

KEY CSR AREAS

Environment — Achieving a Symbiosis of People, Vehicles and Nature

Nissan's environmental philosophy, "a Symbiosis of People, Vehicle and Nature," expresses our ideal picture of a sustainable mobility society. To achieve this, we have defined three key issues to be tackled: reducing CO₂ emissions, reducing other emissions (to protect the air, water and soil) and recycling resources. We are working toward the ultimate goal of keeping the environmental impact caused by our operations and Nissan vehicles throughout their life cycle to a level that can be absorbed naturally by the Earth.

Three Key Issues

1. Reducing CO₂ Emissions

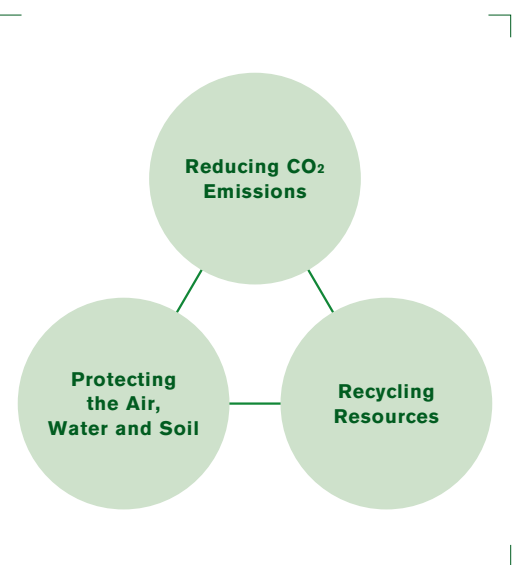
The automobile industry is entering an age when it must work not only to help reduce CO₂ emissions, but also to reinvent its business structures to reduce reliance on fossil fuels. As a global automobile manufacturer, Nissan is working to reduce CO₂ emissions at every stage of its vehicles' lives, from production to transport and operation, as well as to develop technologies for making use of renewable energy and to create related business models.

2. Protecting the Air, Water and Soil

Our lives depend on a balance within the ecosystem composed of air, water, soil and other living beings. At Nissan, we are working to reduce the environmental effects of our vehicles throughout their life cycles so that we may hand down a healthy global environment to future generations. We are making this approach a new part of our values as we continue to develop and champion environmentally friendly technologies.

3. Recycling Resources

Nissan manufactures and markets its vehicles all around the world, utilizing resources in a variety of forms. In line with our basic stance of treating resources as limited, and believing that they should be used as efficiently as possible, we are working to make effective use of resources at every stage of our vehicles' life cycles.



■ Environmental Vision



Achieving “a Symbiosis of People, Vehicles and Nature”

As a global automaker, Nissan takes active steps to identify the direct and indirect impacts of its business on the environment and subsequently work to help minimize them. Our ultimate goal is to reduce the environmental impact caused by our operations and Nissan vehicles throughout their life cycle to a level that can be absorbed naturally by the Earth, leaving as small a footprint on the planet as possible.

Nissan aims to be a “sincere eco-innovator.” Toward this end, we take a proactive stance toward addressing environmental challenges and helping to reduce the real-world environmental effect of our products, people and facilities, as well as providing our customers with optimal value in the form of innovative products, technologies and services as contributions to a sustainable mobility society. By actively working to contribute to the protection of the global environment through sustainable mobility, we hope to make our vision of achieving “a Symbiosis of People, Vehicles and Nature” a reality.

The Nissan Green Program

To propel the company forward in pursuit of its ultimate goal, Nissan established a medium-term environmental action plan, the Nissan Green Program (NGP), and is working to advance it companywide. We have completed most of the action plans intended to target three key issues—reducing CO₂ emissions, reducing other emissions (to protect the air, water and soil) and recycling resources—for NGP2010, which was launched in 2006. During this time, we introduced many new environmental technologies to the market as we focused on reducing CO₂ emissions in all of our business fields. We also established an environmental management framework and steadily moved forward with measures for achieving our long-term goals. In the next phase of this action plan we will continue to work to reduce the environmental dependency and impact of our vehicles and business activities while continuing to strive to achieve zero-emission mobility by promoting effective products and technologies, leading society toward greater sustainability. (For more information on the goals of NGP2010, please see pp. 17-18.)



NISSAN
GREEN PROGRAM

Environmental Management Framework

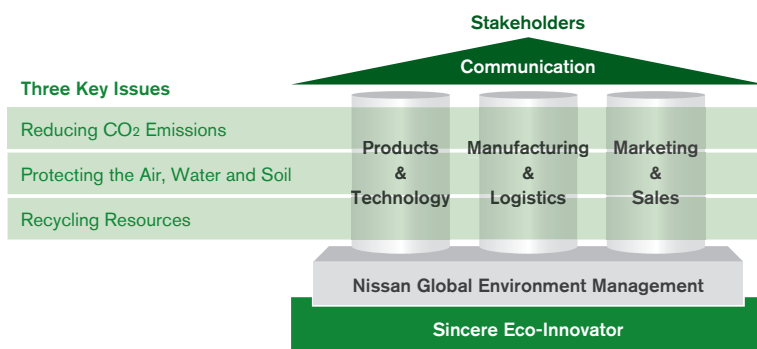
Nissan has built a global environmental management system that achieves maximum results targeting the three key issues outlined earlier by organically linking divisions engaged in product and technical development, production, logistics, marketing and sales.

To promote environmental management globally, Nissan has created specific organizational roles and responsibilities to clarify areas of activity and responsibility. Our Global Environment Management Committee (G-EMC), headed by Nissan's chief operating officer, determines overall policies and the proposals to be put before the Executive Committee. The Global Environmental Planning Office, established in 2007, determines which proposals will be forwarded to the G-EMC and assigns specific actions to each division. It is also responsible for the efficient management and operation of environmental programs based on the PDCA cycle: plan, do, check and act.

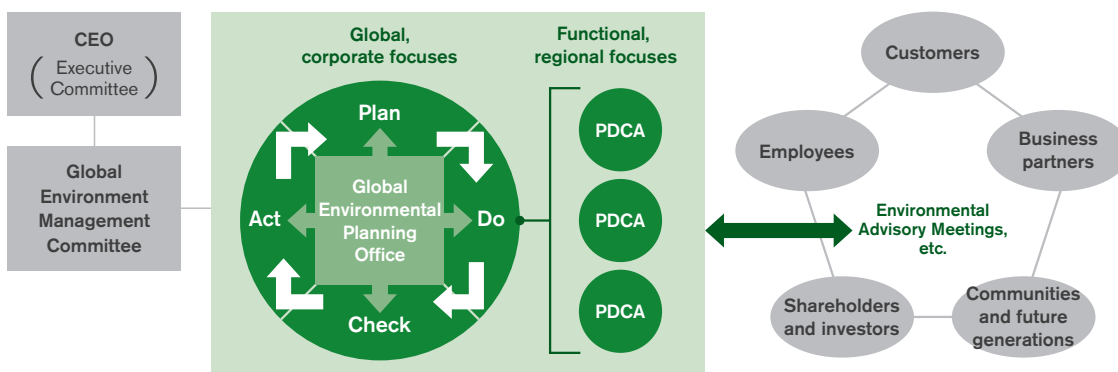
In addition, we further enhance our activities by soliciting the ideas of leading environmental experts and organizations at our Environmental Advisory Meetings, and by learning about the trends of socially responsible investment funds and assessments from rating organizations. We use this information to help understand the opinions of our stakeholders and to better assess our goals and activities.

We have also introduced the Nissan Global CO₂ Management Way (QCT-C), a new set of management indices with CO₂ (C) added to the traditional indices of quality, cost and time. In this way we have placed CO₂ reductions alongside these more traditional measures in importance, and we are promoting corporate activities with a balance in these four areas with the aim of creating new value.

Our Framework for Global Environment Management



Nissan's Global Environment Management Organization



A Full Range of Environment Management Systems

Nissan is progressing with the introduction of environmental management systems to all of its operation sites worldwide.

In January 2011 we obtained integrated ISO 14001 certification for our Global Headquarters and all of our main facilities in Japan for research and development, production and distribution, as well as for our product development processes. With this certification, we are creating a consistent framework for management of environmental issues. In addition to undergoing audits by third-party organizations, each year we carry out our own internal audits of our environmental systems and environmental performance as a means of strengthening the company's measures based on the PDCA cycle. We have also obtained ISO 14001 certification at our main production plants outside Japan. Our policy is to extend environmental management systems with these same criteria to regions in which we are newly expanding.

We have also introduced an original approach to environmental management based on ISO 14001 certification, which we call the Nissan Green Shop certification system, to our sales companies in Japan. This system is managed through internal audits conducted by the sales companies themselves every six months, in addition to regular annual reviews and certification renewal audits carried out every three years by Nissan headquarters. As of the end of March 2011, some 2,800 dealership outlets of 174 sales companies, including parts and forklift dealers, have been certified under the system.

Additionally, 18 of our 20 consolidated manufacturing affiliates have obtained ISO 14001 certification.

Shared Approach with Suppliers

The purchasing divisions of Nissan and Renault carry out supply-chain management in a manner consistent with *The Renault-Nissan Purchasing Way*, a booklet outlining policies for dealing with suppliers, and the *Renault-Nissan CSR Guidelines for Suppliers* published in 2010. With respect to environmental issues, since April 2008 we have set standards for the efforts of our automobile parts and material suppliers in the form of the revised Nissan Green Purchasing Guidelines. We are now expanding the coverage of these guidelines worldwide. Through these purchasing guidelines we seek to share our environmental principles and action plans with our suppliers and to promote the reduction of environmental impact throughout the entire supply chain, thus helping to realize our philosophy of "a Symbiosis of People, Vehicles and Nature." (Please see pages 82 and 83.)

Utilizing the Life Cycle Assessment Method

Nissan uses the life cycle assessment (LCA) method to quantitatively evaluate and comprehensively assess environmental impact in all stages of the vehicle life cycle, from resource extraction to production, transport, customer use and vehicle disposal. With the aim of developing more environmentally friendly vehicles, we also carry out LCAs for new technologies as they are introduced.

Environmental Education for Employees

Nissan conducts environmental education for all of its employees in Japan to promote and deepen individual awareness of environmental issues. Basic education is a part of the orientation of new employees when they join the company. Additionally, classes and seminars following Nissan's original environmental education curriculum are held to raise the awareness of managers and midlevel employees. We are also developing localized educational tools for employees at our operation sites around the world.

Nissan Green Program 2010 (FY2006–2010) Activities

Item	Target	Activities up to the end of FY2010	See page		
Reduction of CO ₂ emissions	Establish global environmental management framework with QCT-C (CO ₂)	Launched global CO ₂ management scheme in each area of value chain in FY2008 and continued implementing the scheme	15		
	Improve fuel economy	Attain fuel efficiency standards in Japan, Europe, U.S. and China, and further fuel economy progress	Continued promoting activities for fuel economy improvement in each market	20	
		Japan: Introduce eco-friendly vehicles addressing both inside and the ambient environment		Introduced fuel-efficient "Nissan ECO Series" in Japan in 2009	—
		Internal combustion engine improvement	Introduce VVEL system to reduce CO ₂ emissions by approximately 10%	Introduced engine with VVEL system in Skyline Coupe in FY2007	—
			Introduce gasoline engines comparable to current diesel engines in CO ₂ emission levels (approx. 20% less emissions)	Adopted MR16DDT engine with a highly efficient compact turbo charger in Juke in 2010; adopted 5.6-liter V8 engine with VVEL and Direct Injection Gasoline system on Nissan Patrol/Infiniti QX in U.S., GCC and China	26
			Introduce vehicles comparable to current hybrid electric vehicles (HEVs) in CO ₂ emission levels, starting in the Japanese market	Started production of Micra DIG-S, achieving ultra-low CO ₂ emissions in Europe in March 2011	—
		Transmission improvement	Global sales of CVT: Approx. 1 million sales per year	Continued annual global sales of over 1 million units since FY2007; total sales in FY2010 were 1.58 million units	27
	Develop and introduce 7-speed AT		Introduced Infiniti FX50 with 7-speed AT to U.S. market in 2007; more models using this AT to be rolled out	—	
	Develop and expand clean energy vehicles	Vehicles compatible with bioethanol fuel	E85: Continuously expand in U.S. market	Launched Titan FFV in 2005 Launched Armada FFV in 2007	—
			E100: Introduce within three years in Brazil	Launched E100-compatible Livina in 2009; more compatible models to be rolled out	—
		Strengthen development of EV core technologies (motors, batteries and inverters)		Established a joint company, Automotive Energy Supply Corporation (AESC), in 2007; AESC started marketing laminated compact lithium-ion batteries in 2008; AESC started mass production of the batteries in Zama Plant in October 2010	23
		Introduce all-electric vehicles in Japan and U.S. by FY2010; mass-market globally by FY2012		Launched Nissan LEAF in Japan and U.S. in December 2010, and in Europe in March 2011	21
		Promote initiatives to popularize EVs in cooperation with national and local governments		Renault-Nissan Alliance has entered into over 90 partnerships as of March 2011	21
		Market HEVs with Nissan's proprietary hybrid technologies in U.S. and Japan		Introduced Fuga using the original hybrid system in Japan in November 2010 and Infiniti M hybrid model in U.S. and Europe in March 2011	26
		Accelerate plug-in HEV development		Development advanced	—
		Introduce next-generation fuel-cell vehicles (FCVs) with in-house developed fuel-cell stack (in early 2010s, in U.S. and Japan)		Development advanced toward practical technology within the 2010s	25
	Manufacturing and logistics	Reduce CO ₂ reduction from factories worldwide by 7% from 2005 levels (global per vehicle CO ₂ emissions)	Achieved 18.6% reduction from FY2005 levels in global per vehicle CO ₂ emissions in FY2010	30	
		Global: Begin measurement of emission levels and launch emission management for Nissan's logistics	Started measurement of emission levels in FY2006 and launched global management in FY2007	32	
	Dealers and offices	Japan: Launch emission management at dealers and offices Global: Launch emission management at national sales companies and offices	Started measurement of emission levels in FY2007 and launched emission reduction activities in FY2008	33	
	Achievement of clean emissions (to preserve air, water and soil quality)	Cleaner exhaust emissions	Early compliance with upcoming exhaust emission regulations	Japan: Early introduction of models compliant with future regulations, implementation of exhaust measurement methods	Started using new exhaust emission tests on Serena in 2007; X-TRAIL 20GT met Japan's 2009 Emission Regulations in 2008
Europe: Early compliance with emission regulations such as Euro5				Started marketing regulation-compliant G Sedan, G Coupe, EX and FX in 2008	—
U.S.: Expand PZEV and SU-LEV compatible vehicles				PZEV: Introduced Altima in 2006 and Altima Coupe in 2007 SU-LEV: Introduced Rogue in 2007 and Sentra in 2008	—
China: Early compliance with emission regulations such as Euro4				Compliance with Livina, Qashqai and Sylphy in 2006	—
Develop atmospheric air-level emission vehicle		Advance development work completed	—		
Introduce vehicles with clean diesel engines for Japan, U.S. and China		Japan: Launched a new clean diesel X-TRAIL 20GT (MT) in 2008; added AT models in June 2010	35		
Introduce 2-liter-class vehicles with clean diesel engines (Euro4) in FY2007 in Europe		Launched Qashqai and X-TRAIL equipped with clean diesel engines in 2007	—		
Expand use of low precious metal catalysts for gasoline-powered cars utilizing only half the precious metal compared to conventional models		Developed an ultra-low precious metal catalyst for gasoline vehicles in 2007, introduced it in the new Cube in 2008; developed ultra-low precious metal catalyst for clean diesel engines in 2010	35		
Management and reduction of environment-impacting substances		Ban/reduce the use of four heavy-metal compound and specified bromine flame retardants		Compliance with all new models launched in 2007	38
		Reduce in-cabin VOC emissions		Achieved JAMA's voluntary targets for 13 compound concentration levels set by the Japanese Health Ministry in all new models launched in 2007	38
	Compliance with European REACH standards		Started chemical substance management in 2006	38	
Reduction of VOCs in painting process in plants	Global: Achieve VOC reductions exceeding each country's standards		Promoted activities to comply with each country's regulations	36	
	Japan: Achieve 10% reduction in volume of VOC emissions from FY2005 levels (per unit, body and bumper total)		Achieved 17.1% reduction in FY2010	36	
Control environment-impacting substances at dealers	Japan: Protect water and soil through Nissan Green Shop (NGS) activities Global: Study potential for overseas expansion of activities		Promoted activities	—	
Reduce drive-by noise	Compliance with voluntary standards tougher than each country's regulations		Compliance achieved for all models starting in 2007	—	

Item	Target	Activities up to the end of FY2010	See page		
Recycling of resources (promotion of the 3Rs)	Design to facilitate recycling	Promote, expand design to facilitate recycling	Achieved 95% recovery rate in all new models since 2005	39	
		Develop recycling technology for electric vehicles (HEVs, EVs and FCVs)	Development advanced	41	
	Effective utilization of resources	Improve plant resource recovery rate	Global: Industry-best level in each country	Activities promoted	41
			Japan: Resource recovery rate 100% (NML and affiliates)	Achieved 100% resource recovery rate at 5 Nissan plants, 2 offices and 5 affiliates in FY2010	41
		Logistics: Improve parts packaging efficiency	Activities promoted	41	
		Product: Expand the volume of recycled material	Activities promoted	40	
	At sales companies, dealers	Improve ELV recovery rate	Global: Promote activities to achieve 95% recovery rate	Activities promoted	—
			Japan: ELV recovery rate of 95% (5 years ahead of 2015 regulation)	Achieved recovery rate of 97.0% in FY2010	—
		Recycling activities at dealers and national sales companies	Japan: Optimize waste disposal procedures through Nissan Green Shop (NGS) activities Global: Feasibility study for introducing above activities	Activities promoted	42
	Management	Business partners	Consolidated and affiliated companies: Expand management boundary and global environment management system	Started measurement of CO ₂ emission levels, set a reduction target and established CO ₂ management scheme in FY2007; started CO ₂ management in FY2008	—
Renault: Joint implementation of CSR procurement			Conducting based on the <i>Renault-Nissan Purchasing Way</i>	—	
Suppliers: Manage environment-impacting substances by green procurement system			Working in line with Nissan Green Procurement Guidelines since 2008	—	
Companywide activities		Establish LCA procedures for product and operational aspects		Reduction of environmental impact promoted through LCA method	—
		Environment-conscious designs for new buildings	Nissan Advanced Technical Center (NATC) in Atsugi, Kanagawa and Nissan Global Headquarters (GHQ) in Yokohama	NATC and GHQ received top "S" CASBEE ratings in 2008	—
			Regional headquarters around the world	Adopted environment-conscious designs for Nissan North America's new headquarters and some sites in Europe in 2008	—
Employees' awareness		Develop global environmental education program		Started Nissan environmental e-learning program co-developed with Natural Step (NGO); introduced the program in Japan in FY2008 and expanded to affiliates in FY2009	—
Working with society		Collaborating with other sectors	CO ₂ reduction with government ministries, other companies by utilizing ITS	Implemented the ITS Project to reduce traffic accidents and ease congestion in 2006; launched STARWINGS project with Beijing Transportation Information Center in 2007; navigation system with congestion-avoidance route information installed as standard in top luxury-grade Teana in 2008; Renault-Nissan Alliance launched "YOKOHAMA Mobility Project ZERO" with city of Yokohama in 2009; New Energy and Industrial Technology Development Organization (NEDO) commissioned Nissan to test Beijing traffic system in 2010	—
			Study of economic approaches such as emission trading	Launched carbon offset program linked to the sale of March Collet in 2008	—
			Support for environmental studies and education through Nissan Science Foundation (now Nissan Global Foundation)	Implemented support	—
	Communication with stakeholders	Timely environmental information disclosure		Updated information disclosed in June every year	—
		Promote eco-driving to customers	Expand eco-driving support services through the Nissan CARWINGS navigation system in Japan	Started providing monthly eco-drive rankings and advice in 2007; started "Eco-Driving and You" in 2008	—
			Develop new technologies for eco-driving	Expanded use of fuel-efficiency gauges from 2007; developed Eco Pedal in 2008 and installed in Fuga (Infiniti M) in 2009; promoted installation of systems featuring CVT and engine modulation in 2009; started adoption of Eco-mode Function, Eco-drive Navigator, etc. in 2010	—
			Promote eco-driving	Started holding training sessions at various events and at GRANDRIVE test course in FY2008; started "E1 Grand Prix" for eco-driving practice in FY2009	—
		Continue environmental education program	Carried out Nissan Waku-Waku Eco School from FY2008		—
	Improve Nissan's environmental activities through continuous communications with stakeholders	Carried out Nissan Environmental Advisory Meeting from FY2005; published Sustainability Report on website; introduced activities through brochures and leaflets; conducted tours of environmental facilities		—	

■ Reducing Carbon Dioxide (CO₂) ■ ■ ■

Nissan's Tasks to Tackle

Issues related to fossil fuels and natural resources are the focus of increasing attention in connection with the rapid growth of the world's emerging economies. The automobile industry is entering an age when it must work not only to help reduce CO₂ emissions, but also to reinvent its business structures to reduce reliance on fossil fuels. Nissan strives to maintain a sense of urgency about these issues as it creates revolutionary technologies and business models to provide new value to customers and accelerates its efforts toward the realization of a more sustainable mobility society.

Nissan's CO₂ Emission Levels



Calculated according to Nissan's internal standards (projected lifetime emissions from new cars sold in FY09)

Nissan's Approach

Technical innovation is essential for reliable progress in reducing CO₂ emissions, but there is also a need for society to come together as a whole to tackle the major issues. To help achieve steady reductions in the overall amount of CO₂ emissions, Nissan defines its basic approach of introducing technology as the "four rights"—providing the right technology, at the right time, in the right market and at the right value to the customer. We aim to provide effective technologies at prices customers can afford and to spread these technologies swiftly and widely with a focus on their total contribution to sustainable mobility.

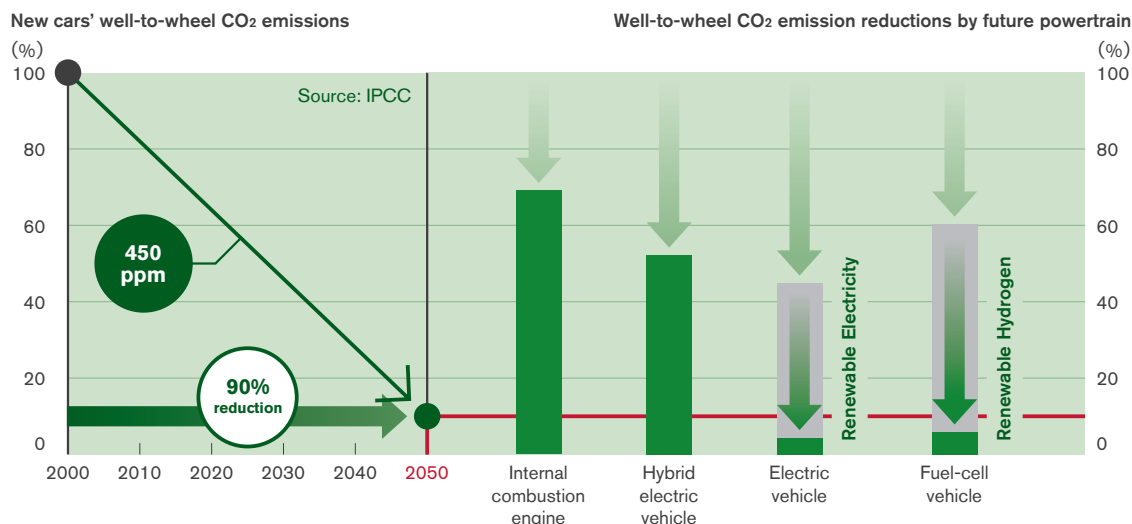
CO₂ emissions produced during vehicle operation can vary greatly depending on vehicle performance and type of fuel, as well as on driving technique and road conditions. We therefore focus not only on our vehicles, but also on support for eco-driving habits and coordinated improvements to the traffic environment. In this way we approach CO₂ reductions from the three perspectives of vehicles, drivers and the driving environment.

Long-Term Goals and Roadmap

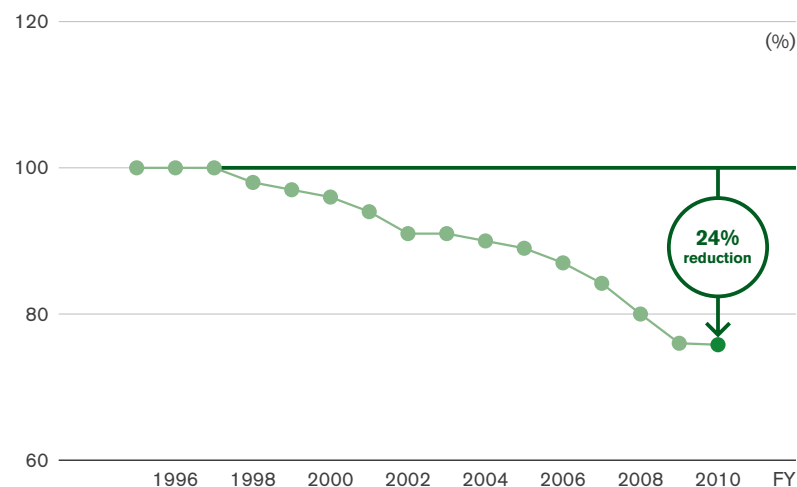
Opinions vary with regard to the levels at which average global temperature and CO₂ concentration will need to be in the future. According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), it is necessary to stabilize atmospheric CO₂ at 450 parts per million or lower in order to keep average temperatures from rising more than 2 degrees Celsius on a global basis. Based on this, we have calculated that “well-to-wheel” CO₂ emissions for new vehicles—including “well-to-tank” emissions, from primary energy extraction through fuel refinement and delivery to customers, in which automakers are not involved, along with fuel consumption during operation—need to be reduced by 90% in 2050 compared with levels in 2000.

To help achieve this 90% reduction, we see the need to further improve the fuel efficiency of internal combustion engines in the short term, and in the longer term, to bring about widespread use of electric and fuel-cell vehicles, making use of renewable energy sources to provide the power they need. We are bolstering our development of new technologies with this long-term scenario in mind. Specifically, we are concentrating our efforts on two pillars: Zero Emission, which involves widespread use of zero-emission vehicles in a holistic approach to promote a sustainable society, and PURE DRIVE, which reduces CO₂ emissions by developing fuel-efficient internal combustion engine technologies and introducing them into the market.

Our CO₂ Reduction Scenario



Average CO₂ Emissions of New Passenger Cars (Japan, EU, USA)



Note: Nissan calculates the companywide averages for fuel consumption in Japan and North America, and for CO₂ emissions in Europe, according to the number and type of vehicles shipped each year.

■ Efforts in Our Products and Technologies

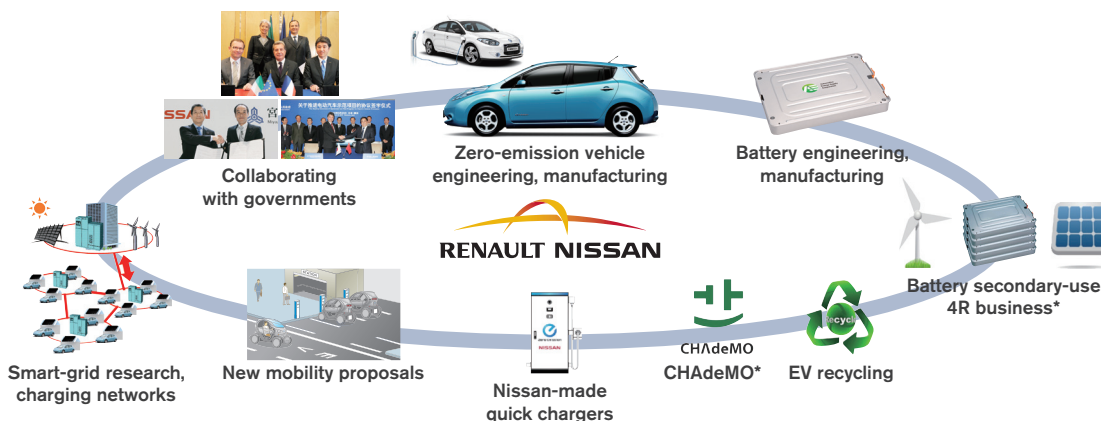
Moves Toward Zero-Emission Mobility

Realizing a sustainable society will require the widespread use of zero-emission vehicles that produce no CO₂ emissions. This means there is a need to go beyond merely producing and selling zero-emission vehicles, and we must also put the needed infrastructure in place and make sure that the vehicles are economical to use, which no single company can accomplish on its own. The Renault-Nissan Alliance, which is positioning the launch and popularization of electric vehicles (EVs)—one form of zero-emission vehicles—as a key corporate strategy, has committed to Zero Emission leadership. In addition to boosting the development and production of EVs, we are forging partnerships with national and local governments, electric power companies and other partners in a range of industries to promote zero-emission mobility and carry out discussions on the construction of the required infrastructure.

As of March 2011, the Alliance has entered more than 90 partnerships around the world, including with the governments of Kanagawa Prefecture and the city of Yokohama in Japan, the government of Portugal and 27 entities (state or local governments and utilities) within the United States.

We are also taking part in a comprehensive range of initiatives built around the zero-emission mobility axis, including the production of lithium-ion batteries, secondary use of batteries, use of recycled materials in cars, in-house manufacturing and sale of quick-charging equipment, construction of vehicle-charging infrastructure and standardization of charging methods with other manufacturers.

A Comprehensive Approach to a Zero-Emission Society



* 4R business: see page 22; CHAdemo: see page 23.

Developing and Manufacturing Zero-Emission Cars

We launched the Nissan LEAF, our 100% electricity-powered vehicle, in Japan and the United States in December 2010 and in Europe in March 2011. As a zero-emission vehicle with no tailpipe emissions including CO₂ during operation, the Nissan LEAF has achieved outstanding environmental performance. Its high-capacity lithium-ion battery, Nissan-developed inverter and electric motor provide powerful, smooth acceleration and a luxurious, quiet ride at all speeds. The Nissan LEAF offers superior handling stability realized by its excellent weight balance and features a maximum driving range of up to 200 kilometers on one full charge (as measured in JC08 test mode). It provides a driving experience unlike any other vehicle ever marketed. With this car and the advanced information technology systems that provide convenient, functional support for its operation, we are seeking to provide new value and a new style of mobility to our customers.

The Nissan LEAF and the steps we are taking to bring about a new zero-emission society have received high marks within Japan and around the world. In Japan, we won the 2010 Good Design Gold Award from the Japan Industrial Design Promotion Organization for our “holistic approach to promote the adoption of Nissan LEAF electric vehicle and zero-emission mobility.”



The award-winning Nissan LEAF

On the international stage, in its Green Awards 2010 the British auto enthusiast magazine *What Car?* presented a special Editor's Award to the Renault-Nissan Alliance for the companies' work on EVs. In the United States, the Nissan LEAF's electric propulsion system won recognition as one of the 2011 Ward's 10 Best Engines, becoming the first non-gasoline-powered, zero-emission winner in the award's 17-year history.

The Nissan LEAF was also named the European Car of the Year for 2011, another first for an electric car in the 47-year history of these awards. The world's first truly mass-produced, affordable, globally marketed EV beat out 40 internal combustion competitors to win this high honor.

Technology to Support EV Drivers

To make new lifestyles with EVs as a part of them more convenient and comfortable, Nissan is developing a range of functional support programs making full use of advanced IT systems.

The Nissan LEAF's onboard communication unit, for instance, allows users to connect to the vehicle with their mobile phone, smartphone, or personal computer. This gives them access to the vehicle's functions like climate control, allowing them to set a comfortable temperature before they get into the car. This system also lets users check on the battery charge level or start the recharging process while away from the vehicle.

We designed an EV-exclusive version of our Carwings navigation system in Japan allowing drivers to search quickly for the nearest charging stations. Once a destination is set, the navigation system automatically calculates whether recharging will be necessary along the way and indicates where there are charging stations along the route. Newly installed stations are automatically added to the system's map data.

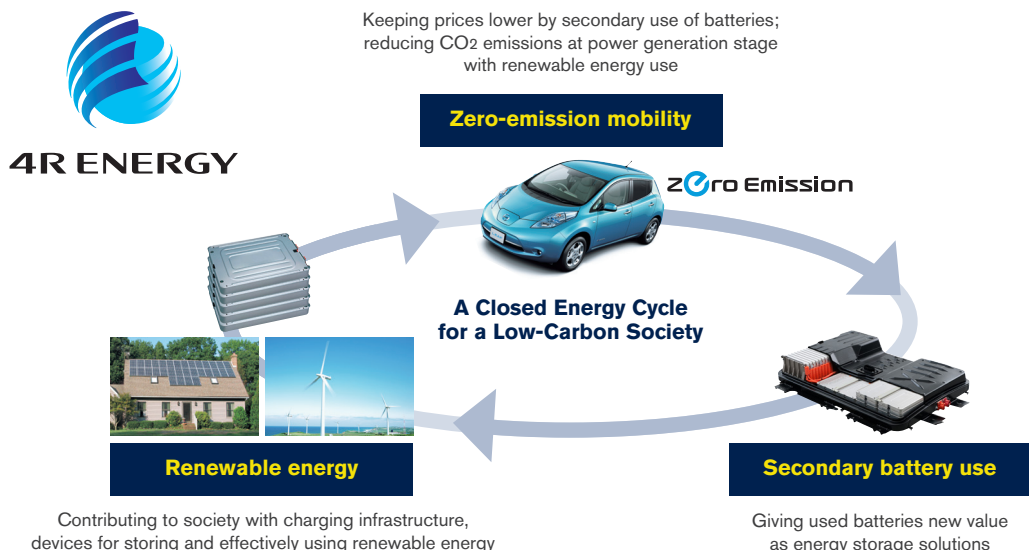
The Nissan LEAF's exclusive IT systems earned widespread praise for their innovation and high quality, winning the Best Mobile Innovation for Automotive and Transport prize in the 2011 Global Mobile Awards. These prestigious awards are presented each year by the GSM Association, a global info-communications industry organization, to leading mobile services and products from around the world.

Our 4R Business for Batteries

The high-performance lithium-ion batteries used in Nissan's EVs retain up to 80% of their initial capacity after five years of use under average conditions. This means these batteries still have useful roles to play even when they are no longer used in vehicles.

In September 2010, Nissan and Sumitomo Corporation launched 4R Energy Corp., a joint venture to develop secondary-use business opportunities for used EV batteries. This company is pursuing the four Rs—reusing, reselling, refabricating and recycling lithium-ion batteries to find ways to put them to effective use in non-automotive second life applications including energy storage solutions. The intent is to add new value to used batteries and establish a closed energy cycle that will contribute to the realization of a low-carbon society in the future.

A Closed Energy Cycle for a Low-Carbon Society



The *What Car?* Editor's Award



The Nissan LEAF earned high marks for its engine.

Global EV and Battery Production

In Japan, Nissan and NEC Corp. launched the joint venture Automotive Energy Supply Corporation (AESC) in 2007. At the AESC plant in Zama, Kanagawa Prefecture, battery modules, which contain four battery cells, are assembled and then shipped to the Nissan Oppama facility, where 48 of them are assembled into the electric car's battery pack. The Oppama Plant has an annual production capacity of 50,000 Nissan LEAFs.

We have also announced that preparations are underway to produce the Nissan LEAF in the United States as well. In late 2012, the Nissan plant in Smyrna, Tennessee, will be outfitted to produce EVs, as well as lithium-ion battery packs. When this plant gets up to full speed it is expected to produce 150,000 EVs and 200,000 battery packs per year and to create some 1,300 new jobs in the state.

In Europe, we are planning to begin production of 60,000 battery packs per year in 2012 at our Sunderland Plant in the United Kingdom. In the first half of the following year, this plant will also see the launch of EV production, with capacity to reach 50,000 vehicles annually. We expect these new U.K. operations to create 200 new jobs within Nissan and 600 positions in our supply chain. Battery production will also begin at Renault's plant in Cacia, Portugal, in December 2013, with capacity of 50,000 Nissan lithium-ion battery packs per year.

In 2015, the Renault-Nissan Alliance is projected to have an annual global production capacity of 500,000 EVs and 500,000 battery packs.

Our Quick EV Charger

In May 2010, ahead of the launch of the Nissan LEAF, our parts dealers throughout Japan began sales of a quick-charging unit developed by Nissan for electric vehicles. By putting its EV R&D know-how and factory facilities to work in the in-house development of this quick charger, Nissan was able to produce a unit at a very competitive price. The charger makes full use of a range of safety devices to achieve a high level of safe reliability; it can be used even when it is raining, and specialized models are also available for use in hot or cold climates.

A Full-Coverage Charging Network

Nissan has worked together with Toyota Motor Corp., Mitsubishi Motors Corp., Fuji Heavy Industries Ltd. and Tokyo Electric Power Co. to form the CHAdeMO Association.* This group aims to standardize the forms of the chargers and to increase the availability of quick-charge units—a must for the spread of EVs. In addition to automakers and power companies, the association includes manufacturers of charging equipment, charging service providers, other companies playing supporting roles and administrative bodies. In all, there are 332 members from all around the world as of March 2011.

Nissan's charging units are based on CHAdeMO standards, and can therefore be used for other manufacturers' EVs that share this interface as well. All of Nissan's approximately 2,200 dealerships in Japan are now equipped with standard 200-volt charging units. Some 200 of these dealers have also quick-charging stations on the premises. In this way we provide nationwide coverage in a worry-free driving environment that never leaves EV drivers more than 40 kilometers away from a quick-charging facility.

In September 2010, Nissan announced it would jointly develop a quick-charging network for EVs with Endesa, Spain's largest electricity utility. We are now working with Endesa to create this network of DC quick-chargers covering all of Spain.

* An abbreviation of "CHArge de MOve," or "charge for moving," CHAdeMO is the trade name for this quick-charging method that the association is proposing as a global industry standard.

EV Charging Infrastructure for Condominiums (Japan)

In August 2010, Nissan and Daikyo Inc., one of Japan's largest condominium marketers, signed an agreement on cooperation toward the realization of a low-carbon, recycling-based society.

To promote the widespread use of EVs, it will be vitally important to establish ubiquitous infrastructure for recharging the vehicles. Charging facilities at multiunit housing structures will be one key to boosting EV use in urban areas. In our memorandum of understanding exchanged with Daikyo, we agreed to launch a Demonstration Project for EV Charging Infrastructure in Condominium Buildings. Through this project we will pursue solutions to the issues involved.

The Nissan New Mobility CONCEPT

As part of our proposals for new forms of mobility for a sustainable zero-emission society, and as one example of what lives of the future with EVs as part of them might be like, in November 2010 we unveiled the Nissan New Mobility CONCEPT.

Society today is seeing rising numbers of senior citizens and single-member households, along with increasing use of automobiles for short-distance trips and to carry small numbers of passengers. We focused on these trends in coming up with this efficient, high-utility, sustainable means of mobility.

This small, easy-to-handle concept car represents a completely new form of mobility in a segment not covered by any existing cars. We expect it to prove handy in a range of driving situations, and we intend to provide various new services built around the New Mobility CONCEPT, including "seamless mobility service," a highly efficient and convenient linkage of public transportation and EVs via IT services, and "two-mode EV car sharing," in which the vehicle serves as a private commuter car in the morning and evening and as corporate transportation during the day. We are also considering ways for this vehicle to contribute to the revitalization of local communities, such as by increasing the accessibility of suburban areas and tourist destinations.



The Nissan New Mobility CONCEPT

Partnerships Toward a Zero-Emission Society

As part of its efforts to promote zero-emission mobility, Nissan has forged partnerships with national and local governments, electricity providers and other counterparts all around the world. One facet of these partnership activities is the Future-Generation EV Kyoto Project, undertaken jointly with the Kyoto city government, Mitsubishi Motors Corp. and Horiba Ltd. since July 2010 to promote EV use, develop vehicle-use systems that match Kyoto's traffic conditions and help spread eco-driving practices. The project aims to prompt people to switch to EVs and to put more charging infrastructure in place; it also involves development of a system that gives drivers information on the location of charging stations and whether they are currently in use, thereby creating a total supportive environment for EV use. Other goals of the project are to reduce traffic within the city limits through park-and-ride and car-sharing initiatives and experimental testing of systems for efficient automobile use.

A Nationwide Tour for the Nissan LEAF

In July 2010, Nissan kicked off "the new action TOUR," a nationwide series of events in Japan aimed at spreading the word about EVs. The first event, organized jointly with the Kanagawa prefectural government and a nonprofit organization, saw some 400 people attend, with 80 of them taking part in test drives and a citizens' workshop at our global headquarters in Yokohama and several nearby facilities.

To give as many of our customers as possible a sense of the coming zero-emission society, we intend to take "the new action TOUR" to all 47 of Japan's prefectures. In fiscal 2010, we followed the Kanagawa Prefecture launch with events in the city of Saitama in August, Kitakyushu in October, Yokohama in December, Miyazaki Prefecture in January 2011 and Kyoto in February. We will continue holding tour events, primarily in areas where the Renault-Nissan Alliance has entered partnerships with local governments to help promote zero-emission mobility.

Creating Smart Energy Grids

The Yokohama Smart City Project, proposed by Nissan in concert with the city of Yokohama and companies including Accenture Japan Ltd., Toshiba Corp., Meidensha Corp., Panasonic Corp., Tokyo Gas Co., Ltd. and Tokyo Electric Power Co., was selected by Japan's Ministry of Economy, Trade and Industry as one of its Next-Generation Energy and Social Systems Demonstration Areas. Through these demonstrations, the ministry intends to realize Japan-style smart energy grids, and eventually to market them overseas.

The batteries that power EVs can also play a key role as energy-storage devices supporting large-scale reliance on renewable energy sources. As such, they have the potential to contribute to lowering carbon emissions throughout society as a whole, and not just in the automotive sector. Nissan has been exploring ways to make innovative use of EVs and their batteries in creating a zero-emission society. This project is giving fresh impetus to our efforts.

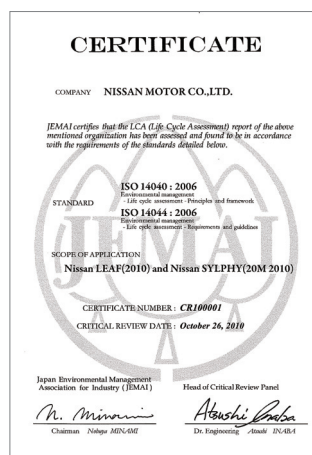
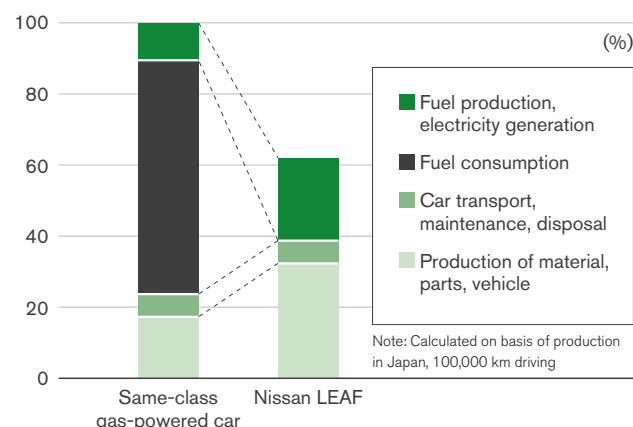
In November 2010, Yokohama hosted the summit of the leaders of the Asia-Pacific Economic Cooperation member economies. In the city's Minato Mirai 21 district, the site of Nissan's Global Headquarters, we carried out an intensive public relations campaign. These will be expanded to areas like Kohoku New Town, a heavily built-up district in Yokohama, and the city's shoreline Kanazawa Ward, part of the Yokohama Green Valley Initiative eco-city scheme, to gauge this approach's extensibility and potential for broad popularization.

In April 2010, Nissan also signed a memorandum of agreement with the U.S. manufacturer General Electric Co. on joint research of smart-recharging technologies aimed at boosting EV use. The companies will cooperate over three years in two areas: control of electricity supply and demand in homes and other buildings making use of EVs' energy-storage capacity and EV charging as an integrated part of large-scale electric grids. Through their joint research, Nissan and GE hope to develop reliable new technologies that can flexibly meet a range of charging and power provision needs as part of overall utility systems.

Reducing CO₂ Throughout the Nissan LEAF's Life Cycle

Our calculations show that the Nissan LEAF produces up to 40% less CO₂ emissions over its entire life cycle than a gasoline-powered vehicle in its class. This has been verified by an LCA, or life cycle assessment, carried out by the Japan Environmental Management Association for Industry, a public assessment institution. We will continue improving our vehicles' electricity consumption through technological innovation and streamlining our manufacturing processes in an effort to further reduce CO₂ emissions over the life cycle of our EVs.

CO₂ Emissions Over a Vehicle's Life Cycle



Nissan's LCA certification

Work to Improve Fuel-Cell Vehicles

Fuel-cell vehicles (FCVs) are another type of zero-emission vehicle emitting no CO₂ or other exhaust gases. Running on electricity generated from hydrogen and oxygen, they emit only water during driving. Nissan's FCVs make use of the lithium-ion batteries and high-power electric systems refined in the development of its EVs, as well as the control systems from its hybrid vehicles and the high-pressure gas storage technologies from its cars running on compressed natural gas. In 2008, we developed a new fuel-cell stack with twice the power density of previous stacks, and we continue to work on ways to lower costs considerably by reducing the amount of precious metal used in the stacks while also making them last longer. In January 2011, we joined 12 other companies to jointly announce efforts to develop the hydrogen supply infrastructure necessary for FCVs and to spur their adoption in the Japanese market. Development is now underway toward achieving these goals within this decade.

PURE DRIVE for Low Fuel Consumption

To reduce CO₂ emissions, Nissan continues to develop technologies to improve fuel efficiency in internal combustion engine technologies and bring them into the market. One special area of focus is expansion of our PURE DRIVE series of cars with low CO₂ output.

Unique Hybrid System

Hybrid vehicles combining gasoline engines and electric motors can significantly reduce CO₂ emissions. Nissan has developed a unique hybrid system using a high-output lithium-ion battery together with a single motor for both drive and regeneration, as well as an intelligent dual clutch control system in which two clutches are linked in parallel, one to the motor and one directly to the engine and transmission. With this hybrid system one of the two clutches completely disconnects the motor from the engine, resulting in quiet and highly efficient EV-mode driving. By using this EV mode in high-speed driving and similar conditions, we have achieved best-in-class fuel economy for four-door sedans with 3.0-liter or larger engines.

The compact, high-output lithium-ion battery is able to charge/discharge quickly. This contributes to high-speed, precise control of the electric motor and optimum clutch control, which enable both luxury driving with smooth shift quality and sharp acceleration response.

Nissan released the Fuga Hybrid equipped with this system in Japan in autumn 2010. The Fuga Hybrid achieves fuel economy of 19 km/L (10-15 mode)—comparable to that of a compact car—while providing immediately responsive driving performance. We have also installed this hybrid system in our Infiniti M models that went on sale in North America and Europe in March 2011.

Hybrid System

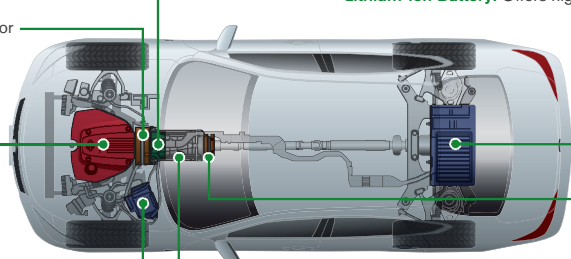
Motor: Performs both propulsion and generation functions

Clutch 1: Connects/disconnects motor and engine

V6 3.5L DOHC Engine: Delivers efficiency and high power output

Lithium-ion Battery: Offers high capacity, quick charging/discharging

Inverter: Controls electricity flows to motor



Clutch 2: Engages drive, changes transmission speed

Hybrid Transmission: Transmits drive force to the vehicle via electronic 7-speed system with manual mode

HR12DE Engine Achieves Low Fuel Consumption of 26 km/L

Nissan developed the new 1.2-liter HR12DE engine in pursuit of lighter weight and smaller size. This 3-cylinder engine requires fewer moving parts than the 4-cylinder engines more commonly used in small cars. By applying bore circularity machining to the cylinder block, we have reduced friction by 20% compared with conventional 4-cylinder engines. Moreover, improved noise vibration performance—at a level equivalent to that of a 4-cylinder engine—has been achieved by adjusting the weight balance of the engine's rotary shaft. This engine is used in the new March launched in Japan in July 2010.



HR12DE engine

MR16DDT Direct Injection Gasoline Turbocharged Engine

Nissan's newly developed 1.6-liter 4-cylinder MR16DDT engine is based on a downsizing concept that combines a turbocharger with a low displacement, direct injection gasoline engine (fuel is injected directly into the engine cylinders) to achieve both higher power output and lower fuel consumption.

The MR16DDT engine adopts new technologies including Continuously Variable Valve Timing Control (CVTC), which continuously changes the opening-closing timing of the inlet and exhaust valves, and a new friction-reduced valve spring. From low to high engine speeds, the MR16DDT achieves an excellent balance between acceleration performance and fuel efficiency, with power equivalent to that of a 2.5-liter engine. This engine is used in the Juke sold in the Japanese, U.S. and European markets.



MR16DDT engine

HR15DE Engine with Dual Injectors

Nissan has also developed the new HR15DE 1.5-liter engine, the world's first mass-produced 1.5-liter engine with dual injectors (2 compact injectors per each cylinder).

The dual injectors stabilize combustion by reducing the size of the particles sprayed in the form of a mist by approximately 60%. Improved thermal efficiency and reduced air intake resistance have been achieved by combining the injectors with Continuously Variable valve Timing Control (CVTC). As a result, fuel economy has been improved by approximately 4% compared to Nissan's conventional engines in the same class. In addition, more efficient burning helps to control the hydrocarbons in the exhaust gas and reduces the amount of noble metals needed for exhaust purification. The engine is mounted on the Nissan Juke, which was launched in Japan in June 2010.



HR15DE engine

Idling Stop System with Shorter Startup Time

Nissan's Idling Stop system automatically stops a car's engine when waiting at signals or other times the car is stopped, and then restarts it when the car needs to move again. Cutting the engine when the car is stopped improves fuel efficiency and reduces CO₂ emissions.

The restart function after an idling stop of the engine is crucial to making this technology practical. Nissan has adopted a sensor to detect reverse engine rotation, and has achieved simpler and more convenient idling stop technology without the addition of new equipment. To do this, we worked, for instance, to reduce the time required by completing startup in the second cycle rather than in the fourth cycle as in conventional engines. This helps our system to reduce fuel consumption by about 8% (10-15 Mode).

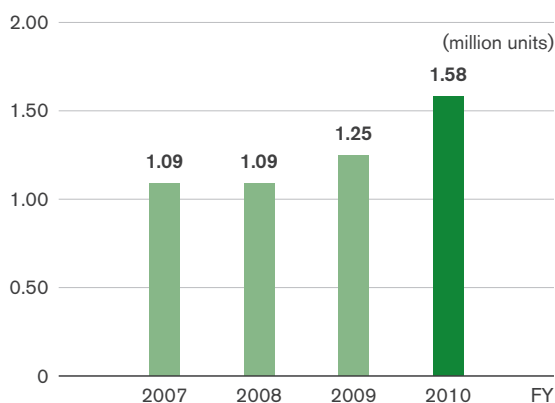
The Idling Stop system with an Energy Control Motor (ECO Motor) for quiet running and quick engine starts is used in the Serena launched in November 2010 in Japan.

Use of New CVT

Nissan aims to reduce total CO₂ by increasing the use of genuinely effective technologies. We consider the continuously variable transmission (CVT) to be an important technology in raising fuel efficiency, and have introduced a wide range of vehicle models with CVTs, from compact to full-sized cars. Since fiscal 2007 we have sold more than one million vehicles per year worldwide, in fiscal 2010 selling more than 1.58 million units.

The new XTRONIC CVT developed by Nissan utilizes a one-piece structure equipped with a sub-planetary gear. Its compact, lightweight design is 10% smaller and 13% lighter than previous CVT designs, while also achieving a 30% friction reduction for powerful acceleration performance, quiet operation and improved fuel economy. Its gear ratio of 7.3 (versus a conventional CVT's 6.0) is the world's largest among automatic-transmission-equipped passenger cars. We have also adopted a new Idling Stop system that includes an internal lock function using the sub-planetary gear. The engine can be restarted on roads with a slope of 6% or less without sliding backwards. The engine restart time is also shortened. During everyday driving, the Idling Stop function works so smoothly that the driver will hardly be aware of it. This CVT is used on the new March and Juke.

Number of CVT-Equipped Units Sold



New Engine Achieves High Fuel Efficiency

Nissan has developed the HR12DDR, a 1.2-liter engine, aiming to achieve the lowest level of fuel consumption in the world for gasoline-powered cars. The engine is based on the HR12DE, the 1.2L 3-cylinder engine mounted on the new Nissan March, and features power output equivalent to that of a 1.5L engine and CO₂ emissions of 95 grams per kilometer (New European Drive Cycle). The engine will be mounted on the new Micra (branded as the March elsewhere) in the European market in the first half of 2011. We have achieved high engine performance and low fuel consumption levels by adopting the Miller cycle, a gasoline direct injection system and a highly efficient supercharger, in combination with the Idling Stop system.



HR12DDR engine

M9R Clean Diesel Engine

Nissan is focusing efforts on clean diesel engine vehicles. Conventional diesel vehicles have much better fuel efficiency than gasoline vehicles with the same power, and so significant reductions in CO₂ can be expected in long-distance and various other driving situations. Considerable cost savings can also be achieved with diesel fuel. To take advantage of these features, under its Alliance with Renault Nissan has developed a new clean diesel engine, the M9R, which successfully cleans exhaust gas. It is used in the X-TRAIL 20GT, which has been introduced in the Japanese market.

An automatic-transmission version of the X-TRAIL 20GT was added in July 2010.



M9R engine

Eco-Drive Support Technology

Eco-mode Function

The engine and CVT are constantly controlled in a coordinated way by a computer that normally switches automatically between high-performance and fuel-efficiency modes depending on driving conditions. The Eco-mode Function incorporates a coordinated control program that makes maximum use of fuel-efficiency mode to further improve the vehicle's efficiency. Drivers can easily switch to Eco-mode using either the car navigation system screen or the Eco-mode switch.

Cars driving in Eco-mode respond more gradually to accelerator input. However, in emergency avoidance and other situations when rapid acceleration is necessary, the computer immediately switches the system to enable quick acceleration.

Eco-drive Navigator

Differences in driving habits can greatly affect fuel efficiency, even with the same car. Nissan has developed an Eco-drive Navigator system to guide drivers in environmentally friendly driving. The system works in particular to prevent excessive fuel consumption when starting and accelerating.

Pressing the accelerator pedal more than is necessary when starting and cruising can use more fuel than needed. This feedback is shown on a meter as an eco-driving guide for the driver. Eco and non-eco ranges are easily distinguished with a gauge and color display so that the driver can intuitively understand just the right amount to press the accelerator pedal.

Eco-driving Diagnosis

Nissan has developed the world's first "eco-driving diagnosis" system, which analyzes driving behavior and scores the driver's eco-driving level for each driving mode. It is adopted in all five of Nissan's original navigation systems and sold as a dealer option to promote the real spread of eco-driving in Japan.

This eco-driving diagnosis system makes use of an original theoretical model of fuel consumption developed by Nissan in its judgment algorithm. The system compares theoretical fuel consumption based on the operations of an individual driver and ideal fuel consumption as determined by Nissan's test drivers, and the eco-driving level achieved by the driver is assessed and given a score. In this way, drivers with different vehicle models and driving environments can compare themselves fairly by score. This is the world's first mechanism to score driving behavior in this way.

Nissan's Carwings information service for car navigation systems has been enhanced to promote eco-driving with a web-based advice service to support individual drivers' eco-driving based on fuel consumption and other data, as well as with the "Eco-driving and You" information channel.

Traffic Information System in Beijing (China)

Nissan has been commissioned by the New Energy and Industrial Technology Development Organization (NEDO) of Japan to work with the National Development and Reform Commission and the Beijing Municipal Development and Reform Commission of the People's Republic of China in implementing a system to provide information to drivers from a dynamic route guidance system (DRGS) and an eco-management system. A system will also be introduced to verify the effects. In the future we will continue to promote cooperative verification projects between Japan and China.

In DRGS, telematics systems (which provide information services to automobiles and other forms of mobility) are used to send traffic information in real time to in-car devices. These devices receive precise traffic information, display the fastest routes and provide road guidance to drivers.

The eco-management system promotes eco-driving by making drivers aware of the amount of fuel they are using when on the road. The system provides continuous eco-driving support through advice on eco-driving and ranking comparisons with other drivers.

Efforts in the Production and Logistics Stages

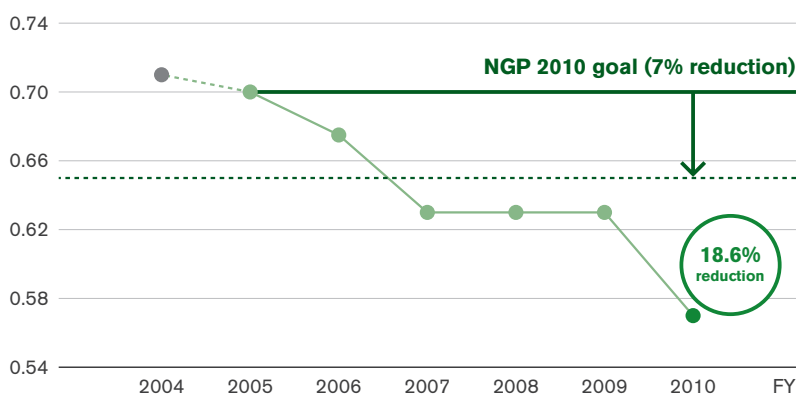
Global Energy Saving

Most of the CO₂ emissions in the manufacturing process are from the consumption of energy generated with fossil fuels. We are confronting these issues directly and engaging in a variety of energy-saving activities in manufacturing our vehicles. In the area of production technology, this includes the introduction of highly efficient facilities, improved production methods and the use of energy-efficient lighting. In our business offices, fine control of lighting and air-conditioning equipment enables us to operate with lower levels of energy use and loss. We then share these activities and best practices with our global production sites.

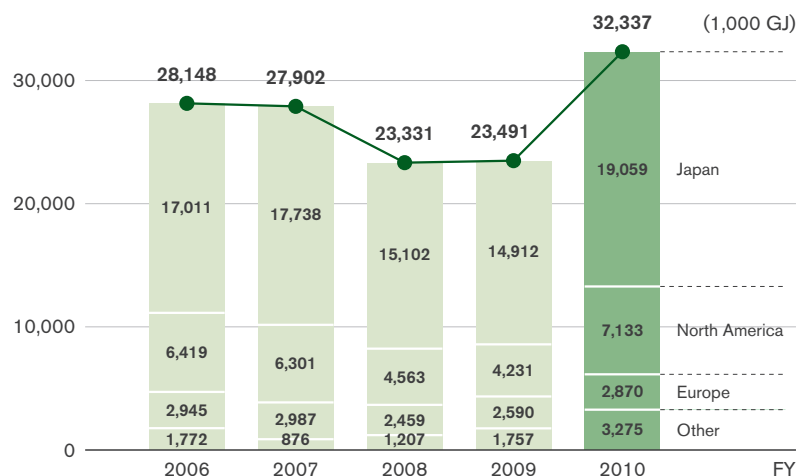
We are also advancing the use of renewable energy sources appropriate to the location of each plant site worldwide. Since 2005, we have installed 10 power-generating wind turbines on the grounds of Nissan Motor Manufacturing (UK) Ltd., which together provide about 7% of the electricity used at the entire site. In Japan, Nissan is co-sponsoring the city of Yokohama's Y-Green Partner program for wind power generation. We are also adopting solar energy: Nissan Motor Iberica, S.A. in Spain has set up solar energy panels and Nissan Mexicana, S.A. de C.V. in Mexico has installed facilities to produce hot water by solar power.

Nissan's target was to reduce CO₂ emissions by 7% below the fiscal 2005 level by fiscal 2010 as measured by the index of "CO₂ emissions per global vehicle" (total emissions generated from global Nissan vehicle manufacturing sites divided by the total Nissan vehicle production volume). To achieve this, we are promoting CO₂ emission reduction activities and introducing Japan's cutting-edge energy conservation technology at our plants worldwide, while our plants in all countries also learn and share best practices with each other. We achieved the above target with CO₂ emissions per vehicle in our global manufacturing sites of approximately 0.57 tons in fiscal 2010, an 18.6% reduction from the fiscal 2005 level.

Global CO₂ Emissions per Vehicle (t-CO₂/vehicle produced)



Global Energy Consumption



Note: The figures for FY2010 are for the Nissan Group worldwide, including 71 consolidated companies. The figures for each fiscal year may encompass different numbers of business locations due to growth in the number of consolidated companies or changes in the scope of companies involved in Nissan's environmental management.

Nissan Honored in the International Energy Star Program (North America)

The International Energy Star program to promote energy savings was started by the U.S. Environmental Protection Agency in 1992, and is currently being implemented in seven countries and regions. There are now 17,000 companies and organizations participating in the program, carrying out various energy-saving activities. Nissan has been involved in the program since 2006, and Nissan North America (NNA) was named Partner of the Year in 2010 for Energy Management. Nissan's manufacturing plants in Smyrna and Decherd, Tennessee, and Canton, Mississippi, are Energy Star award winners for their specific energy efficient operations.

NNA has increased energy efficiency by more than 30% at the above three plants with thorough energy control that reduces energy use and loss in operations. This has resulted in savings of more than \$11.5 million in energy costs annually.

GSEP Initiative Certification Program (North America)

In July 2010 the U.S. Department of Energy announced the Global Superior Energy Performance (GSEP) initiative, an international partnership to improve energy efficiency, with the aim of creating an international certification system for large buildings and industrial facilities. Currently, 24 governments are participating.

To receive certification, a company or organization must have introduced and be using a certified energy control system, and undergo long-term inspection by a third party for improved energy efficiency.

Pilot operation of the program is being handled by eight companies. NNA's Smyrna, Tennessee, plant was selected as one of the participants and is working with the DOE, Oak Ridge National Laboratory and the Georgia Institute of Technology to demonstrate the initial International Standard for Energy Management (ISO 50001).

More Efficient Logistics and Modal Shifts

Nissan began sending chartered trucks for pick-up and delivery of parts in 2000, a method that was uncommon among automobile manufacturers in Japan at the time. This has enabled us to “visualize” waste during transport that had been hidden in the past. We have worked together with suppliers to optimize the frequency of deliveries and transport routes and to improve packaging specifications. The result has been better loading ratios and fewer truck runs. This approach has also been adopted widely at our overseas manufacturing sites, increasing the global efficiency of our operations.

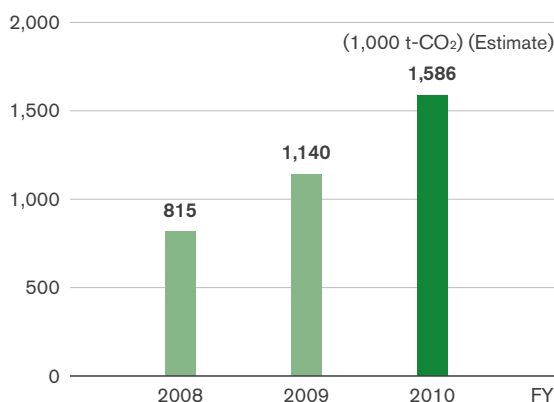
In Europe, we are conducting joint shipment of parts, as well as of completed vehicles, in cooperation with our Alliance partner Renault. In joint shipments by ferry across the English Channel, we have also linked up with other automakers to further improve transport efficiency.

We are also putting much effort into devising efficient modes of packaging for the huge number of parts of different shapes and materials that go into an automobile. As a simultaneous-engineering logistics activity, we are working from the design stage to create parts and develop new vehicles with consideration for transportation efficiency, as well as to reduce the parts shipments per vehicle. We also monitor the competency levels of packaging design engineers, and are cultivating their abilities through global adoption of an original Nissan program.

We have reviewed our transport methods and are undertaking a modal shift from truck to maritime and rail transport. Some 70% of our completed vehicles in Japan are transported by sea. Parts shipments from the Kanto area around Tokyo to our Kyushu Plant are nearly all by rail and ship. The Japanese Ministry of Land, Infrastructure, Transport and Tourism has recognized Nissan as an outstanding enterprise for this modal shift to sea transport.

At our overseas sites, transport methods are selected to best match the local geographical conditions. We are also shifting from truck to rail and ship for completed vehicle transport, depending on the destination. In Mexico, we are increasing the proportion of completed vehicles that are transported domestically by rail.

CO₂ Emissions in Logistics



New Energy Efficient Car Carrier (Europe)

Nissan unveiled the M.V. *City of St. Petersburg*, an all-new energy efficient car carrier for sea transport of vehicles within Europe, in December 2010.

The new car carrier reduces wind resistance by up to 50% compared to conventional vessels with a sleek, semispherical bow. Based on calculations of an annual navigation rate of 75% under average hydrographic conditions for the North Atlantic Ocean, this new design can reduce fuel consumption by up to 800 tons annually, equivalent to an annual reduction of approximately 2,500 tons of CO₂ emissions. Euro Marine Carrier B.V., a Dutch company owned by Nissan Motor Car Carrier that operates this new vessel, plans to use it to transport Nissan vehicles to Northern Europe and Russia. It is expected to show maximum effect in the North Sea, where the wind is known to be very strong.

■ Efforts at Our Dealerships and Offices

Comprehensive Emissions Management

Nissan comprehensively manages CO₂ emissions at its offices and all dealerships in Japan. In fiscal 2008 we began activities to control and reduce CO₂ emissions produced in business activities at our dealers based on the Nissan Green Program 2010. Many of our dealers are making efforts to save energy, including the use of highly efficient air-conditioning, insulation films, ceiling fans and LED lighting. Overseas, we have begun managing CO₂ emissions from corporate activities at our North American and European business sites. We plan to strengthen our management of CO₂ emissions in many more countries and regions in the future.

■ Protecting the Air, Water and Soil



Nissan's Approach to Environmental Protection

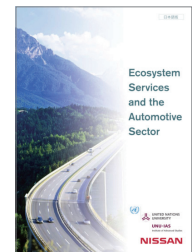
The United Nations Millennium Ecosystem Assessment report issued in 2005 concluded that the ecosystem services evaluated had degraded over the past 50 years. Many scientists believe that humans have changed the Earth's ecosystems more rapidly and extensively than in any comparable period of time in history. Humankind depends greatly on a number of ecosystem services, including provision of food and fresh water, climate regulation and protection from natural disasters. Industry must recognize not just its impact on ecosystems, but also its dependence on these services. Companies today face the pressing need to balance environmental preservation and economic progress as they pursue their business activities. Nissan makes every effort to minimize the ecological impact of its corporate activities and throughout the life cycle of its vehicles, and is working to develop and spread environmental technologies that will create new value.

Our Priorities in Biodiversity

Nissan has carried out extensive studies on the relationship between mobility and ecosystem services through workshops with specialists in the field. We have cooperated with the United Nations University Institute of Advanced Studies, which played a central role in the U.N. Millennium Ecosystem Assessment, on the impact of mobility on the ecosystem and the benefits to humans derived from ecosystem services. In 2010, we published the results of this research in "Ecosystem Services and the Automotive Sector." This joint study focused on the value of ecosystem services that nature produces in human society when biodiversity is protected. The study's aim was to investigate how the automobile business depends on ecosystem services through the entire value chain and what kinds of effects it has on the ecosystem. Using the method of Corporate Ecosystem Services Review,* we have evaluated value chains such as that from extraction of material resources to vehicle production and operation. Based on the results, we then identified three priority areas for us as an automobile manufacturer: energy sourcing, mineral material sourcing and water usage.

From now on, we will work to position the business risks and opportunities identified through this research, reevaluating and further developing our traditional environmental initiatives as we implement strategic measures primarily in the areas of focus that we have defined.

* Developed by the World Resources Institute in cooperation with the World Business Council for Sustainable Development and Meridian Institute based on the U.N. Millennium Ecosystem Assessment.



"Ecosystem Services and the Automotive Sector" is available for download from our website (currently in Japanese only):

<http://www.nissan-global.com/JP/ENVIRONMENT/SOCIAL/BIODIVERSITY/>

■ Efforts in Our Products and Technologies

Toward Cleaner Exhaust Emissions

Nissan proactively sets strict regulations and targets for the design and production of its vehicles. Building on our research and development, in which we have set ourselves the ultimate goal of emissions as clean as the atmosphere, we are working to be a world leader in reducing exhaust emissions with the early introduction of vehicles that meet emissions regulations in each country.

Our Sentra CA, released in the United States in January 2000, was the first gasoline-powered car in the world to receive Partial Zero Emissions Vehicle (PZEV) certification in compliance with the emissions requirements of the California Air Resources Board. PZEV vehicles must meet the zero-evaporative-emission regulations as well as have an on-board diagnostic system that warns of problems with the catalytic converter or other emission-control systems.

The Bluebird Sylphy, released in Japan in August 2000, became the first vehicle to gain certification from the Ministry of Transport (now the Ministry of Land, Infrastructure, Transport and Tourism) as an Ultra-Low Emission Vehicle (U-LEV) producing 50% less nitrogen oxide (NO_x) and nonmethane hydrocarbon (NMHC) than the 2005 emission standards level. In 2003, this model became Japan's first to receive SU-LEV certification as a Super Ultra-Low Emission Vehicle, with emissions at 75% less than that level. As of the end of March 2011, 96.4% of all Nissan gasoline-powered vehicles sold in Japan are SU-LEVs.

Clean Diesel Meets Stringent Exhaust Gas Regulations

While diesel vehicles have an advantage in terms of energy efficiency and level of CO₂ emissions, it has been very difficult to make their exhaust cleaner. At Nissan, we have developed technologies including a diesel particulate filter that traps and eliminates substances making up sooty exhaust, as well as NO_x absorption and oxidation catalysts. These next-generation environmental technologies are used in the M9R clean diesel engine, developed through our Alliance with Renault, that comes in the X-TRAIL 20GT. The X-TRAIL 20GT was the first vehicle to meet Japan's 2009 emissions regulations,* among the most stringent in the world. Since July 2010 an automatic model with a 6-speed transmission (including manual mode) has also been available.

* Japan's 2009 emission standards stipulate that NO_x is to be reduced by 47% and particulate matter by 64% from the levels required by the 2005 emission standards (applicable to vehicles weighing more than 1,265 kilograms). The 2009 Emission Regulations went into effect for new models in October 2009 and will apply to existing models and imported cars, starting from September 2010.

New Catalysts Clean NO_x in Diesel Engines

The M9R clean diesel engine that has been used in the X-TRAIL 20GT since 2010 is equipped with a new lean NO_x trap catalyst that enables cleaning of NO_x, something that has been difficult to do in the past. This new catalyst uses high-dispersion catalyst technology in the NO_x cleaning and NO_x trap layers, inhibiting precious metal surface area reduction from thermal degradation (precious metal condensation) and displaying performance equal to that of conventional technologies, with 50% less precious metal. Technology has been developed to inhibit the reduction in metal surface area exposed to exhaust gas from cohesion of the precious metal, by integrating the substrates and wall material in ultra-low precious metal catalysts and raising the binding strength between the substrate and precious metal. Exhaust gas is further cleaned with high-level engine control to draw out the maximum cleaning performance.

■ Efforts in the Production and Logistics Stages

Prevention of Air Pollution

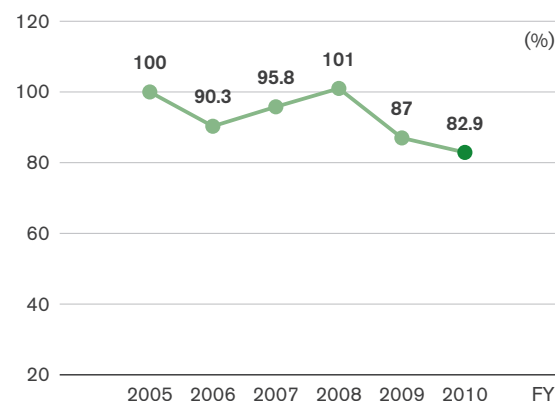
At Nissan production plants, we thoroughly implement systems and control standards to manage air pollutants and undertake activities to reduce the amount of these substances used and emitted in our production operations. We aim for even higher levels of air pollution control than those mandated by the countries in which we operate.

In Japan, we have taken strict measures to reduce emissions of NO_x and SO_x pollutants from our factories, reducing the amount of these emissions to one fourth of the levels emitted in the 1970s. Painting lines and other processes in vehicle production consume large amounts of heat. We have lowered NO_x and SO_x emissions by introducing low-NO_x burners in the ovens and boilers that provide heat for our painting lines and by switching from heavy oil and kerosene to fuels with low SO_x emissions for these ovens and boilers.

A current challenge is the reduction of volatile organic compounds (VOCs), which readily evaporate and become gaseous in the atmosphere. These account for approximately 90% of chemicals released in our vehicle production processes. We are working to increase the recovery of cleaning solvents and other chemicals and reduce the amounts of these substances emitted from our plants ahead of the implementation of new regulations in each country where we operate. We are also systematically switching to lines using water-based paints, which have fewer VOCs, and increasing the recycling rate for waste paint thinner in order to cut down on the total volume of VOCs used.

VOC emissions from the Kyushu Plant water-based paint line are now less than 20 grams per square meter of painted surface, and we are maintaining one of the best levels in the industry. Water-based paint lines have also been introduced in our Smyrna and Canton Plants in North America and our Zona Franca Plant in Spain and other plants. With these efforts, VOC emissions per painted surface area in fiscal 2010 were reduced by 17.1% from 2005 levels.

VOC Emissions



Note: The figures are for VOC emissions from Nissan Motor's production plants in Japan.

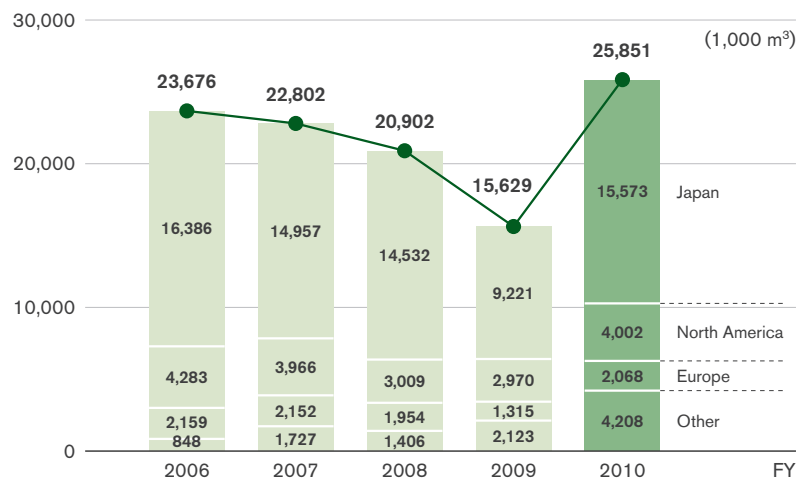
Water-Use Management

The issue of water resources is becoming ever more serious as water use increases from the growing world population and economic development.

There are over 40 plants in 18 different countries building Nissan-branded vehicles and parts, and they all use water as part of the production process. We have therefore started efforts to reduce water consumption at our production plants.

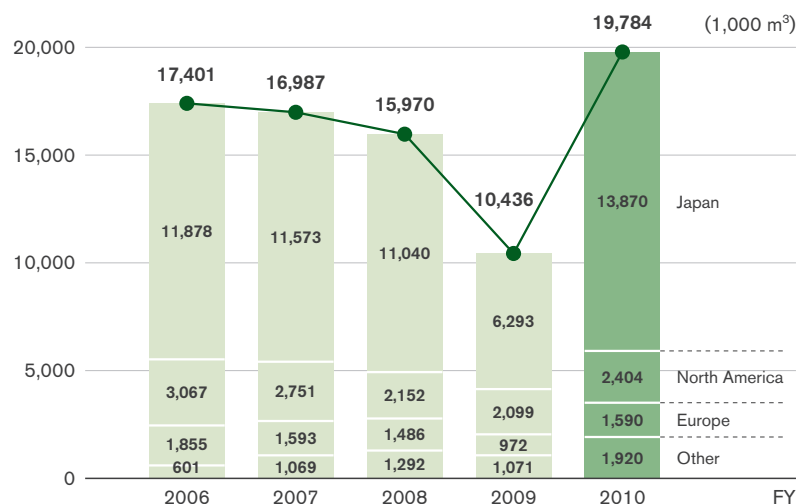
Water-use assessments were carried out at all plants, which were categorized into three levels according to a Nissan-developed index of water risks, and activities have been pursued that are relevant to the plants' respective circumstances. The highest-risk plants were placed at Level A, defined as a plant that either already has a water-related problem or is expected to face one in the near future. Water-reduction targets have been independently set for each of these plants, which will undertake activities to reach those targets. Level B plants are those with the potential for water problems; they will regularly monitor water risks, in addition to undertaking the voluntary water-reduction activities they have been pursuing to date. Level C plants are at low water risk, and they will continue their voluntary water-reduction initiatives. These classifications and activity levels have been adopted as uniform, companywide standards, and the initiatives that had been pursued separately at each plant are now being undertaken throughout the company.

Water Resource Use



Note: The figures for FY2010 are for the Nissan Group worldwide, including 71 consolidated companies. The figures for each fiscal year may encompass different numbers of business locations due to growth in the number of consolidated companies or changes in the scope of companies involved in Nissan's environmental management.

Wastewater Release



Note: The figures for FY2010 are for the Nissan Group worldwide, including 71 consolidated companies. The figures for each fiscal year may encompass different numbers of business locations due to growth in the number of consolidated companies or changes in the scope of companies involved in Nissan's environmental management.

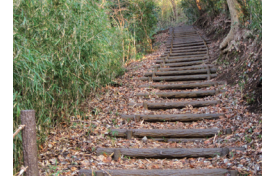
■ Efforts in Our Business Activities

Working Locally to Preserve Biodiversity

The Nissan Technical Center and Nissan Advanced Technical Development Center in Atsugi, Kanagawa Prefecture, are located in the natural splendor of the Tanzawa-Oyama region. We are working to preserve the greenery that remains on the grounds of these centers, as well as to maintain the natural connections between these grounds and the natural environment that exists in surrounding areas.

At the Nissan Technical Center, for instance, we work to preserve the natural stands of forest growing on the grounds and to maintain the area's biodiversity by planting trees in areas affected by construction of the facilities. Various birds, wild deer and even troops of monkeys can be spotted on the grounds. The site is also home to a rare natural growth of a perennial orchid called *ebine* in Japanese, which is on the "Red List" of threatened species published by Japan's Ministry of the Environment. In recent years overharvesting of these flowers has pushed them to the brink of extinction in the wild. We are carrying out minimally invasive management of these flowers to preserve them in an undisturbed, natural state. The green areas near our facilities are used by local residents for both recreation and environmental education activities. Here we have set up a network of walking trails connecting a number of nearby parks; these trails have proved popular with adults and children alike.

These preservation and greening efforts at our facilities have won acclaim, and brought us recognition as a Green Top 100 Company for Biodiversity Protection by Japan's Organization for Landscape and Urban Green Infrastructure in May 2010.



A walking trail near our facilities

■ Supply Chain Management

Nissan's Tough Voluntary Standards

Stricter controls on the environmental impact of substances are being sought in countries around the world. Examples include the European End-of-Life Vehicles (ELV) Directive and the European Commission's Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, which went into force in June 2007. To help minimize the potential release of formaldehyde, toluene and other VOCs in vehicle cabins, the Japan Automobile Manufacturers Association has launched a voluntary program that calls for all new models launched in Japan from April 2007 to meet standards set by the Japanese Ministry of Health, Labor and Welfare for concentration levels of 13 compounds in vehicle interiors.

Nissan has steadily advanced efforts to meet these requirements. In an effort to reduce the potential release of environment-impacting substances, we have established voluntary standards to meet the environmental regulations enacted in countries where we do business. We are working on a global basis to prohibit or limit the use of four heavy metals (mercury, lead, cadmium and hexavalent chromium) and polybrominated diphenyl ether (PBDE) flame retardants in all new models (excluding OEM vehicles) launched from July 2007 onward. To meet European Union requirements, we have fulfilled our registration and notification duties under the REACH Regulation, and have filed notification of the classification, labelling and packaging of substances and mixtures in line with the CLP Regulation. To reduce VOCs in vehicle cabins, we have adopted the voluntary targets of the Japan Automobile Manufacturers Association as Nissan's global standards and are reconsidering the parts and adhesives used in seats, door trim, floor carpets and other vehicle parts.

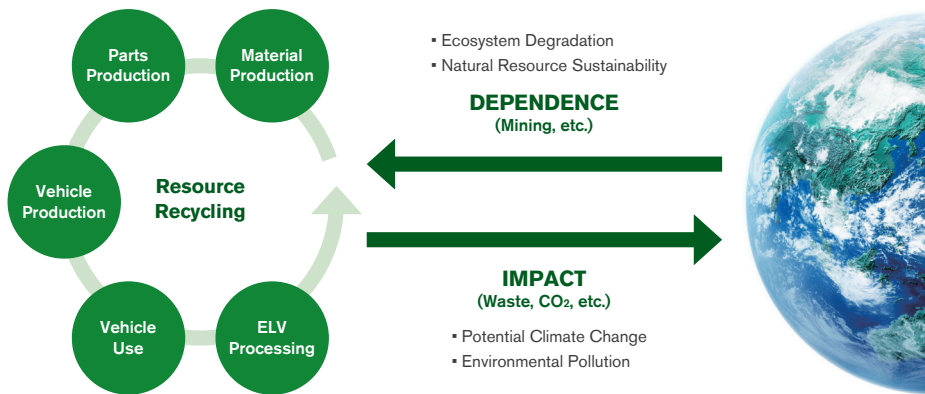
■ Toward Sustainable Recycling of Resources

Nissan's Approach to Resource Recycling

Demand for natural resources such as metals and oil is skyrocketing in response to the rapid economic growth of emerging countries. In addition to promoting reduced use of virgin natural resources through resource-saving and resource-recycling measures, it is becoming important to procure natural resources that have a lower impact on the Earth's ecosystems, not only from the standpoint that these resources are limited, but also considering the wide-ranging effects that resource extraction has on ecosystems.

Nissan has targeted 100% resource recovery for end-of-life vehicles (ELVs), while also promoting design centered on the vehicle life cycle, waste reduction, and other such resource-saving measures. In addition to continuing these activities, we will promote expanded use of recycled materials to reduce ecosystem degradation and reliance on virgin natural resources, doing our utmost to contribute to the development of a sustainable society.

Nissan's Goals for the Resource Cycle



■ Efforts in Our Products and Technologies

Design Centered on Vehicle Life Cycle

Nissan designs and develops new vehicles from the point of view of the three Rs—reduce, reuse and recycle—taking into consideration the automobile's entire life cycle, from the design stage until the end of its useful life. We seek to avoid the use of substances that impact the environment and ensure that our products are easy to dismantle and recycle. Since 2005, Nissan has achieved a recoverability rate of 95% or greater for all new models in Japan, and we are focusing development efforts on pushing this rate still higher.

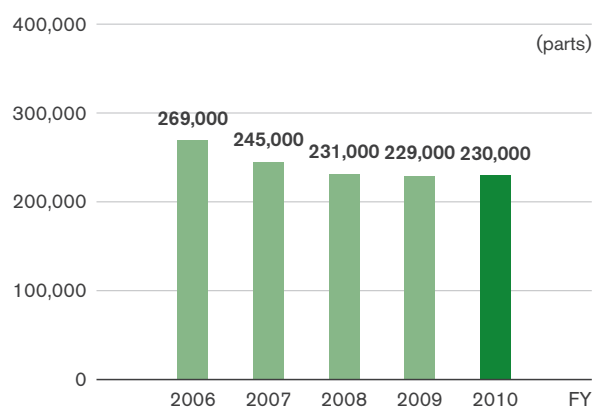
Working together with our Alliance partner Renault, we have created a recycling simulation system called OPERA for use in the early design stages to calculate recoverability rates and recovery costs for new models. This has led to enhanced recycling efficiency from an economic standpoint as well.

Reuse of Vehicle Parts

Nissan recycles used ELV parts and promotes their reuse as material for new automobiles. One example is aluminum wheel rims. We collect aluminum rims from ELVs and recycle them as materials for new vehicles. While waste aluminum materials are usually recycled into engine parts, we work together with recyclers throughout Japan to collect rims from Nissan ELVs and put the recycled high-grade aluminum back to use in suspensions and other important vehicle parts. Striving to reduce the use of virgin natural resources, in fiscal 2010, we collected and recycled around 248 tons of end-of-life aluminum wheel rims each month.

We also promote the collection and recycling of used plastic bumpers accumulated during the repair and replacement of vehicle parts at dealers in Japan. Material reclaimed from the damaged bumpers is reprocessed and then recycled into new vehicles as plastic parts. Furthermore, we are promoting the use of recycled materials from sources other than automobiles.

Number of Recovered Bumpers



Use of Recycled Materials in the Nissan LEAF

The all-electric Nissan LEAF not only features life-cycle-centered design, but is also tied deeply into the company's car-to-car recycling efforts, utilizing ELVs as a source of new parts.

Plastic interior trim parts collected from ELVs, for example, are processed using a new technology to maintain colors and improve product quality, and then incorporated into the Nissan LEAF as plastic parts. For bumpers, we have developed a device that strips the paint without the use of chemicals and without deteriorating the material's quality. Painted bumpers damaged during the production process are recycled with this device and then used in new Nissan LEAF bumpers.

Nissan applies recycled material from non-ELV sources as well, including plastic bottles, which are utilized as seat fabric.

Recycled Materials Used in the Nissan LEAF



Dismantling Methods that Raise the Recovery Rate

To optimize processing and improve the recovery rate for ELVs, Nissan carries out experimental studies to develop more efficient ways of dismantling its cars. While such research has until now focused on establishing methods of processing waste oil, waste liquids, lead and other substances that impact the environment, we are presently moving ahead with research aimed at further increasing the recovery rate in order to reclaim and reuse valuable materials from ELVs. Feedback from the studies has led to improvements in dismantling techniques and has proved useful to our product design division in choosing suitable materials and designing vehicles that are easier to dismantle.

Nissan emphasizes the creation of partnerships that go beyond industry frameworks in advancing the effective use of resources. Our hope is to produce synergistic effects through these partnerships that will lead to a large circle of resource recycling.

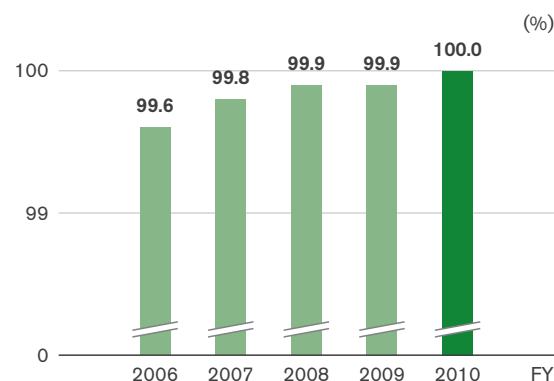
One way we do this is by distributing an ELV recycling manual to automobile dismantlers in order to promote the proper treatment of ELVs. The manual includes key points related to the location in the vehicles of and work processes for environment-impacting substances, as well as safety precautions. We also publish an instruction manual for removing lithium-ion batteries from electric and hybrid vehicles, enabling automobile dismantlers to remove these power packs safely.

Efforts in the Production and Logistics Stages

Thorough Measures for Waste Materials

Nissan actively promotes measures based on the three Rs in its production processes whenever possible, striving to minimize the waste generated and maximize recycling efficiency by means of thorough sorting of waste. In line with the objectives of our medium-term environmental action plan, NGP2010, we have been working to achieve a 100% recovery rate for our operations in Japan and bring this rate to an automotive-industry-leading level in each region of the globe. Our efforts have paid off. As of the end of 2010, we have achieved this 100% recovery rate at all of our production sites in Japan: five manufacturing plants, two operations centers and five affiliates.

Recovery Rate



Container and Packaging Material Reductions

Nissan has been making great efforts to reduce the number of wooden pallets and cardboard boxes used in parts shipping, replacing them with units made from such materials as steel and plastic, which can be returned for reuse. In 2010, we used roughly 4 million collapsible plastic containers and 600,000 collapsible steel containers for shipping parts to and from our operational sites around the world. We have been working with our Alliance partner Renault to expand the use of our globally standardized, returnable containers. In the area of packaging efficiency, we are making progress in reducing packaging materials from the development stage by applying simultaneous design activities to logistics as well.

■ Efforts in the Market and at Dealerships

Sales of Nissan Green Parts

Parts with the potential for recycling include those reclaimed from ELVs as well as those replaced during repairs. In Japan, Nissan collects and thoroughly checks the quality of these secondhand parts, and those that receive a passing grade are sold through our sales outlets as Nissan Green Parts. We sell these parts in two categories: reusable parts, which are cleaned and tested for quality before sale, and rebuilt parts, which are disassembled and have components replaced as needed. Sales of these parts in fiscal 2010 reached ¥1.71 billion.

Area Leaders' Messages

Reducing Vehicles' Environmental Impact

In fiscal 2010, we launched the 100% electric Nissan LEAF and introduced the PURE DRIVE series of vehicles, including the new March and the Fuga Hybrid. We also obtained ISO 14001 certification for all of our main operations in Japan. This progress is the fruit of Nissan Green Program 2010. It is also the starting point for the next round of challenges we will undertake. The scale of motorization is set to expand, given the growing global population and the economic growth in emerging countries. This could lead to an increase in energy and resource consumption, impacting the global ecosystem. Dedicated to enriching people's lives worldwide through mobility, we are advancing activities to help curtail the impact of automobiles on the environment and their reliance upon valuable natural resources.

Hiromi Asahi

Deputy General Manager
Global Environmental Planning Office
Corporate Planning and
Business Development Division

