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# Protecting the Environment

## Achieving a Symbiosis of People, Vehicles and Nature

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## Protecting the Environment Nissan and the Global Environment

## **Contributing to Sustainable Mobility**

As a time when global environmental issues came into much sharper focus, 2006 turned out to be an important year. Climate change, in particular, is becoming a concern for countries around the world, as reflected in the publication of the "Working Group Report," which will be contained in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change to be issued at the end of 2007, and the Stern Review Report on the Economics of Climate Change, issued in October 2006 by the U.K. Treasury. These reports cite a strong possibility that human factors may be related to climate issues and conclude that prompt action is necessary. They also call for further contributions from all members of society, including the government and private business.

The year was also important for Nissan, which unveiled a midterm environmental action plan, Nissan Green Program 2010, containing "ultimate goals" for helping to protect the environment. This program will serve as the basis for technological innovations and their broad applications to contribute to the addressing of environmental issues and the realization of sustainable mobility.

### NISSAN'S BUSINESS ACTIVITIES AND THE ENVIRONMENT

### A Company That Sincerely Cares About the Environment

Motor vehicles, the primary products made by Nissan, are built using a variety of resources and run primarily on fossil fuels like gasoline and diesel. As a global automaker, Nissan actively seeks to ascertain the impact of its business on the environment and to take steps to minimize such impact. As ultimate goals, moreover, we seek to reduce the environmental impact caused by our operations and the usage of Nissan vehicles to keep it within the Earth's natural ability to absorb it. Our goal is to leave as small a footprint on the planet as possible.



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Nissan aims to become a "sincere eco-innovator." By *sincere*, we mean to proactively address the environmental challenges and reduce the real-world environmental impact, and being an *eco-innovator* means providing customers with innovative products, technologies and services to contribute to the development of a sustainable mobile society.

Nissan believes that it can make a meaningful effort to help protect the global environment. The exhaust emission levels of the cleanest vehicle today are under 1/100 to 1/250 of the levels defined in regulations in the early 1970s. Efforts are being conceived to further reduce emissions to "virtually zero." We will contribute to the protection of the global environment by creating a sustainable mobility society and achieving a "symbiosis of people, vehicles and nature."

### **Three Major Issues for Nissan**

Nissan has identified three major issues to be tackled in the light of the impact that our primary products—motor vehicles—and our operations have on the environment, which is now confronted by issues like climate change, the burden placed on the ecosystem and humans by environment-impacting substances, and dwindling stores of mineral and water resources. We have established and are working to achieve ultimate goals for these three issues, namely, managing CO<sub>2</sub> emissions; protecting the air, water and soil; and recycling resources.

These issues cannot be resolved in a sustainable way, though, unless they are harmonized with other considerations, such as value for and costs to the customer. The management of  $CO_2$  emissions, which Nissan considers to be a high priority, is being advanced under a "QCT-C" framework that adds a  $CO_2$  component to the traditional management indices of quality, cost and time. Nissan is thus undertaking companywide management of  $CO_2$  emissions.

### Launching of Nissan Green Program 2010

Nissan Green Program 2010, NGP2010, was announced in December 2006 as a set of medium-term targets, established through backcasting, to be reached by 2010 so as to enable Nissan to achieve its ultimate goals. It represents a step forward from Nissan Green Program 2005 and strongly reflects our perceptions and resolve to protect the environment. We will continue to rise to the challenge of offering products sought by customers that are truly environment-friendly.



To reduce other emissions substances to atmospheric levels To attain resource recovery rate of 100%



NISSAN GREEN PROGRAM

### Link

Please see our website for additional details about Nissan Green Program 2010. http://www.nissan-global.com/EN/ ENVIRONMENT/GREENPROGRAM\_ 2010/index.html

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### **ENVIRONMENTAL MANAGEMENT**

## Nissan's Global Management System

To achieve progress in its three key issues—managing CO<sub>2</sub> emissions, protecting the air, water and soil, and recycling resources—Nissan believes it is necessary to link the efforts of its product and technical development, production, distribution, marketing and sales divisions, taking a cooperative approach that boosts the effect of our actions. We have established a global environmental management framework to advance our activities across this broad spectrum. By setting numerical targets and creating action plans for each area of our operations, we are making it possible to tackle the issues in an integrated manner.

### Framework of Global Environment Management



The framework depicted below has been organized to promote environmentally oriented management on a scale that covers our global activities. The Global Environment Management Committee (G-EMC), chaired by the company's COO, draws up companywide plans for environmental policy and makes decisions on proposals to be made to the Executive Committee, chaired by the CEO. The Global Environmental Planning Office, launched in April 2007, manages planning, doing, checking and acting, or PDCA tasks, by making decisions on proposals forwarded to the G-EMC and specific actions to be taken in various divisions of the company, as well as tracking progress in these areas.

### Nissan's Global Environment Management Organization



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In addition to these internal organizations, Nissan makes use of external input in refining its goals and actions. We seek a deeper understanding of the views of all our stakeholders, for instance by carrying out discussion with external experts and specialist organizations at our Environmental Advisory Meeting. We are also working to improve the content of our actions by examining them from the perspectives of trends in institutional SRI—socially responsible investment—or evaluations from rating agencies.

### Toward a Sustainable Management System

To promote environmental activities, each company in the Nissan Group worldwide—including production sites, sales companies and affiliate companies—has been introducing environmental management systems.

Nissan's main global production plants and its R&D centers have been introducing ISO 14001. At present 15 of 18 production companies including Nissan and its consolidated manufacturing affiliates have obtained ISO 14001 certification. Our basic policy is to set up environmental management systems according to the same standards whenever we expand our business into new areas.

In Japan we have introduced a unique environmental management system for our dealerships based on ISO 14001 certification—the Nissan Green Shop certification system. As of March 2007 some 3,300 dealership outlets in Japan had been designated as Nissan Green Shops. Every three years Nissan headquarters audits these dealers to decide whether they can renew this certification; the dealers themselves carry out internal examinations twice annually, thus working to constantly improve their environmental performance.

## Supply-Chain Management for the Alliance

The purchasing divisions of Nissan and Renault manage their supply chains in line with the Renault-Nissan Purchasing Way, which defines the companies' approach to dealing with their supplier business partners. To ensure sustainable development for society as a whole, the companies share the values of trust, respect and transparency with all their suppliers. Suppliers are required to promise full compliance with laws and regulations in this CSR-based approach to procurement. Additionally, in Japan we have specified Nissan Green Procurement Standards requiring suppliers to submit environment-related data, to set up their own environmental management systems and to designate people to operate these systems. We plan to expand these activities overseas next.

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### Communicating with Stakeholders



For more of our environment-related publications and data, please see our website. http://www.nissan-global.com/EN/ ENVIRONMENT/



Environmental Advisory Meeting





Huadu Automobile Forum

Nissan works to provide opportunities for direct dialogue with stakeholders as part of its strategy for two-way communication. This allows us to better understand what our stakeholders think about various issues. We put this understanding to work in our planning and business strategies with the end goal of increasing Nissan's corporate value to all stakeholders. Forums for opinion exchange with external experts help us to adjust our goals and the direction of our progress as needed. We position all these efforts as a fundamental part of our corporate management, one that gives us valuable third-party reviews of our actions.

Nissan also works to disclose information through its Sustainability Reports, as well as a range of pamphlets and websites. Other efforts to boost communication with stakeholders include our informational exhibits, test-drive events, environmental panel displays in the guest halls at our plants, public tours of our environmental facilities, internal communications, Environmental Advisory Meetings and Environmental Communication Meetings.

#### The Environmental Advisory Meeting

Beginning in 2005, Nissan has held annual Environmental Advisory Meetings that aim to produce discussion whose results can be put to work in the company's environmental measures. These gatherings are a valuable venue for us to collect input from specialists on how we may craft our global environmental strategy. Nissan Green Program 2010, our midterm environmental action plan announced in December 2006, is a product of these meetings, in addition to our internal deliberations. Outside opinions will remain an essential part of our consideration process as we take them to heart and reflect them in our decision-making.

#### **China Environmental Forum**

In September 2006 Dongfeng Motor Co., Ltd. hosted the Huadu Automobile Forum in the Huadu district of the city of Guangzhou, where its factory is located. Co-organized by the Chinese State Environment Protection Administration's Science and Technology Department, the China Association of Automobile Manufacturers and the Huadu district authorities, this forum saw the participation of people from the national, city and district governments, as well as academic groups. Also present were 250 media representatives, making this a major event on the theme of harmonizing automotive development with protection of the environment.

Government and academic representatives spoke on environmental preservation, and President Katsumi Nakamura of Dongfeng Motor gave a presentation on the company's environmental strategy. The Chinese authorities and media showed particular interest in Dongfeng's approach to preservation activities, which encompasses concrete actions and specific targets throughout the value chain, and in Nissan's technologies—both the continuously variable transmission (CVT) and the "design for recycling" now in use and future technologies that have yet to be introduced.

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#### **Elementary School Education Efforts**

As part of our support for education, we spent more than half a year preparing for an environmental course presented at Yokohama's Honcho Elementary School. This public school, with a history of more than a century, emphasizes a comprehensive, year-round course of environmental learning; for its innovative activities it has also been designated one of Yokohama's leading "pioneer schools." Nissan's course, presented to around 140 fourth and fifth graders, included lectures on environmental issues and the chance to ride in one of Nissan's fuel-cell vehicles, the X-TRAIL FCV. We plan to offer eco-themed programs at this school on an ongoing basis.

### **Communication to Boost Employee Awareness**

In order to further bolster its approach to environmental issues and deepen dialogue with external stakeholders, Nissan believes it is important to raise the awareness of all its employees. Toward this end we are focusing on more energetic internal communication. During fiscal 2006 we used posters and our intranet to share information about Nissan's environmental measures. COO Toshiyuki Shiga also took part in a meeting with employees on the topic of Nissan Green Program 2010, talking directly to them about his views of the program and addressing issues raised.

### **Environmental Education for Employees**

Nissan provides focused training to all its employees to promote their awareness of environmental issues. New hires—around 240 in fiscal 2006—undergo basic environmental education as part of their orientation program. New managers, too, undergo training to gain the knowledge and awareness they need to lead our environmental preservation activities. Nissan has developed a unique curriculum for its training, including discussion programs with the participation of outside experts, courses to boost the eco-awareness of the company's midlevel employees and environmental seminars for top managers in the research and development division.

#### **Environmental e-Learning**

One of Nissan's in-house educational tools for employees is its environmental e-learning program. This enjoyable learning tool—developed in concert with the Natural Step, an NPO focusing on sustainability education—gives clear explanations of global environmental mechanisms and the importance to automakers of being involved in tackling environmental issues. The program went online in Japan in June 2007, and is slated for expansion overseas in the future; it will eventually boost environmental literacy throughout the Nissan Group worldwide.



Elementary schoolers learning in Nissan's environmental course (Japan)



COO Toshiyuki Shiga talking with employees about NGP2010 (Japan)



Nissan's online environmental e-learning program

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## REDUCING CO<sub>2</sub>

### Nissan's CO<sub>2</sub> Reduction Challenges

Some scientists have predicted major changes in the environment because of  $CO_2$  emissions. The reduction of  $CO_2$  is a challenge that humanity must meet on a global scale.

At Nissan, we are taking a variety of steps to minimize the emission of CO<sub>2</sub> at all stages of our operations and during the life cycle of Nissan cars, from the production of vehicles, their transport to dealerships and their use by customers to disposal.

#### Nissan's efforts to reduce CO<sub>2</sub> emissions



In October 2006 the U.K. Treasury issued the Stern Review Report on the Economics of Climate Change, which pointed to the economic advantages of prompt action in averting climate change. The Intergovernmental Panel on Climate Change, moreover, published an interim report stating that human factors are a highly probable cause of climate change and that it is having a significant impact around the world. These reports are likely to encourage accelerated action to cope with this trend.

International debate is intensifying on the next framework agreement for climate change prior to the start of the first commitment period of the Kyoto Protocol in 2008. Many governments are enforcing stricter fuel-efficiency standards for motor vehicles: in Japan, a new target has been set for achievement in 2015, and in Europe, voluntary agreements on average CO<sub>2</sub> emissions have been concluded between the European Commission and automobile manufacturers associations. Average corporate fuel economy standards in North America and fuel consumption standards in China are also growing more stringent.

Many individuals are also expressing greater interest in fuel-efficient technologies, partly in reaction to the steep rise in the price of crude oil. For example, while new vehicle sales in Japan as a whole are falling, shipments of minicars with engine displacement of 660 cc or less hit a record high for the second straight year, rising 4.2% in 2006 over the preceding year.



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We are already living in a carbon-constrained society. We at Nissan, therefore, regard CO<sub>2</sub> reduction to be an important challenge that we must tackle with sincerity and innovation in order to provide life with mobility to future generations of people around the world and to fulfill our corporate vision of Enriching People's Lives.

### Nissan's Present Levels of CO<sub>2</sub> Emissions



Calculated according to Nissan's internal standards (annual figures)

### Nissan's Approach to CO<sub>2</sub> Reduction

We believe that technology can play a significant role in the reduction of  $CO_2$ . This does not mean, though, that there exists any one technology that can reduce  $CO_2$  emissions to sustainable levels.  $CO_2$  reduction is an issue that cannot be resolved through technology alone; it requires efforts by all of society. It is not sustainable, moreover, just to develop the necessary technology; it must also be made compatible with other factors and balanced with cost considerations.

It is with this understanding that Nissan is undertaking the reduction of  $CO_2$  through the following approaches, turning the challenges posed by  $CO_2$  emissions into an opportunity to sustain our business.

## Our CO<sub>2</sub> Management Way: QCT-C

Nissan has introduced its Global  $CO_2$  Management Way, QCT-C, in an effort to reduce  $CO_2$  emissions in a more positive and innovative way. This framework adds a  $CO_2$  component to the traditional management indices of quality, cost and time and sets emission targets not just for our products, but for all corporate operations, in step with QCT indices. Balancing the often conflicting demands of QCT and  $CO_2$  emissions is a big challenge, but we believe it is indispensable to achieving breakthroughs that can provide Nissan customers with added value.

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### Roadmap to Long-Term CO<sub>2</sub> Reductions

We at Nissan have established long-term  $CO_2$ -reduction targets and are carrying out the necessary research and development to achieve those goals.

Opinion is divided over how high average global temperatures are rising and how low we must keep the density of  $CO_2$ . If we assume that atmospheric  $CO_2$  must be stabilized at 550 parts per million to prevent average temperatures from rising more than 2 degrees Celsius, the "well-to-wheel"  $CO_2$  emissions of new vehicles in 2050 need to be reduced by 70% over 2000 levels. (Reductions in new vehicle emissions must work in concert with  $CO_2$  reductions throughout the transportation chain [well-to-tank], beginning with oil extraction and continuing through refining and transporting the fuel to the customer.)

By vehicle power source, gasoline engines can be improved to achieve an additional 30% cut in  $CO_2$  emissions over the long term. Over the short and medium term, the focus of  $CO_2$ -reduction efforts will be on enhancing the fuel efficiency of these internal combustion engines. It will also be important to make diesel engines, which promise further reductions in  $CO_2$  output, even cleaner.

But achieving further reductions will require the spread of new types of electricity-powered vehicles, such as hybrid, full-cell and electric vehicles. The 70% reduction target cannot be met even with these technologies, though, unless renewable energy is used to power the motors. Strengthening coordination with the energy sector will thus be essential.

### Long-Term Goal for Reducing CO<sub>2</sub>



## "Four Rights"

We feel it is important to quickly and broadly popularize the technologies that can contribute to  $CO_2$  reduction.

Our approach at Nissan has consistently been to provide effective technologies at prices that customers can afford so they can be quickly and broadly embraced by the market. This is in

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keeping with our belief, based on the "four rights" (the right technology, at the right time, in the right market, at the right value to the customer), that unless a technology is "right" for the customer, it cannot make a significant contribution to improving the global environment. Technology cannot be forced onto the customer; it must truly meet customer needs and have true value. This is our responsibility as a global automaker and an indication of our sincerity.

### Nissan's Roadmap for Reducing the CO<sub>2</sub> from Our Vehicles



## Three Aspects of CO<sub>2</sub> Reduction: Technology, Cars and Infrastructure

The level of CO<sub>2</sub> emitted while driving is influenced not only by a vehicle's performance and type of fuel but also by how a car is driven and traffic conditions.

Nissan thus approaches  $CO_2$  reduction from three sides: the vehicle (Nissan products), people and the traffic environment. To more effectively reduce  $CO_2$  emissions, we seek to develop and popularize fuel-efficient vehicles as well as to undertake driver education programs and carry out improvements of the traffic environment in cooperation with local communities, governments and other industries.

### Utilizing the Merits of the Alliance

The reduction of  $CO_2$  is an important responsibility for any automaker, but this admittedly is a task that requires vast R&D resources. We at Nissan thus utilize the merits of our Alliance with Renault to advance efficiencies in the development of new technologies. Through the division of R&D resources, such as by sharing platforms and powertrain technologies, the Alliance can make a contribution to the reduction of  $CO_2$  as well.

Vehicles Improvement of fuel economy, development of alternative energy vehicles, etc.

Encouragement of eco-driving, etc.

Use of Intelligent Transport System (ITS) technologies, etc.

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## **CO<sub>2</sub>-Reducing Products and Technologies**

## 70% Reduction by 2050

Nissan has established a long-term goal of reducing CO<sub>2</sub> emissions in 2050 by 70% over 2000 levels and is promoting a variety of approaches to achieve this target. Nissan discloses fuelconsumption data for its vehicles in accordance with the measurement standards prescribed in each country, and it also calculates real-world fuel economy for in-house use by considering a mix of figures for city, highway and heavy-traffic road conditions to be used as an index for enhanced fuel efficiency.

We also estimate the companywide averages for fuel consumption (in Japan and North America) and  $CO_2$  emissions (in Europe) by taking note of the number and type of vehicles shipped each year. This helps us to set targets to meet regulatory standards in each region and to reduce overall  $CO_2$  emissions.

The figure at right shows the average annual CO $_2$  emissions of new Nissan cars sold in the Japanese, U.S. and European markets based on actual shipments.

### A New Gasoline Engine and CVT

As part of Nissan's efforts to enhance the fuel efficiency of gasoline engines and reduce  $CO_2$ emissions, it has developed a new 1.5-liter gasoline engine and the electronically improved Xtronic continuously variable transmission (CVT) system for the Note that qualifies for the highest available "green tax" breaks in Japan for low-polluting vehicles. It has been certified as surpassing fuelefficiency standards for fiscal 2010 by 20% and as an SU-LEV (super ultra-low emission vehicle) with emission levels that are 75% lower than 2005 standards. In addition to lower emissions, the Note also features a high potential recycling rate and gets more than 6% better mileage compared to the earlier models.





#### Sales-weighted average CO<sub>2</sub> emissions of new passenger cars (Japan, EU, USA)





The Nissan Note uses a highly efficient HR15DE engine to improve fuel economy.

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### **Global Introduction of VVEL**

Nissan is introducing the variable valve event and lift system on a global basis to achieve a higher response, greater power, lower fuel consumption and cleaner emissions. The VVEL system continuously varies the angle and lift of an engine's intake valve in accordance with the pressure that is applied to the accelerator to directly control the amount of air that is fed to the engine. By combining this system with continuous valve timing control (C-VTC), the timing and lift of the valves can be controlled to yield dramatic improvements in intake resistance and air intake response. This leads not only to better driving performance but also improved environmental performance by reducing  $CO_2$  emissions up to 10% (according to internal measurements comparing  $CO_2$  outputs of engines with and without VVEL systems).

### **Getting 30 Kilometers per Liter**

Nissan will introduce gasoline-powered cars that reduce CO<sub>2</sub> emissions to levels equivalent to hybrid vehicles by the target date of 2010, starting in the Japanese market. This will be a car that can run for 100 kilometers on just 3 liters of gasoline, meaning it gets more than 30 kilometers per liter. Such fuel efficiency has never been achieved with a gasoline-powered car, but Nissan is working on its realization by combining ultra-efficient, supercharged engines with next-generation CVTs and integrated control systems.

### Introduction of Clean Diesel Vehicles

Clean diesel engines are also being looked upon as a promising technology to lower CO<sub>2</sub> emissions. Nissan has already launched such engines running on blended biodiesel fuel on the European market, and in 2007 it introduced for the first time a 2-liter clean diesel engine complying with Euro4 emissions standards in the Qashqai. We will gradually expand our lineup of clean diesel vehicles clearing emission standards for the Japanese, North American and Chinese markets as well from the end of fiscal 2010. In North America, the clean diesel engine will be installed in the Maxima in 2010.

### Cars That Run on 100% Biofuel

Biofuels are made from such plant matter as sugarcane, corn and construction waste. The  $CO_2$  emitted by cars running on such fuels is essentially what the plants absorbed during their growth, so biofuel is regarded as a renewable energy source that does not increase  $CO_2$  levels in the atmosphere. All Nissan gasoline-fueled new vehicles can already run on gasoline with a 10% blend of bio-ethanol (E10). And in North America, Nissan markets the Titan FFV and Armada FFV, which can run on E85, 85% bio-ethanol fuel. It plans to introduce a 100% bio-ethanol model in Brazil within three years.



Nissan's VVEL system to be released in the U.S. in  $2007\,$ 



Nissan's clean diesel engine released in Europe in 2007



The Titan pickup sold in North America can run on fuel mixtures of up to 85% biofuel (E85).

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### New Hybrid Vehicles

Hybrid electric vehicles (HEVs), which combine a gasoline engine and an electric motor, have such eco-friendly features as low CO<sub>2</sub> emissions and clean exhausts. Nissan marketed the Atlas 20 Hybrid truck in Japan in 2006 and the Altima Hybrid in North America in 2007. In fiscal 2010, it will launch new HEVs with Nissan's original hybrid technologies in North America and Japan.

### Plug-in Hybrids

Research and development is being carried out into plug-in hybrid technology, which is considered effective in reducing  $CO_2$  emissions. Plug-in HEVs can run on motors whose batteries may be charged using ordinary electric sockets to enable  $CO_2$ -free driving, just like electric cars, when running on electric power.

### **Next-Generation Fuel-Cell Vehicles**

FCVs, or fuel-cell vehicles, run on electricity generated from hydrogen and oxygen. The only waste emitted during driving is water, and FCVs generate neither CO<sub>2</sub> nor other exhaust gases. Nissan is actively involved in the development of such vehicles, having achieved cruising ranges and acceleration on a par with gasoline models with its X-Trail FCV 2005 equipped with a 70 megapascal high-pressure hydrogen tank and a Nissan-developed fuel-cell stack. In Japan, we have been leasing FCVs on a limited basis since fiscal 2003. We are planning to market next-generation FCVs with an improved Nissan fuel-cell stack in North America and Japan in the early 2010s.

### Launching of New Electric Vehicles

Electric vehicles that run on motors and batteries are also very clean cars that do not generate  $CO_2$  or other exhaust gases. Nissan has been developing electric cars since the 1960s and has announced and marketed numerous models. We will conduct fleet tests through 2010 and work closely with other industries on recharging facilities and other infrastructure so as to be able to launch new models in the early 2010s, starting with the Japanese market.

### New Technologies to Promote Electrification

The core technologies in building electricity-powered cars are the motor, battery and inverter. Nissan has long focused its energies on the development of these technologies, and it will continue to do so under Nissan Green Program 2010, working particularly hard to reduce costs for mass production. Nissan has established a battery manufacturing company as part of such efforts, and it will strive to improve performance and further reduce costs. The batteries produced are expected to be used in hybrid, next-generation fuel-cell and electric vehicles.



The Altima Hybrid achieves low exhaust emissions and outstanding fuel economy without sacrificing the acceleration and power performance of conventional vehicles.



Nissan's latest FCV, the X-Trail FCV 2005 model



Pivo, the next-generation EV concept car displayed at the 2005 Tokyo Motor Show



Nissan's compact lithium-ion battery has a volume less than one-half that of a conventional cylindrical lithium-ion battery, but it produces 1.5 times the power.

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#### Agreement Reached to Establish Lithium-Ion Battery Manufacturer

On April 13, 2007, Nissan announced the establishment of a joint venture with NEC Corp. and NEC Tokin Corp. to manufacture lithium-ion batteries. The new company, Automotive Energy Supply Corp. (AESC), aims to supply lithium-ion batteries for electric-powered vehicles to not only Nissan but also automakers worldwide by fiscal 2009. The establishment of AESC is based on a belief that lithiumion technology offers a key solution to the achievement of a sustainable mobile society.

#### Improving Traffic Conditions with ITS

Fuel efficiency is not just a matter of technology: it is also influenced by road conditions and other factors. We are working toward the practical application of the Intelligent Transport System, which is expected to make driving smoother, by implementing the ITS Project in Kanagawa Prefecture. The project was launched in October 2006 to help reduce accidents, alleviate congested roads and improve other aspects of the traffic and social infrastructure, and it is being implemented not just with other automakers but also in conjunction with other industries.

#### Using Navigation Systems to Promote Eco-Driving

Carwings is a service in Japan that Nissan provides for car navigation system users. In January 2007 we began offering a new service using Carwings in an effort to steadily reduce CO<sub>2</sub> emission levels. Information about registered vehicles is transmitted to the Carwings Center, which calculates average fuel consumption and ranks drivers according to fuel efficiency on a membersonly website each month. Users can thus enjoy seeing how well they do as eco-drivers while being encouraged to pursue fuel-efficient habits.

## CO<sub>2</sub>-Reduction Activities in Manufacturing and Logistics



Most of the CO<sub>2</sub> emissions from manufacturing are due to the usage of energy produced by burning fossil fuels. While promoting the Nissan Production Way, Nissan is proceeding with effective energy-saving activities in order to manufacture vehicles with less energy usage.

For example, in the area of technical improvements, more efficient facilities and processes have been applied and more efficient lighting has been introduced. Operational improvements include operation with less loss and careful management of air-conditioning and lighting systems. These best-suited reduction measures and case examples are shared among global sites and expanded accordingly.

In addition, utilization of natural energy has been also promoted according to each area's condition. Nissan Motor Manufacturing (UK) Ltd. has introduced wind-generated electricity and Nissan Motor Co. participates in a wind-generated electricity project in Yokohama, Japan. Moreover, Nissan Motor Iberica S.A. in Spain has installed photovoltaic panels, while Nissan Mexicana, S.A. de C.V. produces hot water by using solar energy.



Press conference on establishment of Automotive Energy Supply Corp. (Japan)



ECO Drive Ranking in Carwings



Wind turbines at Nissan Motor Manufacturing (UK) Ltd.

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We are actively promoting CO<sub>2</sub> reduction activities at all plants around the world, by learning from each other. In particular, the experience and knowledge stored in Japan, where Nissan Motor Co., Ltd. is leading in the field of energy efficient technology, have been utilized in every facility. Nissan set goals to reduce CO<sub>2</sub> emissions per vehicle and to promote these activities globally in Nissan Green Program 2010. The target for fiscal 2010 is to reduce CO<sub>2</sub> emissions by 7% from 2005 levels. Facilities around the world will reduce their CO<sub>2</sub> emissions, subject to this target.

Global CO<sub>2</sub> emissions per vehicle—the total CO<sub>2</sub> emission amount from global Nissan sites divided by Nissan's global annual production volume—were approximately 0.675 tons in fiscal 2006, a 4% reduction from the previous year.

#### Nissan North America Plants Earn Energy Star Award

Nissan North America's manufacturing plants in Smyrna, Tennessee, and Canton, Mississippi, received the Energy Star Award from the U.S. Environmental Protection Agency in September 2006. This award is given to companies achieving an energy performance score within the top 25% nationally based on the EPA's plant energy performance indicators measured on actual energy use. These two plants, our first award winners, were recognized for their energy-efficient operations that have reduced pollution, energy consumption and costs.

### Nissan Supports Yokohama Wind-Generated Electricity Project as "Y-Green Partner"

As part of the measures against global warming and promotion of natural energy application, the city of Yokohama, which is seeking "Environmental Action City" status, is developing the Yokohama Large-Scale Wind-Generated Electricity Project by constructing wind turbines along its waterfront areas. Nissan supports this project, and by purchasing the electricity generated here as "green electricity," Nissan was certified as a "Y-Green Partner" for its efforts to make business coexist with environmental activity.

### Solar Power Generation and Application Project at Nissan Motor Iberica

Nissan Motor Iberica has placed photovoltaic panels on the roofs of the manufacturing plants in Barcelona and Avila, putting them into operation as of May 2007. Additional solar panels to produce hot water with solar energy are also under construction. This application of solar energy by Nissan is the first such attempt by an automaker in Europe. With this attempt, 260MWh of electricity can be generated and CO<sub>2</sub> emissions can be reduced by 380 tons. These initiatives can contribute to Spain's achievement of CO<sub>2</sub> reduction under the Kyoto Protocol.

## **Enhancing Transport Efficiency**

The transport of parts and finished products, an integral aspect of any production activity, is done mainly by trucks that emit high volumes of  $CO_2$ . Nissan is seeking to enhance the efficiency of its physical distribution network and reduce emissions by shifting to other means of transport and improving the packaging of parts to increase the loading ratio.

 Global CO<sub>2</sub> Emissions per Vehicle (t-CO<sub>2</sub>/unit produced)



 2004 figure is per vehicle emissions for major global production plants.



The U.S. EPA presents Nissan with its Energy Star Award.



A wind turbine in Yokohama (Japan)



Solar panels at Nissan Motor Iberica (Spain)

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The CO<sub>2</sub> emissions for distribution in Japan were 108,728 tons in fiscal 2006. In establishing targets for Nissan Green Program 2010, moreover, CO<sub>2</sub> emissions during physical distribution were recalculated using updated energy consumption methods using ton-kilometers and the type and volume of fuel used. Activities in fiscal 2006 included in the calculations were expanded, moreover, to include not only the domestic transport of parts for production and repair and of finished vehicles by truck and rail and between ports, but also such new categories as internal mail delivery, shipments of industrial waste and the distribution of pamphlets and other promotional materials to dealers. Additional efforts will be made to ascertain emission levels during shipments between Japanese and foreign ports, as well as for distribution within the North American, European and other markets.

#### **Improving Loading Ratios**

Nissan was the first Japanese automaker to use its own hired trucks to collect parts from suppliers. Compared to the earlier practice of having the necessary parts delivered by the supplier, this led to an improvement in the loading ratio. Whereas deliveries used to require some 2,500 10-ton trucks a day, under the new system, the number of trucks fell to 2,200. This approach has been adopted in China and Thailand as well, and it will henceforth be expanded to other countries. In Europe, Nissan has an arrangement with Renault for the joint shipment of parts. Shipments of finished cars across the English Channel had already been conducted jointly with Renault, but since January 2004 the mutual use of ferry transport has been expanded to other automakers as well to improve efficiency.

Containers called pallets that are used in the transport of parts have also been improved. Nissan has independently developed 55 pallet varieties to house parts more efficiently. When the containers are shipped back after delivery, they can be folded to save space, leading to a 10% increase in the loading ratio.

### **Shifting Modes of Conveyance**

Nissan is undertaking a modal shift from truck transport to marine and rail transport. Already in Japan, 51% of finished automobiles and parts destined for remote areas are conveyed by sea. Parts that had previously been trucked from Kanto suppliers to Nissan's Kyushu Plant are now transported via container rail freight, which results in less than half the CO<sub>2</sub> emissions of maritime transport. In February and March, when new car orders swell in Japan, specialized two-tier Nissan Car Pack freight cars that can accommodate vehicles on two levels are used to enhance efficiency. These were used to ship approximately 1,500 export-bound sports cars from Nissan's Tochigi Plant to Nissan's Honmoku Wharf in Yokohama during the February–March period in 2006, and further shifts in modes of conveyance are being advanced.



Modal shift to ferry transport



Modal shift to rail

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### Initiatives at Dealers and Offices

As for dealers, the Nissan Green Shop program being implemented throughout Japan will be further upgraded to introduce comprehensive CO<sub>2</sub> management. In fiscal 2007, total CO<sub>2</sub> discharges of dealer-related activities will be ascertained to conduct full-scale management starting in fiscal 2008, including the setting of emission targets.

Initiatives involving Nissan offices, meanwhile, include the full incorporation of environmentfriendly designs for the new Nissan Headquarters in Yokohama, which is scheduled for completion in 2009, and at the Nissan Advanced Technical Development Center that was completed in Atsugi in fiscal 2007. These two new buildings are expected to qualify for the top S ranking under the Comprehensive Assessment System for Building Environmental Efficiency, which is being promoted by Japan's Ministry of Land, Infrastructure and Transport. CASBEE forms part of the Japanese government's efforts to fulfill its obligations under the Kyoto Protocol by promoting energy-saving residences, and Nissan is helping meet the government's challenge. In March 2007, Nissan also received a local CASBEE certification from the city of Yokohama.

#### **Planting Trees to Offset Carbon Emissions**

In October 2006 Nissan Motor (GB) Ltd. joined in the Carbon Offset program, offered by the Carbon Neutral Company, and planted approximately 180 trees in the Carrifran Wildwood in Scotland. These plantings were calculated to neutralize the CO<sub>2</sub> emissions between September 18 and December 31, 2006, from test-drive vehicles owned by the communications team and the use of airplanes carrying journalists to various Nissan events. This program aims to re-create the ancient woodlands of southern Scotland and offset some 30,000 tons of CO<sub>2</sub> discharged over the next century.

### PROTECTING THE AIR, WATER AND SOIL

### **Building Environmental Value into Our Cars**

Governmental regulations on vehicle exhaust began coming into effect in response to growing pollution problems in the 1960s. Later rules restricted the use of materials in vehicles that have adverse effects on the water and soil when the vehicles are disposed of. We have worked to comply fully with all these regulations by quickly developing cars that meet their requirements, as well as our own voluntary standards for areas including the reduction of volatile organic compounds (VOCs) in vehicle cabins. Today our cleanest car on the market emits exhaust with less than 1/100—in some cases less than 1/250—of the pollutants produced by cars in the early 1970s. At Nissan we focus on the environmental burden of our cars over their entire life cycles, and of our corporate activities, on the air, soil and water. We are dedicated to bringing this burden as close to zero as possible, to making this a new value for our customers and society, and to developing technologies that make this all possible.



Nissan's new Yokohama headquarters will be an eco-friendly facility.



The city of Yokohama presented Nissan with CASBEE certification.



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### Providing Environmental Quality Across the Globe

In order to reduce our use and emissions of substances that adversely affect the air, water and soil, Nissan sees a need to consider the automobile over its entire life cycle—from development and production through use and disposal.

The impact of Nissan's products on air quality comes primarily in the form of emissions released while a car is on the road. Regulations covering these exhaust emissions are becoming stricter all around the world. Euro4, the European Emissions Standards Level 4, went into effect in Europe in 2005, and the follow-up Euro5 standards will come into effect in 2009; in the United States, meanwhile, the Environmental Protection Agency's Tier 2 Vehicle and Gasoline Sulfur Program and Zero Emission Vehicle (ZEV) requirements regulate vehicle emissions in that country; and Japan is now implementing new long-term emission standards. The technology of diesel vehicles is an effective means of reducing CO<sub>2</sub> emissions, and governments are expected to bring the regulations on them into line with those now covering gasoline vehicles. And China and other countries are now moving toward closing the time lag in implementation of exhaust regulations as stringent as those seen in Japan, Europe and North America.

Nissan is making aggressive efforts to reduce the health effects of formaldehyde, toluene and other VOCs that can be released in vehicle cabins. Under a voluntary program carried out by the Japan Automobile Manufacturers Association to reduce cabin VOCs, all new cars produced and sold in Japan from April 2007 will meet standards set by the Japanese Ministry of Health, Labor and Welfare for concentration levels of 13 compounds in vehicle interiors. There is also a need to minimize the VOCs released on the painting lines in our plants.

The European End-of-Life Vehicles (ELV) Directive is a set of advanced regulations seeking to reduce the environment-impacting substances used in vehicles around the world. Nissan sources an increasing portion of its parts from locations all across the globe, and we are strongly aware of our responsibility to reduce the environmental impact of the substances we use in all the areas where we do business.

In accordance with the European Commission's Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, adopted in December 2006, we are also working on the management of chemical substances all the way up our supply chain.

### Working to Meet Future Standards

In designing and producing its vehicles, Nissan sets strict regulations and targets for itself in an effort to foresee and stay ahead of future regulatory trends. Our Sentra CA, marketed in the United States in January 2000, was the first gasoline-powered car in the world to comply with the emissions requirements of CARB, the California Air Resources Board, and receive Partial Zero Emissions Vehicle (PZEV) certification. Our Bluebird Sylphy released in August 2000 became the first vehicle to gain certification from Japan's Ministry of Transport as an Ultra-Low Emission Vehicle (U-LEV), a vehicle producing 75% less nitrogen oxide (NOx) and hydrocarbon

### Improvements in Gasoline, Diesel Engine Technology



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(HC) than the level prescribed in the 2000 emission standards. In 2003 this model became Japan's first to receive SU-LEV certification as a Super Ultra-Low Emission Vehicle producing 75% less NOx and nonmethane hydrocarbon (NMHC) emissions than prescribed by the 2005 standards.

Nissan's ultimate goal for emissions is to make them as clean as the atmosphere, and we are proceeding proactively with research and development aimed at this. Nissan Green Program 2010 sets a target of achieving early compliance by 2010 with upcoming exhaust emission regulations in each region.

#### Reduction of Exhaust Emissions Achieved with LEVs and Future Target (NOx and HC) [g/km]



### **Toward cleaner exhaust**

Major Nissan models certified as SU-LEVs (Japan)



Tiida



Note



Bluebird Sylphy



## and HC emissions.

#### Global standards for environment-impacting substances

Nissan is moving forward with measures to reduce usage of environment-impacting substances. Regulations and guidelines differ from country to country, but Nissan has expanded its procurement network to a worldwide scale, and is applying one set of global standards to its own activities.

When it comes to pursuing cleaner vehicle emissions, Nissan believes it both necessary and effective to begin by improving gasoline engines. We have built up a body of industry-leading catalytic technologies, and we are putting these to work in the development of cleaner engines,

providing effective technology to our customers at an affordable price. By May 2006, fully 80% of the Nissan vehicles sold in Japan had earned SU-LEV certification, the highest rank for emission cleanliness. We calculate that this level of SU-LEV penetration is the equivalent of shifting 40% of all new cars purchased in Japan to electric vehicles in terms of reducing NOx

We are working on the reduction of VOCs in the production process from two angles, focusing on both the materials used to make our products and the compounds emitted by those products. Our VOC-reduction measures include a switch to water-based painting systems, lower usage of paint and thinners themselves and collection of used thinners.

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## **Eco-Friendly Products and Technologies**

## World-Leading Catalytic Technology

Nissan has long held a top global position in the area of catalytic technology, beginning with its moves to meet the requirements of the U.S. Clean Air Act of 1970 and including the PZEV certification earned by the Sentra CA in 2000—the world's first—and the first U-LEV certification awarded in Japan, earned by the Bluebird Sylphy in the same year.

In May 2006 Nissan reached its goal of receiving SU-LEV certification for 80% of its gasoline-powered passenger vehicles sold in Japan. As of March 2007, this figure had climbed still higher, to 84.4%. We intend to continue expanding our production and marketing of SU-LEV models. In the city of Beijing, which in December 2005 adopted the Euro3 emission standards as an early phase of their nationwide implementation, the Nissan Tiida marketed there complied with the requirements; this was followed by the Sylphy, which complied with the Euro4 requirements. We were also one of the first automakers to receive certification from the Beijing Environmental Protection Bureau for our on-board diagnostic (OBD) system, a self-diagnosing system that reports problems with the catalytic converter or other emission-control systems. In Europe, too, we moved steadily ahead with programs to comply with Euro4 regulations, introducing qualifying vehicles in 2003 ahead of applicable regulatory dates.

## **Toward Even Cleaner Diesel**

Diesel engines, which promise further reductions in CO<sub>2</sub> output, are being required to be cleaner, and we aim to stay ahead of the regulatory curve in this field. Our new clean vehicles make use of diesel particulate filters (DPFs) that trap and remove substances making up dark fumes, NOx-absorbent catalysts and oxidation catalysts. In 2007 we are releasing our Qashqai SUV, outfitted with a 2-liter diesel engine and a DPF that clear the Euro4 standards, in Europe.

Far-cleaner diesel vehicles that will meet the most stringent exhaust emission standards including Japan's Post–New Long-Term, the United States' Tier 2 Bin 5 and Europe's Euro5 regulations—will be marketed in Japan, the United States and China beginning in 2010.

### Clean air both inside and outside the cabin

In December 2006 Nissan launched six new "clean air vehicle" compact models in Japan. Designed around the concept of "clean cabin air, clean emissions," these models have all received SU-LEV certification; their high fuel efficiency also places them in the category taxed most favorably in Japan's green tax system. With their advanced exhaust-detection systems governing airflows into the cabin and their high-performance filters, these cars provide passengers with consistently clean air.



Tiida (China)



Qashqai (Europe)



Cube Cubic (Japan)

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#### **Training OBD Specialists in China**

Stringent emission standards have been implemented in China, and the Beijing city government began requiring on-board diagnostic (OBD) systems in all new vehicles on December 30, 2005. This requirement will be expanded throughout China from July 1, 2008, and the Chinese authorities are working hard to train the specialists needed to ensure nationwide compliance. Nissan has cooperated with China's State Environmental Protection Administration to operate a three-year OBD training program in which 21 trainees have taken part.

In July 2004 Nissan held an additional seminar on OBD systems in Beijing. Our forward-looking approach to improving the atmospheric environment in China has also been clear in our obtaining official OBD certification for our Teana and Tiida models ahead of other manufacturers.



Chinese OBD specialists training program (Japan)

### A Global Policy to Reduce Chemical Substances

On a global basis, we are working to reduce or completely do away with certain substances in all new models launched beginning in July 2007: heavy metal including mercury, lead, cadmium and hexavalent chromium, in-cabin VOCs, and polybrominated diphenyl ether (PBDE) flame retardants. In Europe in particular, in line with the End-of-Life Vehicles (ELV) Directive, we have eliminated our use of the heavy metal listed here, except for in exempted parts.

We have begun a reconsideration of the adhesives and other substances in the seats, door trim, floor carpets and other parts of our vehicle cabins, with a view to reducing the amount of VOCs. Beginning with minor design changes to the Cube and Cube Cubic in 2005, Nissan has been reducing the cabin concentrations of 13 substances to below levels permitted by Japan's Ministry of Health, Labor and Welfare. In this we are ahead of the voluntary industry moves aimed at meeting governmental guidelines.

### Efforts to Protect the Air, Water and Soil in the Manufacturing Process

### Seeking to Reduce Environmental Impact

Nissan clearly defines a management standard and scheme that control environment-impacting substances in the manufacturing process. We are working on reductions of both usage and emission amounts of these substances.

In addition, we are trying to achieve higher levels of performance toward satisfying legal requirements in all regions where we carry out our business. For example, in Japan, VOC regulations were enacted in fiscal 2006 and will be applied from fiscal 2010. Nissan has already complied with this regulation by switching to water-based painting and installing regenerative thermal oxidizers.



We brought cabin VOC concentrations below guideline values set by the Ministry of Health, Labor and Welfare in the Bluebird Sylphy. (Japan)



A Kyushu Plant line switched to waterbased paint, producing less VOCs. (Japan)

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### TOWARD SUSTAINABLE RECYCLING OF RESOURCES

#### **Recycling Resources**

### Taking Appropriate Measures Around the Globe

As an automaker with operations around the world, Nissan makes use of a truly wide range of resources. Rapid price increases for crude oil and rare metals are also issues related to our business. Nissan hopes to continue Enriching People's Lives with mobility, and views securing the sustainable recycling of resources as essential in achieving this goal. Our fundamental stance is that resources are precious things to be used as efficiently as possible. We intend to work on recycling resources around the world, using the methods best suited to each area in which we do business.

An average passenger vehicle weighs 1 to 2 tons and is composed of precious materials available in limited supplies, including iron, aluminum, copper and synthetic resin. The cars consume fossil fuels once they are on the road.

Against this backdrop nations around the world are advancing measures to boost efficient resource usage. Japan and the countries of the European Union were among the first to regulate automobile recycling. These efforts have gained fresh momentum from legislation, with the End-of Life Vehicles (ELV) Directive that came into effect in Europe in 2000 and the 2005 enforcement of Japan's Automobile Recycling Law promoting the creation of better recycling systems. Developing economies like China are expected to see leaps in the numbers of ELVs accompanying the rapid rise in car sales there, and they are already preparing measures to cope with this.

### **Giving Resources New Life**

·Introduce easy-to-dismantle designs for new vehicles ·Apply easily recyclable materials in new vehicles Improve recovery rate Increase use of recycled materials ·Develop recycling ·Decrease use of hazardous technology substances ·Provide information for Introduce designs with reduced recycling promotion evelopment naterial use Recycle Vision Achieving sustainable automobile society through environmentally friendly End-of-Life Production recycling Sales and Service Utilize resources in Control and reduce production plants waste effectively

Nissan aims to achieve a sustainable society with mobility through the recycling of automobiles. Our basic approach is the three Rs-reducing the use of substances that will end up as waste, reusing what we can and recycling materials whenever possible. We take steps to make effective use of the precious and limited resources available to us at every stage of a car's life cycle, thereby contributing to a sustainable resource cycle.

In Japan, where the Automobile Recycling Law mandates a 95% recovery rate to be achieved by 2015, Nissan has moved its own target up by five years, and has been on track to achieve this figure by 2010 as stated in its Nissan Green Program 2010 commitments. Thanks to our activities in a range of fields, we were able to hit this target even earlier, in fiscal 2006four years ahead of NGP2010 and nine years ahead of the legal requirement.

Our next step is to reach this 95% target on a global basis. As part of our efforts to achieve this goal we are working with our Alliance partner, Renault, to create a European network for used vehicle recovery.

At the development stage, we design our vehicles to avoid the use of environment-impacting substances and make them easier to recycle. Additionally, to reduce our reliance on

#### **Global Nissan Recycling Way**



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nonrenewable resources, we give consideration to the use of recycled plastics and other materials, as well as renewable bio-materials. The material derived from bumpers that have been exchanged in repairs is recycled for new vehicles. We are also examining the possibility of recycling plastic parts from ELVs as material for new vehicles, searching for ways to overcome the technical challenge of maintaining their quality.

During the production phase, our goal is to reduce, reuse and recycle the waste generated at each stage as much as possible. At the sales and service phases of the vehicle's life cycle, reused parts play an important role, and at the end of a vehicle's life, we carry out research on ways to make it easier to dismantle and recycle, sharing the knowledge and techniques gained through this research with our people involved in earlier phases of the life cycle to improve the process as a whole. Nissan places particular emphasis on finding ways to recycle cars into new cars, rather than other products, without allowing the quality of reused materials to degrade.

All these steps are part of Nissan's pursuit of the final goal of a 100% recovery rate—the percentage of all by-products from production and other business activities, including heat exhaust, that is recovered instead of discarded—for its products. We are also implementing measures that will bring our global recovery rate, the actual recovery percentage attained when a vehicle reaches the end of its life, to the 95% level.

Cooperation with many other members of society is essential for making that society truly sustainable. In its pursuit of effective resource-usage policies Nissan stresses the formation of partnerships outside its corporate sphere. We hope to make the synergies thus formed a part of the grand cycle of recycling resources.

### Flow of Resource Recycling (ultimate goals)



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### **Development: Design for Recycling**

## Designing with the Full Life Cycle in Mind

Accumulating expertise in the wise use of the Earth's limited natural resources is a must for a company seeking to make its business sustainable. When Nissan begins designing a new model it considers what will happen to the vehicle after it ends its useful life, whenever possible avoiding the use of environment-impacting substances and seeking improved recyclability. In Japan we have set our sights on a recoverability rate above 95% for our vehicles, and beginning with the 2005 Note, we have achieved this goal for all of our new models. Now we are focusing development efforts on pushing this rate still higher.

Together with Renault, our Alliance partner, we have created OPERA, a recycling simulation system used in the early design stages to calculate recoverability rates and recovery costs for new models. In this way we make recycling a guiding concept in the design process.

### Clearing the 95% Recoverability Rate with the Skyline



## **Production and Distribution: Using Resources Efficiently**

## Efforts to Raise the Recycling Rate

To reduce the amount of waste generated during the production stage, Nissan promotes activities based on the "three Rs"—reducing, reusing and recycling materials whenever possible. Nissan Green Program 2010, our midterm environmental action plan, defines our goals in this area as achieving a 100% recycling rate for our operations in Japan and bringing this rate to an

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industry-best level globally. In Japan, during fiscal 2006 we hit our 100% target at the Tochigi Plant and the Zama Operations Center. Also reaching this goal in fiscal 2006 were Nissan Shatai Co., Ltd. and Nissan Kohki Co., Ltd., bringing our total to four plants, one operation center and two consolidated companies' plants with a 100% recycling rate.

### A Better Approach to Parts Packaging

In its pursuit of eco-friendly ways of doing business, Nissan was quick to focus on the wooden pallets used in parts shipping. We moved to replace these pallets, which ended up as refuse, with steel and plastic shipping units that could be returned and reused. Since 2001 we have worked with our Alliance partner Renault to standardize our returnable pallets; now this standardization is mostly complete all around the world, including in China and other Asian markets. Reexamination of our packing methods has allowed us to reduce the space occupied by our products during shipping, as well as the amount of packing materials required. For instance, by shipping modular parts in disassembled lots separated by component it is possible to cut the volume required per part by roughly half.

## Activities at Dealerships and the End of a Vehicle's Life

## The Nissan Green Shop Certification System

In Japan, our dealerships are the locations of our closest contact with our customers. To promote a responsible stance on the environment at our sales outlets, we undertake a range of activities based on our Nissan Green Shop environmental management system. Dealers certified as Nissan Green Shops are required to name an officer responsible for environmental issues; these officers keep the dealers in compliance with all environmental regulations, ensure that end-of-life vehicles and other forms of waste are disposed of properly, manage all environment-related equipment and carry out communication activities aimed at customers.

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The Nissan Green Shop certification logo

## **Boosting Reuse with Nissan Green Parts**

When dismantling Nissan's end-of-life vehicles (ELVs), recyclers carefully set aside the reusable parts. After we collect these and check their quality, we make them available through our sales outlets as Nissan Green Parts. The 42 types of secondhand parts on sale come in two categories: reusable parts, which are washed and tested for quality before sale, and rebuilt parts, which are disassembled and have components replaced as needed. Sales of these parts in fiscal 2006 were more than ¥2.17 billion. Nissan Green Parts are an effective way not just to reduce waste, but also to provide the parts that customers need more affordably—in the case of reusable parts, just one-third to one-fifth of the price of new parts.

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### **Recycling Aluminum from Wheels**

One of Nissan's unique recycling programs is its recycling of aluminum wheels. We work together with recyclers throughout Japan to collect these wheels from Nissan ELVs. We recycle the wheels through a process that does not degrade their metal, putting the recycled high-grade aluminum back to use in suspensions and other important vehicle parts. At present we recover and recycle around 100 tons of end-of-life aluminum wheels each month.

### **Dismantling Cars for a Greater Recovery Rate**

To improve the recovery rate of its end-of-life vehicles (ELVs), Nissan is working together with recyclers, carrying out experimental dismantling of its cars. This research allows us to learn appropriate methods for dismantling ELVs, recycling the materials in them and recovering reusable parts from the perspective of the workplaces involved in these operations. Feedback from these experiments goes to our product design division, which puts it to work in new vehicle designs. The airbag recovery system developed through this process is now being put to work as part of Japan's Automobile Recycling Law regime.

## Boosting Industrywide Recycling Law Compliance

Japan's Automobile Recycling Law went into force in January 2005. This law requires automakers to recover automobile shredder residue (ASR) and airbags, as well as to recover and dispose of chlorofluorocarbons and hydrofluorocarbons (CFCs and HFCs) from their ELVs. As part of its efforts to comply with the law and increase the efficiency of resource recovery, Nissan is active in the ASR Recycling Promotion Team, or ART, a group of 11 automobile manufacturers and other firms. As a leading ART member, Nissan is working together with society to improve recycling cost efficiency for the vehicle owners.

Nissan's recovery rate for ASR from April 2006 through March 2007 was 73.9%, corresponding to an overall ELV recovery rate of 95.2%. This result comfortably clears the 50% level mandated by the law for fiscal 2010, and even satisfies the 70% requirement set for fiscal 2015. We have also achieved an airbag recovery rate of 94.3%, exceeding the legally required 85%, and recovered and safely destroyed 160,200 kilograms of CFCs and HFCs.



Suspension parts recycled from aluminum wheels



Experimental dismantling of a car (Japan)

### Overview of Recycling Performance (Apr. 2006–Mar. 2007)

ASR	Volume Received	128,827.9 t
	Volume Recovered	95,240.3 t
	Recovery Rate	73.9%
Airbags	Volume Received	40,847.6 kg
	Volume Recovered	38,504.2 kg
	Recovery Rate	94.3%
CFCs/ HFCs	Volume Received	160,200 kg
Total Deposits Received		¥5,642,113,359
Total Cost for Recovery, etc.		¥5,523,193,204

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### Automobile Shredder Residue Recovery

Nissan has focused on recovering automobile shredder residue, or ASR, since well before the 2002 enactment of Japan's Automobile Recycling Law. ASR has a high heat index, which makes it difficult to control the temperature during the heat recovery process, but Nissandeveloped technology has allowed us to overcome this problem. By modifying the furnace at our Oppama Plant, in fall 2003 we were able to become the world's first automaker to recover energy from ASR in its own furnace. Since the 2005 enforcement of the Automobile Recycling Law, we have processed about 400 tons of ASR each month. We create steam with the energy generated in the incineration, using it in painting processes at the factory.

### **Recycling Activities as an Alliance**

The European Union's End-of-Life Vehicles (ELV) Directive was enacted in October 2000. This required automobile manufacturers and sales distributors to collect and recover ELVs. In order to comply with this directive, Nissan Europe S.A.S. and Renault are cooperating in activities in the countries where Alliance synergy effects are expected. These activities include the establishment of networks for collecting and recycling ELVs and supporting the sales distributors in each country.

### **RESPONDING TO VARIOUS ENVIRONMENTAL ISSUES**

At Nissan our consideration for the environmental impact of the vehicles that are our products and our business activities has led us to define three key areas of focus for our environmental efforts. In addition to these areas, though, we carry out research aimed at gauging the importance of other factors to our company and responding appropriately to them. Our investigations of these fields are in some cases far from complete, but we intend to continue working to research various issues and the risk associated with them and to understand the demands that society has of us.

## **Dwindling Water Resources**

At the United Nations Millennium Summit, held in 2000, member nations adopted a declaration establishing the Millennium Development Goals. The seventh of these, "ensure environmental sustainability," includes the target of halving the proportion of people without sustainable access to safe drinking water by 2015. Nissan is doing its part to reduce its water use by cutting back on the amounts used and making use of reclaimed water in its processes.



ASR energy recovery facility at the Oppama Plant (Japan)

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### Protecting Biodiversity

In 1992 the U.N. Conference on Environment and Development, held in Rio de Janeiro, Brazil, adopted the Convention on Biological Diversity. The signatory nations have been pursuing the goals of this convention, which were reconfirmed in March 2006 at the international gathering COP8, where a new agreement sought increased participation from industry. Today corporate efforts toward protecting biodiversity are accelerating. March 2007, meanwhile, saw environment and development ministers from the Group of Eight (G8) nations and five developing nations agree on the Potsdam Initiative—Biological Diversity 2010. Spurred by these governmental agreements, corporate moves to protect biodiversity are expected to pick up further steam in the future.

#### Biodiversity Protection at the NTC, Japan

Around Nissan's Technical Center (NTC) in central Kanagawa Prefecture, located near the natural splendor of the Tanzawa-Oyama region, we have set up walking trails for nature observation. These have proved very popular with local residents. University teams researching the area's ecosystem, home to many wild animals, also make use of this trail network. In fiscal 2006 a research group investigated the local forest's capacity to absorb carbon dioxide, in the process discovering growths of a rare type of calanthe, a perennial plant designated as an endangered species. Nissan plans to continue its efforts aimed at coexistence with the natural environment.



Calanthe grows naturally on the NTC grounds. (Japan)

#### Messages from Our Stakeholders

## Society's Hopes for Nissan's Visible Results



**Takejiro Sueyoshi** Special Advisor in Asia and the Pacific Region UNEP Finance Initiative Nissan Green Program 2010 states that a society with symbiosis among people, cars and nature is an ideal one in the future. In order to realize this ultimate society, Nissan puts high priority on the substantial reduction of CO<sub>2</sub> emissions from cars. It also promises society that its technology will provide innovative cars to achieve the goal.

As the IPCC's Fourth Assessment Report of 2007 urges us, humankind needs to aggressively take on the challenge to reduce CO<sub>2</sub>. I do welcome Nissan's commitment to fulfill its social responsibility as a leading globally operating

automaker. I support it because its environmental policy is in keeping with the expectations of society.

Though this is good, it is not an easy mission to complete. It is fair to say that without the understanding and collaboration of its customers and stakeholders, Nissan's efforts will not pay off. A stronger linkage with society will help Nissan to overcome a lot of difficulties on the way.

Nissan says its CSR vision is to Enrich People's Lives. It is my hope that with concrete and visible results, Nissan's goal will be obtained very successfully.