, we are urging them to promote zero emission activities and to introduce the International Material Data System (IMDS) to comply with the EU-ELV Directive and Japan's Automobile Recycling Law. Currently, 254 of the 366 suppliers are ISO 14001-certified, accounting for 69.4% of the total as of March 2003.



Green procurement explanatory seminar

#### ISO 14001 Certification of Isuzu's Suppliers



### Environmental Efforts in the Logistics Division

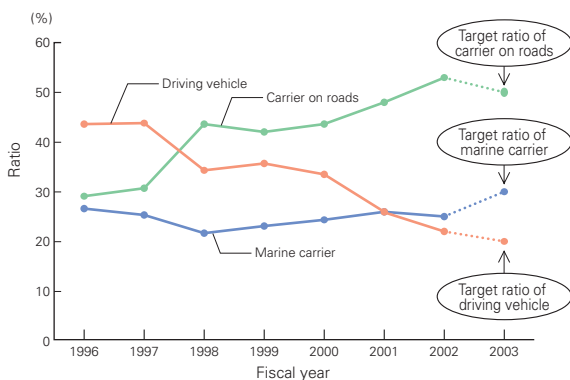
In the Logistics Division, we divide logistics into three forms: vehicles logistics, component logistics and procurement logistics. We conduct environmental efforts according to the respective categories. We are expanding delivery by railways and marine transport to replace deliveries by driving the vehicle, use of returnable packaging materials, and improving transport efficiency. These initiatives are supported by the cooperative activities of Isuzu and its group companies, in order to reduce CO<sub>2</sub> emissions and energy consumption.

### Rationalizing Vehicles Logistics

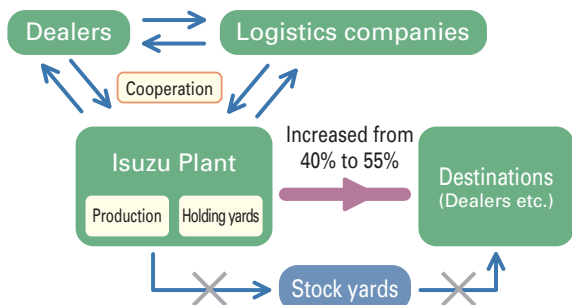
To reduce the CO<sub>2</sub> emissions and energy consumption that arise when we deliver our vehicles for ourselves to the market, we are shifting away from the past practice of driving the actual vehicle, in favor of using car and truck carriers, as well as ocean transport by ship. As a result, we were able to reduce the percentage of deliveries by driving the vehicles for ourselves from 26% in fiscal 2001 to 22% in fiscal 2002. We will continue to work to reduce the ratio to 20% in fiscal 2003.

Isuzu and its group companies are also lessening CO<sub>2</sub> emissions by delivering vehicles directly to our dealers and places specified by our customers rather than transferring them to stockyards for temporary storage. The concerned companies have taken responsibility to aid these more efficient vehicle deliveries by sharing information: dealers transmit advance delivery requests, logistics companies provide unified delivery control, and Isuzu provides information on production and sets aside a special holding yard in each plant. As a result, the ratio of vehicles delivered directly from our plants increased from 40% in 2001 to 55% in 2002 and is expected to exceed 70% this year.

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



#### Improving Efficiency of Vehicle Deliveries (Cooperation of Dealers, Logistics Companies and Isuzu)



### Improving Component Logistics

We transport components for local production overseas. To meet environmental requirements concerning this practice, we are working to reduce the amount of wood used for packaging materials. In fiscal 2002, we focused on those for South America. As a result, the usage of non-wood packaging and packing materials increased to 88% in containerized transport and 68% in returnable/steel case transport, clearing the fiscal 2002 targets of an 80% shift to containerization and a 65% shift to returnable cases/steel cases. In fiscal 2003, we will focus on logistics for China. Consequently, shift to containerization and returnable cases/steel cases will be completed for major destinations.

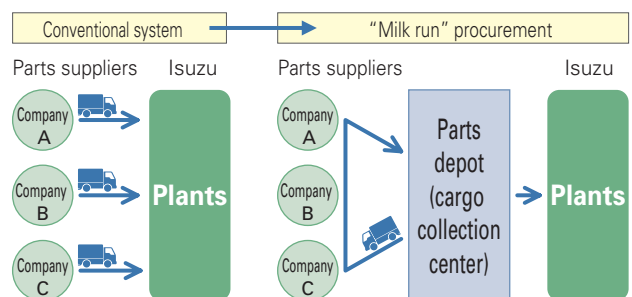
#### Promotion of Containerization and Returnable Cases/Steel Cases for Packaging Materials



### Improving Procurement Logistics

In the conventional practice, parts manufacturers deliver components separately to the plants of their customers such as Isuzu. In 1995, Isuzu became Japan's first vehicle automobile manufacturer to introduce the "milk run" system for procurement logistics. In this system, the parts purchaser collects cargoes using its own fleet of trucks. We have steadily expanded the milk run system since 1995, and today, it is used for 80% of our parts suppliers in the Kanto district. It allows improvement of the cargo loading efficiency for delivery vehicles and efficient control of the number of vehicles used, thus significantly reducing CO<sub>2</sub> emissions and energy consumption. Our manufacturing environment is undergoing a sweeping change: vehicle models, production volume, manufacturing site integration and relocation. Against this background, we will appropriately adjust the use of the "milk run" system to meet environmental requirements for procurement logistics.

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





# Community and Social Relations

## Environmental Communications with Customers

### Providing Diagnostic Information on Vehicles in Operation and Recommending Appropriate Ways to Respond to New Regulations

The diesel-powered vehicles currently in operation are subject to regulations stipulated by Japan's Automobile NO<sub>x</sub>/PM Law and local governmental regulations such as the Tokyo Metropolitan Ordinance on Environmental Preservation. Consequently, operation of our customers' vehicles should be prohibited in some districts. In June 2002 we started a free consultation service using our diagnostic system for the influence of exhaust emissions regulations. With the system the "Eco Solution Plan", we provide our customers with a summary of recommendations about the possible influence of the regulations and the most appropriate action to take. In line with this plan, we provide diagnostic information about the influence of the new exhaust emissions regulations and recommend actions on a vehicle-by-vehicle basis.

- 1) We provide diagnostic information about the time the regulation goes into effect, whether the vehicle can be operated over the user's desired period, and the equipment necessary to reduce particulate matter.
- 2) We recommend the optimum timing of vehicle replacement and provide information on costs relating to the exhaust emissions regulations.

We also prepare reports to our customers to hand out to the other companies they do business with. Our reports explain ideas for ways to reduce vehicles' environmental impact. This is another part of our response to the social demand for green procurement.

In September 2002, we started providing this service on our website. By the end of June 2003, we had diagnosed about 200,000 vehicles of 6,000 companies and made due recommendations. They exhibited favorable responses, including "what equipment should this vehicle be equipped with?" and "We heard that it is the best way to ask Isuzu for information on exhaust emissions and the regulations."

[www.isuzu.co.jp/cv/](http://www.isuzu.co.jp/cv/)



Website screen for determination of effects concerning Japan's Automobile NO<sub>x</sub> and PM Control Law and the Tokyo Metropolitan Ordinance



Website screen for simulation of exhaust emissions reduction

### Supporting Fuel-Efficient and Safe Driving for Heavy-Duty Trucks

In January 2002, we started the operation of the "Mimamori-kun" next generation vehicle diagnostic system for the GIGA heavy-duty truck series. A range of driving data from on-board monitoring equipment is 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.

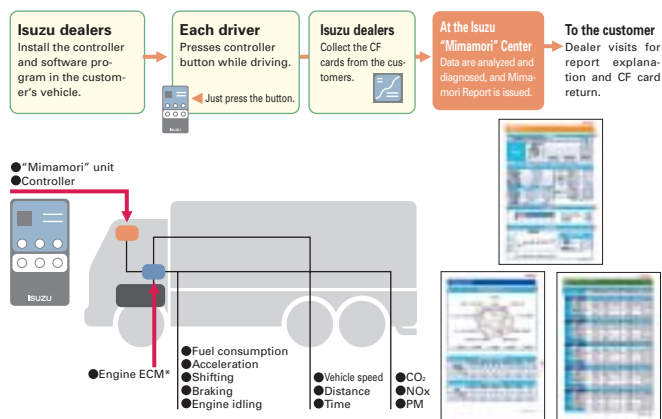
This system collects precise driving data from the engine control computer and analyzes it by vehicle operator, by cargo owner and by driving route, thus providing information on vehicle operation by each driver, detailed transportation cost data, and environmental data, including CO<sub>2</sub> emissions.

Several advantages were realized as a result of inauguration of this system, including 1) fuel consumption reductions thanks to advice on vehicle speed, shift-up engine RPM and gear shifting, 2) promotion of safe driving by suppression of maximum speed and decrease in frequency of hard acceleration and deceleration, and

3) vehicle life extension and repair cost reductions due to fuel-efficient and safe driving and by vehicle usage planning based on actual fleet operating data.

This system was operating on about 600 GIGA series trucks at the end of March 2003. Customers reported an average reduction of 15% in fuel consumption and highly appreciated this service. They also reported that significant improvements in safe driving aspects were achieved, including reduced average vehicle speeds during high-speed driving and decreased frequency of hard braking.

#### Flowchart of "Mimamori-kun" System



\* ECM: Engine Control Module

### Driving Seminar to Improve Fuel Efficiency

Isuzu has sponsored driver training sessions since 1996, in order to promote fuel-efficient and safe driving. Currently, we are providing driver training sessions called the Isuzu Environmental Seminar in Hokkaido Driving Session or the Delivery and Safety Driving Seminar using actual vehicles, for the participants to learn knowledge and skills for fuel-efficient and high-quality transportation. In fiscal 2002, a total of 688 participants from 628 companies joined the sessions. We also provide the Fuel-Efficient Driving Session to teach fuel-efficient driving. Our overseas efforts for driver training are also highly appreciated. These include the Fuel-Efficient Driving Contest, sponsored by Tri Petch Isuzu Dealer of Thailand, and the Fuel-Efficient Driving Competition, sponsored by P.T. Pantja Motor of Indonesia.



Economy Driving Session

### Operations at the Isuzu Customer Center

In 1979 Isuzu opened the Customer Center to ensure direct communication with our customers. We systematically respond to comments and inquiries from customers and feed them back on our sales, development and other departments. We also provide information on frequently asked questions from customers and children on our website. We are endeavoring to answer their questions about exhaust emissions regulations accurately and sincerely, as public concern about exhaust has increased in recent years. Our service is earning a favorable reputation for the simplicity and clarity of explanations.

#### Isuzu Customer Center

<http://www.isuzu.co.jp/inquiry/>

TEL: 0120-119113 (toll free throughout Japan)

Service available from 9:00 to 17:00 on Monday to Friday (excluding national holidays and days specified by Isuzu.)

## Environmental Communications with Society

### Policy of Information Disclosure

We encourage active participation in society and in environmental preservation, as advocated in the Isuzu Charter on the Global Environment, established in 1992: "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" (see page 9).

To this end, we are working to promote employees' environmental communication with our customers and society. We also provide a wide range of information on our environmental activities through various media and events.

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



Isuzu website

### Providing Information through Environmental Reports and Educational Booklets

Isuzu started publishing environmental reports in 1999 to help people to understand our environmental initiatives. We were Japan's first commercial vehicle manufacturer to publish such reports, and this fiscal 2003 edition is our fifth 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.

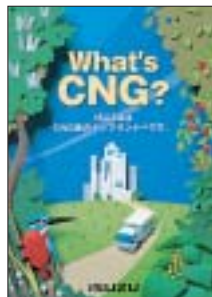
We have published "Diesel Seminar" booklet, which aim to promote a better understanding of diesel engines among the general public. We have also published "ISUZU Clean Diesel Engines" in English, which aims at promoting awareness about diesel engines worldwide, and "What's CNG?" in Japanese to answer questions about CNG-powered vehicles.



Diesel Seminar



ISUZU Clean Diesel Engines



What's CNG?

### Participating in Events and Exhibitions

Isuzu participates in a range of events and exhibitions. For example, in the Eco-Products 2002 exhibition we exhibited ELF KR series trucks, the particulate matter (PM) oxidization catalytic converter, and other products. Visitors to our booth were interested in Isuzu's environmental technologies, where the ELF KR series met high approbation.

In the Technology for Man and Vehicles Exhibition 2002, Isuzu exhibited the 4HL1 engine for ELF KR trucks, the "Smoother-F" and "Smoother-G" transmissions, technology for next-generation super clean diesel engines, etc., attracting many of the people who visited the exhibition.



Eco-Products 2002 Exhibition



Technology for Man and Vehicles Exhibition 2002

### Support for National South Pole Expeditions

In Antarctica, observations are made to clarify global environmental changes such as the ozone hole and global warming, as well as to investigate the actual status and mechanism of global phenomena, including auroras and meteorites. Isuzu has provided its engineers to support equipment installation and maintenance in national observational expeditions at the South Pole, since the first expedition by Japan in 1956 through the forty-fourth expedition in 2002. Our engineers support observations of the global environment in a range of duties, including maintenance of the diesel engines for vehicles and for base power generation, and maintenance and checking of the lifeline of the base.



Machinery Group Members of the Forty-third Expedition

### Environmental Communication and Contributions to Society at Individual Plants

Isuzu conducts proactive efforts to protect the environment in society and living communities, and is involved in a variety of initiatives mainly around each plant.

#### Major Environmental Communication and Contributions to Society at Each Plant in Fiscal 2002

Plant	Events/Projects	Implemented
Fujiwara Plant	2002 Fujiwara Environmental Fair	June 2002
	Clean-up of area around plant	Monthly
Kawasaki Plant	Clean-up of employee commuter roads, Tama River promenade, and Route 409	1 ~ 3' /month
	Issuance of "Environmental News," "Zero Emissions Bulletin" and "Saving-Energy News"	June and July, 2002
	Environmental suggestions campaign, plant manager's awards	June and July, 2002
	Received "Kanto Economic and Industrial Bureau Director-General Award for Efficient Use of Electricity"	February 2003
Tochigi Plant	With welfare facility of Ohira Town: Collecting, donating collected cans; assistance to the disabled	1 ~ 2' /month
	With welfare facility of Ohira Town: Cleaning uniforms, boots for reuse by seasonal employees	April 2003
	"Clean-up activities" in local community	June 2002
	Environmental suggestions campaign, in-house awards	June 2002
Isuzu Engine Manufacturing Hokkaido Co., Ltd. (Isuzu subsidiary in November 2002)	Clean-up of roads around plant	As appropriate
	Tomakomai City Tree Planting Festival, planted 200 fir trees	May 2002
	Tomakomai City Zero Emissions Network	7' / year
	Environmental Protection Partner Forum"	February 2003



2002 Fujiwara Environmental Fair



Aluminum cans collected once or twice every month and donated to a welfare facility for people with disabilities of Ohira Town.

## 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 we promote three themes to personnel: "Preventing Industrial Accidents, Traffic Accidents and Fires", "Improve the Work Environment" and "Promote Health." We pay particular attention to safety to prevent industrial accidents based on the case studies of accidents.



Isuzu's safety and health philosophy

### Key Issues and Actual Efforts

Key Issues	Efforts
Prevention of industrial accidents	<ul style="list-style-type: none"> <li>Observing safety rules and mandated follow-up</li> <li>Verification of actual practice against standard operating procedures</li> <li>Raising awareness about non-routine operations</li> <li>Providing safety instructions and reviewing traffic signs for operation of in-plant vehicles</li> <li>Reporting manufacturing equipment accidents to all employees and sharing information on preventive measures</li> </ul>
Fire prevention	<ul style="list-style-type: none"> <li>Eliminating potential sources of fires</li> <li>Strengthening of painting plant management system and "buddy" patrol</li> <li>Company-wide improvements based on lessons from past fire incidents</li> <li>Strengthening of daily inspections and review of warning signs posted at facilities storing dangerous substances</li> </ul>
Improving workplace environment	<ul style="list-style-type: none"> <li>Environmental assessments and improvements at start-up of new or relocated production lines</li> <li>Systematic implementation of suggestions and requests from workplaces</li> </ul>
Prevention of traffic accidents	<ul style="list-style-type: none"> <li>Reporting of traffic accidents throughout company, sharing information on preventive measures, and providing safety instructions</li> <li>Review of individual commuter route</li> <li>Variety of traffic safety education</li> <li>Seatbelt checks, patrolling employee parking lots</li> </ul>
Promotion of employee health	<ul style="list-style-type: none"> <li>Physical and mental health programs</li> <li>Medical checkups</li> <li>Health guidance programs by industrial doctors and public health nurses</li> <li>Hygiene lectures by outside experts</li> </ul>

### Promoting Total Health

We are promoting "Total Health" management programs, with an emphasis on the prevention of lifestyle-related diseases, to ensure fulfilling daily lives for our own employees and their families. The "Physical Health" program offers about 10 hiking tours annually for employees and their families, including strawberry-picking tours and other seasonal events. This program was highly appreciated by the participants, and we will continue the program. Also offered is the "Challenge Courses" program on the themes of exercise, no-smoking, dietary life and no-alcohol days, which aims at improving daily life styles based on self-management of health based on individual goals.

In the other "Mental Health" program, specialists offer free counseling services for employees and their families. In fiscal 2002, the "Isuzu Healthy Dial" hotline was opened to provide an everyday service for telephone counseling by experienced staff concerning health, disease, caregiving, medical treatment, welfare and other issues for troubled employees and families.

### Activities of the Health Promotion Center

Key Issues and Activities		Implementation
Prevention of lifestyle-related diseases	Seminars	Diabetes, osteoporosis, obesity prevention, hyperlipemia, dental health, lecture meetings (one event each in the year)
Lifestyle improvements	"Challenge courses"	Quitting smoking, exercise, dietary habits, and no-alcohol days (each event once each year)
Life plan	Seminars	Life planning seminar, 6 events during the year
Mental health	Counseling etc.	Available throughout the year
Recreational activities	Hiking	Nearly every month (10 times during the year)



Picking strawberries in hiking tour in March 2003

### Employees' Voluntary Activities: USE21

Workers of Engineering division have organized the USE21 voluntary working group, with the aim of preventing fires and industrial, traffic and other accidents to ensure safe and pleasant workplaces, and of fostering young workers and improving product quality and production skills. They are actively working in different sub-groups.

The Accident Prevention Subgroup offers a variety of educational programs with lectures and drills, including first-aid lectures, safe-driving lectures and training sessions 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. Activities of the USE21 group include nurturing many first-aid instructors and staff. Aiming at enhancing first-aid skills and awareness, group members have every year participated in a first-aid competition sponsored by Kanagawa Prefecture, with high-rank prize winners turning out in great numbers.



Drill at USE21 first-aid class



## Personnel Management/Employee Training

### Our Approach to Personnel Management

The growth and development of a company depends on its people. Aware that human resources are our most important asset, we at Isuzu believe we cannot fulfill our corporate philosophy "We contribute to society by providing products and services that satisfy our customers worldwide, and evolve ourselves as a company that is friendly to man" unless the workers who make the products are top-notch. As the process of globalization continues, each employee must motivate himself or herself, maximize his individual capabilities and realize his potential. This is the only way in which Isuzu will become a company that grows with its customers. We will develop and provide technologies, products and services that contribute to the creation of a pleasant planet and a rich society.

We will conduct a broad range of efforts to establish a personnel management system that ensures safe and sound workplaces where all employees can work actively to maximize their individual capabilities and contribute to the development of the company and society.

### Employee Training

We are aware that human resources are our most important asset. We have worked to develop a company-wide employee education system that complies with the ISO/QS 9000 standards. Technical education and language training are provided for personnel at all levels, from newly recruited employees to seniors, 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 foster younger employees with well designed plans to help them acquire and improve basic skills. These skills are assessed using our own testing system. We also provide programs for education by our most competent employees to others.

#### Key Issues and Actual Efforts

Key Issues	Actual Efforts
Training for young employees	We help improve the capability of each employee with an emphasis on self-awareness. For likely employees and young employees who have worked for Isuzu for up to five years, we provide education and training to help them acquire basic business skills and motivate themselves. Our goal is to "make learning a custom".
Provide training to nurture self-motivating employees	Support opportunities for each of the employees to consider their careers, to nurture self-motivating employees.
Provide training for each position	Support learning of skills needed to meet the demands of individual roles and situations facing leaders in OJT programs and supervisors.
Provide training in line with global trends	Support English language skills (reading, writing, speaking) and establish a system for studying abroad to help employees to acquire skills useful in international business.
Raise self-awareness	Support self-awareness raising for each employee to improve their skills and enhance their capabilities by correspondence courses, English conversation classes, etc.

### Initiatives for Gender Equity in Employment

Isuzu endeavors to reform and operate its employment system to comply with the relevant laws as revised, and has no gender inequity in recruiting, training and treatment of employees.

Isuzu actively recruits highly motivated and talented persons, irrespective of gender, to help us meet the demands of a globalizing society, including those in managerial positions and posts overseas. We will continue to work to create sound workplaces where all employees can work comfortably.

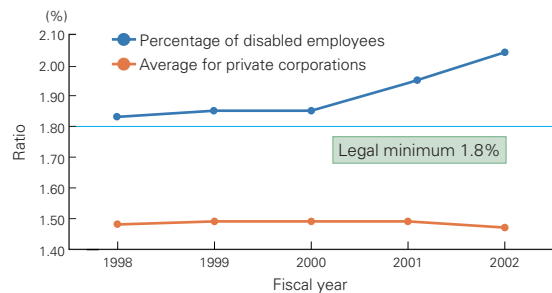
### Initiatives for Employment of Persons with Disabilities

The Isuzu Charter on the Global Environment encourages active participation in society and in environmental preservation as a citizen of this planet (see page 9). This philosophy also includes the concept of "normalization," or creating a society where all persons, whether with disabilities or not, can live actively and comfortably in communities to enable their active participation 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 and the average for private corporations.

Specifically, Isuzu also supports an internship system by a school for the deaf by accepting one or two students for workplace experience every August. Isuzu is also working to help disabled employees work in the company for on a long-term basis, mainly by on-the-job training programs. One Isuzu employee received the Tokyo Governor's Award for workers with disabilities and was hired for long-term employment in 2000. Two disabled employees received the Excellent Worker's Award in 2001. We will continue our company-wide efforts to ensure that our workplace environment is friendly for employees.

#### Employment Ratio of Persons with Disabilities



### Supporting Employees' "Second Life"

Isuzu holds every year life planning seminars for its employees who have inquiries or questions about their life planning to ensure a better quality of life during their mature years.

- 1) "Second life" Seminar I  
Provides programs essential for employees who have reached 50 years in age to ensure good second life.
- 2) "Second life" Seminar II  
Provides more specific and practical programs for employees who have reached 58 years to ensure good second life.

\* Both seminars are mainly programmed for couples (employee can participate only by him/herself), with extensive lectures provided by experts.

# Messages from Readers



## Takehiko Murayama

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

You have made further advances in your environmental conservation activities, such as the development of new vehicles with reduced environmental impact, obtainment and renewal of ISO 14001 certification, and promotion of environmental protection in manufacturing and logistics. I especially appreciate your company-wide zero emissions efforts. Although you accomplished nearly all the previous year's environmental goals, I encourage you to establish more specific targets, even if they seem difficult to accomplish. I hope you will incorporate the average environmental impact per unit of production. I would appreciate it if you work to make the time course of your environmental activities more easily understandable by presenting environmental data in a more convenient way in comparison with environmental impact data obtained in the past, and by constantly renewing PRTR data. Please include the total environmental impacts resulting from the use of your products sold.



## Yohko Hagi

Principal Lecturer of  
an ISO Training Organization

Associate/principal consultant, L.M.J. Japan K.K.  
Representative of Sapphire Corporation

In fiscal 2002, you achieved remarkable results by accomplishing all numerical targets for the year. I imagine you encountered difficulties in protecting the environment while maintaining the high quality of your products in your efforts to reduce the use of substances with environmental impact. I hope that you will make further efforts to completely phase out the three harmful substances, cadmium, mercury and hexavalent chromium on schedule. I also appreciate your achievement in bringing near-dry processing into actual application in the machining plants, from the viewpoint of both environmental conservation and product quality. I pay much attention to the benefits that resulted from the process improvement. I think the Global Environment Committee and other committees are functioning well in your business activities. You will enjoy true benefits from your ISO management systems, as long as your activities to conserve the environment are integrated with your production activities. I encourage you to raise all employees' awareness about this.



## Masakatsu Iwasa

Representative Director  
Tokyo Jyonan Environmental Counselors' Association  
(designated non-profitable organization)  
Technical Advisor to Kanagawa Prefecture

In fiscal 2002, you constantly worked and achieved good results under severe business circumstances, such as the promotion of clean energy vehicles and improved fuel efficiency. You have reached a milestone showing the public the environmental potential of Isuzu as a leading manufacturer of commercial vehicles a core means of logistics. Your environmental activities are maturing and this Environmental Report demonstrates that you have accomplished difficult numerical targets on total environmental impacts at each plant. I especially appreciate your improvements such as increased recycling ratios of total waste volume. It is important that results of this kind should be achieved in the future. Thanks to the recent trends in social consciousness, business is required to make further advances in its activities to protect the environment and suppliers, including those overseas. I hope you, as a key global player, will continue to be an industry leader on environmental issues.



## Akihiko Tsuyama

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

I highly appreciate your further progress since last year, in areas such as the development of technologies with reduced environmental impact and the reduction in volume of waste going to landfills. I think that vehicle manufacturers will be urged to significantly conserve energy to stop global warming. Because sustainable society is based on recycling-oriented local communities, you must consider a shift in business mode for transport services among regions. This will reduce the total energy consumption for cargo transport. I also think a conceptual turnover in advance of the times is necessary to make industry more environmentally friendly. These efforts would include development and utilization of naturally occurring materials that are easily recyclable and disposable.

## ● In Response to the Messages from Readers

Points raised in the readers' comments in last year's report included the promotion of efforts for Isuzu as a manufacturer of commercial vehicles with significant environmental impact and as a key player in global environmental conservation to develop clean diesel engines and to reduce the use of substances that have environmental impact.

Following the launch of the ELF KR series light-duty trucks, which achieved "clean exhaust emissions," in fiscal 2002 we developed and released the GIGA series heavy-duty trucks, equipped with the Smoother-G transmission to significantly reduce fuel consumption, taking the initiative in creating envi-

ronmentally friendly vehicles. We also worked proactively to promote the environmental conservation activities of our customers by developing the "Mimamori-kun" vehicle diagnostic system, which analyzes a range of driving data from our customers in order to provide diagnostic information and recommend appropriate ways to reduce fuel consumption and drive more safely.

In this year's report, we are receiving valuable comments from the readers on our achievements in fiscal 2002, and are expected to make further advances. We will continue to make company-wide efforts in fiscal 2003.

## Editors

- Creating Environmentally Sound Products  
Masami Niikura and Yutaka Ono, Engineering Planning Dept.  
Kazuyoshi Suzuki, Sales Promotion Dept.
- Creating Environmentally Sound Plants  
Tamotsu Shigefuji, Vehicle Manufacturing Preparation Dept.
- Community and Social Relations  
Yasuomi Inoyama, General Affairs and Human Resources Dept.
- Highlights and Secretariat  
Takashi Kanazawa and Masao Konagai,  
Program Management Dept.

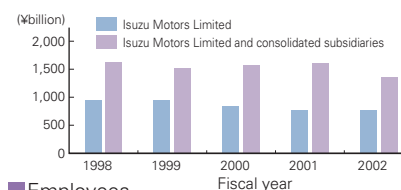
# Corporate Outline and Environmental Accounting

## Corporate Outline

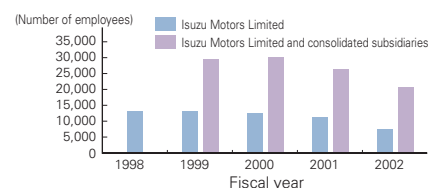
### Isuzu Motors Limited

President : Yoshinori Ida  
 Headquartered at : 6-26-1 Minami-oi, Shinagawa-ku, Tokyo 140-8722 Japan  
 Established : April 9, 1937  
 Capital : ¥ 55.5 billion (as of March 31, 2003)  
 Business Operations : Manufacture, sales and service of motor vehicles, internal combustion engines, and their parts  
 Sales : ¥760.6 billion for Isuzu Motors Limited, ¥1,349.4 billion for Isuzu Motors Limited and consolidated subsidiaries (for the period ended March 2003)  
 Ordinary Profit : ¥4.8 billion for Isuzu Motors Limited, ¥ -4.2 billion for Isuzu Motors Limited and consolidated subsidiaries (for the period ended March 2003)  
 Number of vehicles sold : 232,864 (59,723 sold in Japan, 173,141 exported) (for the period ended March 2003)  
 Product Lineup : Heavy to light-duty trucks, buses, sport-utility vehicles, engines and components  
 Employees : 7,634 for Isuzu Motors Limited, 20,690 for Isuzu Motors Limited and consolidated subsidiaries (as of March 31, 2003)  
 Offices and Plants : Head office, Fujisawa Plant, Tochigi Plant, Kawasaki Plant

### Sales



### Employees



## Environmental Accounting

### Environmental Accounting for Fiscal 2002

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 our customers and shareholders through Isuzu Environmental Reports, and to assist management decisions that will help us accomplish our environmental objectives and goals. Our next step in this process will be to improve the accuracy of environmental accounting and the range of costs and effects covered by reporting.

#### Costs for Environmental Protection

In fiscal 2002, the total expenditures for personnel management, production costs and investments for equipment relating to environmental protection amounted to 17.4 billion

yen. Of this, 16.4 billion yen was spent for research and development, including measures taken to meet exhaust emissions regulations (calculated on a cash-flow basis). These costs were calculated with reference to the Environmental Reporting Guidelines issued by Japan's Ministry of the Environment. For composite costs, including costs used for purposes other than environmental protection, calculations have been made on a proportional basis.

#### Effects of Environmental Protection

CO<sub>2</sub> emissions and water consumption increased as production increased. However, we were able to steadily reduce waste disposal, in terms of both volume and treatment costs. We were also able to reduce expenditures for the sum of tap water, sewage water and industrial water, by minimizing the consumption of tap water.

#### Costs for Environmental Protection

(Units: million yen)

Category	Description of major efforts	Amount
1) Business area costs:	Wastewater treatment, incinerator combustion aid gas, maintenance of anti-pollution equipment	
Pollution prevention	Improvement of energy efficiency	205
Global environmental protection	Waste reduction activities	9
Resource circulation		337
2) Upstream/downstream costs	Adoption of weight management system for substances subject to recycling rate regulations	98
3) Management activity costs	ISO 14001 certification renewal, environmental education, personnel costs, etc.	229
4) Research and development costs	Research and development of products with reduced environmental impact, compliance with new short-term exhaust emission regulations, etc.	16,367
5) Social activity costs	Social contributions, support of environmental activities	155
6) Environmental damage costs	Penalties for polluting loads, litigation costs, etc.	49
Total costs for environmental protection		17,439

#### Effects of Environmental Protection

##### Cost Reduction Effects

(Units: million yen)

Cost reduction by energy conservation	227
Reduction in waste treatment costs	33
Reduction in tap water, sewage water and industrial water consumption	13
<b>Total</b>	<b>273</b>

##### Physical Effects

CO <sub>2</sub> emissions	13,000 tonnes (increased)
Waste disposal	390 tonnes
Water consumption	80,000 m <sup>3</sup> (increased)

## Editorial Policy, Scope of Report and Period Covered

#### Editorial Policy

The Isuzu Environmental Report 2003 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 progress in these topics: (1) Our management's approach to the environment; (2) Isuzu's efforts to produce environmentally friendly vehicles; and (3) the development of the ELF-KR light duty truck series, which has earned high appreciation for its environmental performance. Our first Environmental Report was published in fiscal 1999; this report represents the fifth 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. Although the Hokkaido Plant became Isuzu's subsidiary on November 1, 2002 to Isuzu Engine Manufacturing Hokkaido Co., Ltd., it is still included in the scope of this company's Report.

#### Period Covered

The data used are for fiscal 2002; April 1, 2002 - March 31, 2003. Information on activities includes periods before and after fiscal 2002.





**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 with highly biodegradable soy ink for easy recycling.

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

## Environmental Report 2003

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Eco Planning Group

Program Management Dept.

ISUZU MOTORS LIMITED

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Tel: +81-3-5471-1394 Fax: +81-3-5471-1039

[www.isuzu.co.jp/world/](http://www.isuzu.co.jp/world/)

Published November 2003

# Environmental Data by Plant

Following table shows the air and water quality data for each plant and a comparison to regulated standards. These figures are amounts of actual measurement.

## ● Fujisawa Plant

### Air Quality

Item	Equipment	Regulated standard	Maximum	Average
NOx (ppm)	Boiler	125	110	92.3
	Oil heater	125	88	68
	Cogeneration system	50	30	30
	Incineration	150	78	74.5
	Heat treatment furnace (continuous gas feed)	200	170	150
	Aluminum melting furnace	200	36	31
	3rd painting (drying furnace)	230	19	17
	4th painting (drying furnace)	230	32	31
Dust and soot (mg/Nm <sup>3</sup> )	Boiler	100	5	2
	Oil heater	300	6	5
	Cogeneration system	50	1	1
	Incineration	100	100	90
	Heat treatment furnace (continuous gas feed)	200	9	7
	Aluminum melting furnace	200	26	23
	3rd painting (drying furnace)	100	2	2
	4th painting (drying furnace)	100	2	1
SOx(Nm <sup>3</sup> /h)	(Regulated standard on total emissions)	21.82	1.4	1.23

### Water Quality

Item	Regulated standard	Maximum	Minimum	Average
pH	5.8 ~ 8.6	8	7.7	7.8
COD(mg/l)	60	19	12	15.2
BOD(mg/l)	60	10	5	7.3
SS (mg/l)	90	5.5	≤5	5
Oil content(mg/l)	5	1.3	1	1.1
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

	Description	Responses
Complaints	Vibration of the compressor	Restrict the operation of the compressor during the night
Accidents	None	

## ● Tochigi Plant

### Air Quality

Item	Equipment	Regulated standard	Maximum	Average
NOx (ppm)	Boiler	230	92	84
	Air conditioner	230	92	84
	Unit heater	150	73	71
	Metal furnace	170	120	111
Dust and soot (mg/Nm <sup>3</sup> )	Boiler	300	29	11
	Unit heater	250	26	17
	Metal furnace	250	≤5	≤5
SOx(Nm <sup>3</sup> /h)	(Regulated standard on total emissions)	14.5	0.70	0.25

### Water Quality

Item	Regulated standard	Maximum	Minimum	Average
pH	5.8 ~ 8.6	7.4	7.0	7.2
COD(mg/l)	Max 25, average 20	15	6.4	9.8
BOD(mg/l)	Max 25, average 20	4.2	1.3	2.1
SS (mg/l)	Max 50, average 40	6.0	1.0	2.5
Oil content(mg/l)	5	≤1	≤1	≤1
Copper content (mg/l)	3	≤0.05	≤0.05	≤0.05
Zinc content(mg/l)	5	0.23	0.07	0.12
Soluble iron content(mg/l)	3	0.23	≤0.05	0.10

Complaints	None	
Accidents	None	

## ● Kawasaki Plant

### Air Quality

Item	Equipment	Regulated standard	Maximum	Average
NOx (ppm)	Boiler	125	64	54
	Air conditioner	105	50	50
	Unit heater	150	45	42
	Metal oven	200	15	12
Dust and soot (mg/Nm <sup>3</sup> )	Boiler	100	1	1
	Unit heater	150	2	2
	Metal oven	200	7	5
SOx(Nm <sup>3</sup> /h)	(Regulated standard on total emissions)	4.017	0.008	0.008

### Water Quality

Item	Regulated standard	Maximum	Minimum	Average
pH	5.8 ~ 8.6	8.1	6.3	7
COD(mg/l)	60	8.3	2.1	5.3
BOD(mg/l)	60	8.1	1.8	5
SS (mg/l)	90	12	1	7.2
Oil content(mg/l)	5	1	1	1
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

Complaints	None	
Accidents	None	

## ● Isuzu Engine Manufacturing Hokkaido Co., Ltd.

### Air Quality

Item	Equipment	Regulated standard	Maximum	Average
NOx (Nm <sup>3</sup> /h)	Unit heater	Regulated standard on total emissions 6.3	1.24	1.23
	Boilers			
	Nitride heat treatment furnace			
	Aluminum-smelting furnace			
Dust and soot (kg/h)	Unit heater	Regulated standard on total emissions 3.5	0.1	0.1
	Boilers			
	Nitride heat treatment furnace			
	Aluminum-smelting furnace			
SOx(Nm <sup>3</sup> /h)	(Regulated standard on total emissions)	26	0.034	0.002

### Water Quality

Item	Regulated standard	Maximum	Minimum	Average
pH	6 ~ 8	7.6	6.7	7.2
COD(mg/l)	50	21.2	4.2	13.6
BOD(mg/l)	50	12.7	≤0.5	3.3
SS (mg/l)	50	7.0	1.0	3.0
Oil content(mg/l)	4	1.0	≤0.5	0.5

Complaints	None	
Accidents	None	

### Notes

1. Data for fiscal 2002 (April 2002 to March 2003).
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