ISSAN MOTOR CORPORATION SUSTAINABILITY REPORT 2014 BLUE CITIZENSHIP: NISSAN'S CSR CONTENTS INTRODUCTION CEO MESSAGE RENAULT-NISSAN ALLIANCE CSR DATA THIRD-PARTY COMMENT CORPORATE GOVERNANCE & SAFETY PHILANTHROPY QUALITY VALUE CHAIN EMPLOYEES ECONOMIC CONTRIBUTION ENVIRONMENT INTERNAL CONTROL

ENVIRONMENT

The increasing global population and the rapid growth of the world economy are connected in complex and diverse ways to the global environment. They also affect the environment in numerous ways. To balance economic growth with environmental preservation, the automotive industry is tackling a range of sustainability issues. These include climate change and energy measures, preservation of air, water quality and biodiversity, efficient use of mineral resources, management of chemical substances, waste reduction and recycling. Companies in the industry are also reforming their business structures to move away from dependence on fossil fuels.

As a global automaker, Nissan takes active steps to identify the direct and indirect effects of its businesses on the environment to help minimize them throughout its value chain, pursuing needed technologies and processes as well as engaging in communication with society. The company provides customers with innovative products while promoting effective use of energy and resources and increasing sourcing diversity, such as with renewable energy and recycled materials. In this way, Nissan is aiming to achieve its environmental philosophy of "a Symbiosis of People, Vehicles and Nature."

NISSAN PRIORITIES

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SCORECARD

Nissan makes year-round use of the CSR scorecard as a fundamental tool to manage, review and validate its progress in each of the sustainability strategies defined for its CSR activities. The table below shows some of the values behind Nissan's ongoing activities and the indices used in the scorecard to gauge the company's performance.

ENVIRONMENT

FY2013 target achievement rate: igodot Achieved igodot Mostly Achieved igodot Not Achieved

Nissan Priorities	Nissan Objectives (by FY2016)	Progress Indicators (Scope of Application)	FY2011	FY2012	FY2013	Assess- ment	Long-Term Vision
Zero-emission vehicle penetration	Introduce four EVs including Nissan LEAF	Number of models introduced	Development underway	Development underway	Disclosed e-NV200, the second EV model, for European market (March)	O	90% reduction in CO ₂ emissions from new vehicles by 2050 (vs. 2000)
	Prepare to introduce fuel-cell electric vehicle (FCEV) into market	Results of initiatives	Development underway	Signed agreement for joint development of common fuel-cell system with Daimler AG and Ford Motor	Development underway	0	
	Take global leadership in supplying batteries for electric-drive	Results of initiatives	Prepared for manufacturing batteries overseas	Battery production started by Nissan North America and Nissan Motor Manufacturing (UK)	Production ongoing	0	
	Help create zero-emission society utilizing EVs and their derivative technologies with partners	Results of initiatives	Unveiled "LEAF to Home" power supply system, promoted other activities	Launched "LEAF to Home" power supply system and promoted adoption in houses, condominiums, other buildings	Based on "LEAF to Home," began "Vehicle-to-Building" test using multiple Nissan LEAFs simultaneously	O	
	Provide energy storage solution with used EV batteries through "4R" business	Results of initiatives	Announced electricity storage system for residences using Nissan LEAF batteries	Promoted use of EV batteries for stationary energy storage system for houses, apartment buildings	Developed world's first high- capacity energy storage system built with used batteries (Japan)	O	
Fuel-efficient vehicle expansion	Improve CAFE* by 35% from FY2005 (Japan, U.S., Europe, China) * Corporate average fuel economy; meet or exceed regulatory requirements	CAFE	Improved by 15%	Improved by 24.9%	Improved by 31.5%	0	
	Introduce top fuel-efficiency models in various classes	Model introductions	Versa sedan (U.S.) Tiida (China)	Note, Latio (Japan) Altima (North America) Sylphy (China)	DAYZ (Japan) Infiniti QX60 (U.S.) Note, Qashqai (Europe)	O	
	Introduce FF-HEV in C class and above: expand FR-HEV offerings	Model introductions	Development underway	Cima Hybrid, Serena S-Hybrid (Japan)	Skyline (Japan) Infiniti Q50, Pathfinder, Infiniti QX60 (U.S.)	\bigcirc	
	Promote plug-in hybrid vehicle (P-HEV) development	Model introductions	Development underway	Development underway	Development underway	\bigcirc	
	Introduce next-generation CVT globally; expand CVT sales to 20 million cumulative units from 1992	Number of CVT-equipped vehicle sales	Annual total: 2.08 million Cumulative total: 11.08 million	Annual total: 2.28 million Cumulative total: 13.36 million	Annual total: 2.79 million Cumulative total: 16.15 million	\bigcirc	
	Develop lightweight technologies with structure optimization, new materials and new manufacturing processes	Results of initiatives	Developed the world's first Ultra High Tensile Strength Steel rated at 1.2 gigapascals (GPa)	Used 1.2 gigapascal steel in the Infiniti Q50, achieving weight reduction of about 40 kg	6 models launched in FY2012 and FY2013 achieved the best-in-class vehicle weight	\bigcirc	
	Contribute to CO ₂ reduction with ITS technologies	Results of initiatives	Worked with Beijing Municipal Commission of Transport on dynamic route guidance using IT devices	Worked with Beijing to confirm effectiveness of dynamic route guidance to disperse traffic congestion	Announced results of Beijing dynamic route guidance test: 5.1% decrease in travel time, 7.6% increase in fuel economy	\bigcirc	

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Nissan Priorities	Nissan Objectives (by fiscal FY2016)		Progress Indicators (Scope of Application)	FY2011	FY2012	FY2013	Assess- ment	Long-Term Vision	
Corporate carbon footprint minimization	Reduce CO ₂ emissions of global corporate activities by 20% (t-CO ₂ /vehicle, vs. FY2005)		CO ₂ emission reduction rate	Reduced by 15.4%	Reduced by 15.1%	Reduced by 15.4%	0	80% reduction by 2050 (t-CO ₂ /vehicle, vs. 2005)	
	Reduce by 27% in all manufacturing sites (t-CO ₂ /vehicle, vs. FY2005)		CO ₂ emission reduction rate	Reduced by 20.5%	Reduced by 15.2%	Reduced by 21.8%	0		
	Reduce by 6% in logistics (Japan, North America, Europe, China, t-C0 ₂ /vehicle, vs. FY2005) Reduce by 1%/year in offices (Japan, North America, Europe, China, t-C0 ₂ /floor area, vs. FY2010)		CO ₂ emission reduction rate	-	- Increased by 2.1% Reduced by 4.3% Increased by 14.4% Increased by 6.1%		0	-	
			CO ₂ emission reduction rate	Reduced by 4.3%			0		
	Reduce by 1%/year in dealers (J	apan, t-CO2/floor area)	CO ₂ emission reduction rate	Reduced by 11.5%	Increased by 1.8%	Increased by 7.1%	0		
New natural resource use minimization	Increase recycled material usage ratio per new vehicle for which production begins in FY2016 by 25% in Japan, U.S. and Europe		Recycled material usage ratio	Promoted activities	Promoted activities	Promoted activities	\bigcirc	Reduce ratio of new natural resources per vehicle by 70% (vs. 2010)	
	Expand closed-loop recycling scheme with business partners		Results of initiatives	Worked to reduce the steel and aluminum scrap generated during production, collecting and reusing it as material for new vehicles	Continued activities	Continued activities	O		
	Improve ELV recovery rate - Achieve top-level ELV recovery rate (Japan) - Promote proper treatment and resource recovery globally		Recovery rate	98.8% (Japan) Efforts underway globally	99.3% (Japan) Efforts underway globally	99.5% (Japan) Efforts underway globally	O		
	Reduce scarce resource usage - Reduce critical metal, rare earth usage - Comply with emission regulations in each region with minimum precious metal usage Reduce waste 2%/year in Japan and 1%/year worldwide Promote management and reduction of water usage at all production sites		Results of initiatives	Promoted development aimed at reducing rare earth usage	Developed and applied a new electric motor to reduce use of rare earth dysprosium by 40% in Nissan LEAF	Promoted development	0		
			Waste reduction rate	Reduced by 8.4% (Japan) Reduced by 12.3% globally	Reduced by 10.3% (Japan) Reduced by 3.2% globally	Reduced by 10.9% (Japan) Reduced by 5.5% globally	0		
			Water usage reduction rate	Set water use targets and began activities to reduce usage in China, Mexico, India and Australia	Set targets, started activities to reduce water use in Spain, Egypt and South Africa	Set global target of water use and promoted activities	O		
Environmental management promotion	Enhance and promote environmental management throughout supply chain (consolidated companies, sales companies, suppliers) Promote reduction, substitution, and management of environment- impacting substances		Results of initiatives	Revised the Nissan Green Purchasing Guidelines and asked suppliers for compliance	Requested environmental targets and data from suppliers to understand and promote reduction of environmental impact upstream in the supply chain	Continued activities to reduce environmental impact through understanding upstream in the supply chain	0	-	
			Results of initiatives	Enhanced management of environment-impacting substances to meet REACH targets	Added global policy on environment-impacting substances to the Nissan Green Purchasing Guidelines, distributed it to suppliers	Continued management of environment-impacting substances, creation of well-planned schedule for their reduction and use of alternative substances	0		
	Reduce environmental impact of pro assessments (LCAs)	oducts with lifecycle	Results of initiatives	Promoted CO ₂ assessments in product LCAs	Promoted CO ₂ assessments in product LCAs	Obtained TÜV Rheinland certification for LCA methodology	\bigcirc		

KEY FIGURES			
Carbon footprint		Water resource use	30,134,000 m ³
Direct greenhouse gas emissions (GHG Protocol Scope 1)	780,970 t-CO2	Total waste produced	172.849 tons
Indirect GHG emissions from electricity, heat, steam consumption (Scope 2)	2,622,767 t-CO₂		·
Emissions from employee commutes	426,487 t-CO2		

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Click here for detailed information on our environmental data.

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NISSAN'S APPROACH TO THE ENVIRONMENT

The United Nations Framework Convention on Climate Change states that to stabilize the climate system it is necessary to keep average temperatures from rising more than 2 degrees Celsius on a global basis. Based on this assumption, Nissan has calculated that "well-to-wheel" CO₂ emissions for new vehicles will need to be reduced by 90% by 2050 compared with levels in 2000. The efficiency of internal combustion engines will need to improve in the short term to help achieve this. Over the long term, Nissan also aims to increase the adoption of electric vehicles and fuel-cell electric vehicles (EVs and FCEVs) and to promote the use of renewable energy to power these technologies while each country and region moves toward more renewable energy sources.

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Click here for more information on our zeroemission efforts.

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^{*2} Click here for more information on PURE DRIVE. Nissan is advancing technological development on the basis of this future scenario. Specifically, it is concentrating its efforts on two pillars: zero emission,⁻¹ which involves widespread use of zero-emission vehicles in a holistic approach to promote a sustainable society, and PURE DRIVE,⁻² which reduces CO₂ emissions by developing fuel-efficient internal combustion engine technologies and introducing them into the market.

Nissan has also calculated that it needs to reduce CO₂ emissions from its corporate activities by 80% by 2050 compared with levels in 2000. Accordingly, it plans to continue its energy efficiency measures, leverage the power storage ability of lithium-ion batteries and expand its use of renewable energy.

Our CO₂ Reduction Scenario



FISCAL 2013 PERFORMANCE

- Cumulative sales of the all-electric Nissan LEAF since its 2010 launch through the end of March 2014 exceeded 110,000 units
- 31.5% improvement in corporate average fuel economy (in Japan, the U.S., Europe and China, vs. fiscal 2005)
- 15.4% reduction in CO₂ emissions from corporate activities (t-CO₂/vehicle, vs. fiscal 2005)
- CO₂ emissions in each phase of the value chain: production 2,872 kton, logistics 1,679 kton, use of Nissan vehicles 127,312 kton, employee commutes 426 kton*

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FUTURE MEASURES

- Launch e-NV200, Nissan's second mass-produced EV, in Europe and Japan; promote activities to popularize zero-emission vehicles
- Launch other fuel-efficient vehicles in market
- Promote activities to raise usage rate of renewable energy in global corporate activities

CO₂ emissions of 217 kton from consolidated employee commutes in Japan, the U.S. and Europe have received third-party certification. For details, please refer to the environmental data at the end of this report.



NISSAN GREEN PROGRAM 2016

▶ website

Click here for more information on Nissan Green Program 2016. Nissan's ultimate goal is to limit the environmental impact and resource consumption of its corporate activities, and of its vehicles during their entire lifecycle, to a level at which the planet can naturally sustain itself. To achieve this, Nissan launched its new six-year environmental action plan, Nissan Green Program 2016 (NGP2016), in fiscal 2011. NGP2016 is based on thorough materiality assessments focusing on factors with critical impact on the company's business. These assessments include input from energy and resource specialists around the world. NGP2016 also takes into account survey results in Japan that help gauge employees' understanding and opinions on environmental issues, Nissan's activities and the company's business priorities.

NGP2016 focuses on reducing the environmental impact of Nissan's corporate activities and pursuing harmony between resource consumption and ecology. The company aims to promote diversity of sources for and efficient use and recycling of energy and resources, and to promote and widen the application of green technologies that were developed under NGP2010, its previous environmental action plan. NGP2016 has four specific key actions that involve activities in development, manufacturing, sales, service and all other departments companywide: zero-emission vehicle penetration, fuel-efficient vehicle expansion, corporate carbon footprint minimization and new natural resource use minimization.

Thanks to the Nissan Green Program activities, the company forecasts that CO_2 emissions from its new vehicles and corporate activities will peak in the 2020s and then subside, even taking into account plans to increase sales globally. The volume of new natural resource use will be maintained at the level of the 2010s.

Promoting Energy and Resource Diversity, Efficiency and Recycling



Based on Beyond Growth: The Economics of Sustainable - Development, by Herman E. Daly

Thermal Radiation



COMPANY ORGANIZATIONS FOR THE ENVIRONMENT

To achieve the NGP2016 goals, Nissan has created a global framework for environmental management and is setting targets and organically implementing action plans in all areas of its activity, from production and technical development, manufacturing, marketing and sales to other divisions.

To carry out its global environmental management, Nissan has established an organizational approach linking its various functions and regions. The Global Environment Management Committee (G-EMC), comprising corporate officers chosen depending on the issues being discussed, meets twice annually to determine overall policies and the content of reports to be put before the Board of Directors. The Environmental Planning Department, part of the Corporate Planning and Business Development Division, was launched in 2007 to determine which proposals will be forwarded to the G-EMC and to assign specific actions to each division. This department is also responsible for the efficient management and operation of environmental programs based on the PDCA (plan, do, check, act) cycle.

In addition, Nissan has established committees to implement environmental management and activities at a deeper level in each of its regions. The European Environmental Management Committee (E-EMC) was set up in 2012, followed by the Japanese Environmental Management Committee (J-EMC), the American Environmental Management Committee (NA-EMC) and the Chinese Environmental Management Committee (DFL-EMC) in 2013. These groups report to regional management committees and cooperate with the Environmental Planning Department while reporting to the G-EMC.

Nissan's strategy is built on the concept of listening to the voices of society and identifying the seeds of both opportunity and risk. The company takes into account opinions from leading experts and organizations and examines assessments from rating organizations, using this information to analyze its goals and activities and enhance its environmental measures.

Nissan's Framework for Global Environment Management



Environment Management Organization



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Click here for more information on our environmental management promotion.



Stakeholder Engagement

⁺ Customers, shareholders, investors, business partners, suppliers, NGOs/ NPOs, local communities, governments, future generations, employees and members of Nissan's Board of Directors.

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* For more details.

in this report.

see the CSR Data section

Nissan analyzes its use of resources and energy, the impact on the environment and how it can reduce that impact throughout the value chain. Through the analyses, the company identifies stakeholders* at each stage, from the extraction of resources needed to make vehicles to manufacturing, shipping, use and disposal of end-of-life vehicles. Through a broad range of approaches, it gains an understanding of stakeholder views and the diverse needs of society, taking them into consideration as it develops and implements environmental strategies.

As one example, members of Nissan's Board of Directors hold annual Advisory Meetings with the participation of researchers and experts who lead the environmental field in the academic and industrial worlds, as well as leading businesspeople from various sectors. They discuss the direction and appropriateness of Nissan's business strategies; this input is considered in those strategies going forward.

Materiality Analysis

To reduce environmental impact, countries around the globe implement various regulations that affect the automotive industry in areas like CO₂ and other exhaust emissions, fuel efficiency, noise, material resources, water, chemical substances and recycling. These regulations are becoming more stringent year by year. To meet these tougher regulations and to respond to society's demands, Nissan uses materiality assessments* to analyze potential opportunities and risks. The company identifies those issues viewed by both Nissan and stakeholders as important, sets necessary targets for tackling them effectively and works them into its environmental strategy.

ZERO-EMISSION VEHICLE PENETRATION

Electric vehicles (EVs) demonstrate that what is good for drivers and the planet is also good business. In its Alliance with Renault, Nissan is engaged in a comprehensive approach that involves boosting the production and sales of EVs and other activities coordinated through a variety of partnerships for popularization of EVs.

Zero-Emission Leadership for the Alliance

Nissan's commitment to sustainable mobility addresses concerns over climate change and supports sustainable profits for Nissan while satisfying customers' demands for more environmentally friendly vehicles. Greater use of renewable energy such as solar, wind and hydropower in the future will continue to improve EVs' environmental contribution as electricity generation becomes cleaner. Increased use of batteries as energy storage devices will also boost the market for EV batteries after their initial use for transportation motive power.

In 2010, Nissan began sales of the world's first mass-produced 100% electric vehicle, Nissan LEAF. In May 2014 Nissan expanded its leadership in zero-emission mobility into the LCV segment with the start of production of the e-NV200, the company's second all-electric vehicle, for the European market. The company also plans to begin sales of this model in Japan in fiscal 2014. Together with Renault, which already offers four EV models, Nissan will maintain its dominant position in the EV market.



Nissan LEAF Sales Hit 100,000 in January 2014

Nissan LEAF runs on a lithium-ion battery and electric motor, and it emits no CO₂ or other exhaust emissions during operation. The EV offers excellent, fun-to-drive performance, with smooth, strong acceleration and quiet delivery across a speed range comparable to that of other models, as well as great handling stability realized by well-balanced weight distribution. All of this has earned Nissan LEAF high marks from drivers since its debut in 2010.

Nissan LEAF is now sold in 35 countries on four continents, with sales increasing every year. In January 2014, total sales worldwide hit 100,000 vehicles, making Nissan LEAF the best-selling EV in the world, with a 45% share of the global EV market. As of the end of March 2014, total sales had cleared the 110,000 mark. While the vehicles' low environmental impact is attractive, consumer awareness of other characteristics of EVs, such as the low charging costs and their superior acceleration and steering performance, is likely to have been a factor in these strong sales.

Nissan LEAF has also received praise for its ease of use. Advanced IT systems allow the driver to control some functions remotely, via a smartphone or other device, and they can help the driver find nearby charging stations and identify the most energy-efficient routes.

Nissan has worked with local governments, corporations and other entities to construct vehicle-charging and other infrastructure and encourage the adoption of EVs. The company aims to leverage the valuable experience gained by having Nissan LEAFs in use around the world to stimulate further development and popularization.

The company's calculations show that Nissan LEAF and other EVs produce considerably less CO_2 emissions over their entire lifecycle, from manufacturing to end-of-life disposal, compared to gasoline-powered vehicles of the same class.*

EV batteries can do more than just provide power for driving. As energy storage devices, they can play a key role in supporting the rollout of renewable energy with intermittent output, such as solar and wind power. By contributing to the shift to renewable energy, EVs play an essential role beyond transportation to achieve a low-carbon society.



Nissan LEAF Top Seller in Norway in October 2013

In October 2013, Nissan LEAF was the top-selling model among all vehicles in Norway, including gasoline-powered and hybrid vehicles. Nissan LEAF accounted for around 6% of all sales.

Even within Europe, which leads the world in enacting environmental policies, Norway is known for its strong environmental stance. The country is proactively promoting uptake of EVs through incentives including generous subsidies, exemption from value added tax (VAT) and road tolls, free charging and parking. The country plays a central role in the European EV market. Norwegian customers have favorably assessed the region-specific Nordic pack including battery heater, which is adapted to the harsh cold, as well as Nissan LEAF's excellent all-electric performance.

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* Click here for more information on the lifecycle assessment on Nissan LEAF.



The e-NV200, a Practical, Sustainable City Delivery Vehicle

The e-NV200—Nissan's second mass-produced all-electric vehicle—is an innovative entrant to the compact van market that demonstrates the company's determination to maintain its leadership of the zero-emission market. The drivetrain powering the vehicle's excellent performance is based on components from the Nissan LEAF. The e-NV200 produces no exhaust emissions or noise pollution, like Nissan LEAF, and is a practical, versatile vehicle for transporting people or goods.

* The New European Driving Cycle (NEDC) mode uses a different measuring method from Japan's JC08 mode. The e-NV200's maximum driving range of 170 km (NEDC* mode) is greater than the average 100 km daily driving distance of around half of the business users who operate this class of van. With payload and cargo areas the same size as those in Nissan's multipurpose NV200 van, it will also appeal to private users with larger groups to transport.

As part of a "real-world" test drive program, companies including FedEx Express, Coca-Cola Central Japan, DHL Japan, IKEA, British Gas, Électricité de France and Japan Post, as well as local governments, used pre-production models as part of their fleets. Nissan used feedback from drivers and fleet managers to fine-tune the e-NV200 before beginning series production.

Production of the e-NV200 began in May 2014 at Nissan's Barcelona Plant in Spain.



The all-electric e-NV200: ideal for transporting people or goods.

Commercial Viability of Fuel-Cell Electric Vehicles

Fuel-cell electric vehicles (FCEVs) are another type of zero-emission vehicle producing no CO₂ or other emissions. Powered by electricity generated from hydrogen and oxygen, they emit only water during driving. Nissan believes that in building a sustainable mobility society, both FCEVs and EVs are important from an energy diversity perspective. Nissan's FCEVs make use of proprietary fuel-cell technology, high-power electric systems and control systems refined in its EV development, as well as high-pressure gas storage technologies from its compressed natural gas vehicles (CNGVs).

In 2011, the company announced plans to work with 12 other companies to develop hydrogen supply infrastructure in Japan in preparation for the launch of FCEVs.

Nissan also unveiled the next-generation fuel-cell stack for its FCEVs, featuring dramatically improved power density^{*1} and reduced use of platinum and variation of parts^{*2} to achieve major size and cost reductions.^{*3}

In January 2013, Daimler AG, Ford Motor Company and Nissan, under the Alliance with Renault, signed a unique three-way agreement for the joint development of a common fuel-cell system. The goal of the collaboration is to jointly develop an FCEV system while reducing investment costs associated with the engineering of the technology, lowering manufacturing costs through economies of scale and integrating the companies' knowledge. This will help the company launch the world's first affordable, mass-market FCEVs as early as 2017.

Pursuing a Zero-Emission Society

The widespread use of zero-emission vehicles, which produce no CO₂ emissions during operation, is an effective way of achieving sustainable mobility. The auto industry must go beyond producing and selling zero-emission vehicles to help put the necessary infrastructure in place to ensure that the vehicles are economical to use. No company can achieve this on its own. The Renault-Nissan Alliance is promoting the development and production of zero-emission vehicles and the construction of infrastructure, forging more than 100 zero-emission partnerships with national and local governments, electric power companies and other organizations.

- Power density is 2.5 kW per liter, or 2.5 times more than for the Nissandeveloped 2005 model (according to Nissan calculations).
- Platinum usage and number of parts were both reduced to 1/4 of the 2005 levels (according to Nissan calculations).
 Compared to the 2005 model, fuel-stack size is less than 1/2 and cost is 1/6 (according to Nissan calculations).



Nissan is also taking part in a comprehensive range of initiatives focusing on zero-emission mobility, including the production of lithium-ion batteries, secondary use and recycling of batteries, in-house manufacture and sale of quick-charging equipment, construction of vehicle-charging infrastructure and standardization of charging methods with other manufacturers. Increased uptake of zero-emission vehicles will bring changes to people's lifestyles, laying the groundwork for a sustainable mobility society. Nissan provides more than just EVs themselves; it proposes the new values that they offer as well.

Building a Zero-Emission Society with EVs



An organization established with the aim of increasing quick charger installations, indispensable for the further diffusion of electric vehicles and standardization of charging equipment. CHAdeMO is made up of automakers, electric utilities, charger manufacturers, charging service providers and other supporting groups. Nissan and Bhutan Forge Partnership for EV Shift

In February 2014, Nissan pledged its support for the Kingdom of Bhutan's transition to an electric vehicle fleet. The company is backing the country's groundbreaking environmental vision of becoming a zeroemission nation with its abundant, clean energy. Bhutan, at the foot of the Himalayas, can meet its energy needs through the use of hydropower and has positioned EVs as a key strategy in achieving its vision. If the use of EVs becomes standard in Thimphu, the capital, which has a population of more than 100,000, it will be possible to power all of the city's transportation using clean energy, making the capital a "clean-electric" city. To achieve this, Nissan is discussing delivery of Nissan LEAFs for use in the government fleet and as taxis, as well as the supply of quick chargers to provide the necessary infrastructure nationwide.



Nissan LEAF in Thimphu, Bhutan.



Providing Infrastructure to Support Zero-Emission Vehicles

Nissan is encouraging local governments, public and commercial facilities and others in Japan to install quick chargers. It is also enhancing charging infrastructure by increasing the number of Japanese Nissan dealerships with quick chargers from the current 800.

Quick chargers, which can charge batteries from zero up to 80% capacity in around 30 minutes, are a key part of the infrastructure needed for the widespread adoption of EVs. Nissan launched its quick chargers in 2011. In the following year, the company improved them to make the chargers quieter and the connector easier to use, as well as enabling on-the-spot payment.

In July 2013, Nissan reached an agreement with Toyota Motor Corporation, Honda Motor Co., Ltd. and Mitsubishi Motors Corporation to collaborate on installation of chargers for electric-powered vehicles (including EVs and plug-in hybrid vehicles) and creation of a charging network service that offers more convenience to drivers in Japan. Until now, the four automakers had pursued individual efforts in this area; recognition of their common need to swiftly develop charging infrastructure facilities prompted this joint project. The companies are presently studying the construction of a charging network service with 8,000 normal chargers and 4,000 quick chargers that lets drivers charge their vehicles anywhere with the same card.

Nissan is also pressing forward with infrastructure initiatives overseas. In the United States, the company is cooperating with local dealerships, federal and local government organizations, power companies and other groups to promote the installation of quick chargers for EVs. It is also taking part in the U.S. Department of Energy's Workplace Charging Challenge,* announced in January 2013, by installing charging stations at its business locations. The program aims to support the spread of EVs by making it possible for drivers to charge vehicles at their workplaces as well as at home. In addition, since January 2013, Nissan has installed more than 150 guick chargers at authorized Nissan LEAF dealers.

EV Everywhere Grand Challenge initiative announced by President Barack Obama in March 2012.

Launched as a part of the

In Europe, too, Nissan is focusing efforts on infrastructure by working with companies in the energy industry and others to install more than 1,000 quick chargers compliant with the CHAdeMO standard.

Nissan LEAF: Contributing to Realization of Smart Grids

Nissan LEAF can make possible electricity supply to households through the Power Control System. The "LEAF to Home" power supply system lets Nissan LEAF share the electricity stored in its high-capacity lithium-ion batteries with an ordinary home once the car is connected to the home's electricity distribution panel via its quick charging port. In this way EV batteries can provide new value. The connector has been tested in use worldwide, conforms to the CHAdeMO protocol and ensures a high level of versatility, stability and reliability.

In July 2013, Nissan began a test of "Vehicle-to-Building," which is based on "LEAF to Home," at the Nissan Advanced Technology Center (NATC) in Atsugi, Kanagawa Prefecture. "Vehicle-to-Building" allows up to six Nissan LEAFs to be connected and supply power to office buildings, condominiums or other buildings. Users can save electricity costs by drawing on this system at times of peak demand. In tests at the center, the system achieved an approximately 2.5% reduction of electrical power use during peak hours. Nissan plans to identify issues with operation of the system and test it outside the company.



"Vehicle-to-Building" test at NATC.



Overseas Production of Lithium-Ion Batteries

In Japan, Nissan and NEC Corporation's joint-venture company Automotive Energy Supply Corporation (AESC) produces lithium-ion batteries for Nissan LEAF at its Zama facility. The facility assembles modules made up of four cells, which are put together into battery packs made up of 48 modules at Nissan's Oppama Plant and then fitted into vehicles.

Nissan also manufactures Nissan LEAF and EV batteries overseas. In the United States, the company has produced lithium-ion batteries at its Battery Plant and EVs at its Vehicle Assembly Plant in Smyrna, and in Europe, at its Sunderland Plant in the United Kingdom.

The Nissan New Mobility Concept

The Nissan New Mobility Concept is an ultracompact 100% electric vehicle that was developed in response to rising numbers of senior citizens and single-member households, along with increasing use of automobiles for short-distance trips by up to two people. Even smaller than a "kei" minicar, it gives the driver excellent visibility and a good feel for the dimensions of the vehicle, making it an ideal choice for residential neighborhoods and other areas with narrow streets and poor visibility.

In fiscal 2011, with cooperation from Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Nissan began driving trials together with the city of Yokohama and other local bodies to conduct tests and surveys. Following MLIT's January 2013 announcement of an authorization system for use of ultracompact vehicles on public roads, Nissan is currently testing vehicles in 11 areas. For example, from July 2013 to March 2014 the company implemented a rental car service on the island of Teshima in Tonosho, Kagawa Prefecture, using six Nissan New Mobility Concept vehicles. By supplying vehicles with no exhaust emissions, Nissan aimed to boost the economy of Teshima, for which tourism is the major industry, without impacting the local environment.

In October 2013, Nissan launched "Choimobi Yokohama," a one-way car-sharing service using the Nissan New Mobility Concept in Yokohama, Kanagawa Prefecture. Users are able to drop off cars at a different location from where they began their journey in this program, which is being used to study how ultracompact mobility can improve life in urban areas. The service is easing traffic congestion and offering new and improved access to tourist areas and communities.

Nissan works together with local bodies, corporations and other groups to carry out activities like these with the objective of finding new uses for EVs, as well as to improve traffic flows and to consider alternative visions for the communities of tomorrow.



The "Choimobi Yokohama" service using the Nissan New Mobility Concept.



Joint Venture to Promote Second-Life Use for Batteries

The performance of the lithium-ion batteries used in Nissan's EVs is so high that they retain capacity after the useful lifetime of the vehicles themselves. "4R" business models—which reuse, resell, refabricate and recycle lithium-ion batteries—allow their effective use for energy storage solutions in a range of applications, thus creating a much more efficient energy cycle of battery use.

As the EV market expands, Nissan sees a need to utilize reusable lithium-ion batteries more effectively. In 2010 it launched 4R Energy Corporation, a joint venture with Sumitomo Corp. This company is developing and testing to use EV batteries as part of a stationary energy storage system. Japan is expected to see rising demand for such systems as part of energy storage and backup power systems that also feature solar panels on homes or business structures, and 4R Energy has started sales of them for houses and apartment buildings. The systems have already been installed in Park Tower Shinonome, a 585-unit residential structure built by Mitsui Fudosan Residential Co., Ltd. in Tokyo, and sold for Smart Solabo, a "smart house" designed by Sumitomo Forestry Co., Ltd. In February 2014, 4R Energy developed the world's first* highcapacity energy storage system built with used batteries. With support from Japan's Ministry of the Environment, the system, which includes 16 used Nissan LEAF lithium-ion batteries, is being used in a three-year experiment in Osaka's Konohana Ward. * According to 4R Energy Corporation.



Used batteries can be recycled to recover useful resources.



FUEL-EFFICIENT VEHICLE EXPANSION

Demand for motor vehicles is expected to continue to rise. Mature markets are recovering from the global recession. Emerging markets continue to expand. Nissan is pursuing the greatest possible improvements to the fuel efficiency of internal combustion engines and introducing more fuel-efficient vehicles to the market.

Improved Corporate Average Fuel Efficiency

Nissan strives to develop technologies to maximize the overall energy efficiency of internal combustion engines and improve transmission performance. It is also working to boost the efficiency of hybrid systems that gather and reuse kinetic energy captured from braking. Nissan's core technologies in this area are lithium-ion batteries, Intelligent Dual Clutch Control Hybrid and Xtronic transmission (Continuously Variable Transmission: CVT) systems. Considering space within the vehicle, usage, price and other factors, the company selects the optimum fuel-efficiency technologies for particular vehicles and launches them in the market. The aim is to reduce fuel consumption and CO₂ emissions without sacrificing fun and ease of driving. Nissan is steadily launching new products in its line of particularly low-emission, fuel-efficient PURE DRIVE vehicles.





By fiscal 2016, Nissan targets a 35% improvement in corporate average fuel efficiency from the fiscal 2005 level (as measured in average fuel efficiency in the Japanese, U.S., European and Chinese markets). The company's result in fiscal 2013 was 31.5% improvement from the fiscal 2005 level.

Top-Level Efficiency Due to Improved Engines and CVT

Current internal combustion engine vehicles lose approximately 70% of their fuel's energy as waste heat. Nissan aims to minimize energy loss and increase fuel efficiency by improving combustion efficiency, as well as reducing intake and exhaust resistance and friction.

For example, by downsizing a conventional inline 4-cylinder, 1.5-liter engine to a 3-cylinder, 1.2-liter engine with a supercharger, Nissan boosted fuel efficiency while maintaining the performance of the larger engine. Similarly, replacing a V-type 6-cylinder, 3.5-liter engine with an inline 4-cylinder, 2.5-liter engine with a supercharger increased engine efficiency by up to12%.

Further, Nissan is working steadily to improve engines by refining existing technologies, such as giving cylinder interiors mirrorlike smoothness to reduce friction and improving combustion efficiency through exhaust gas recirculation. All figures as of time of sale.

- DAYZ (29.2 km/L,

of 1,550 mm or more -Infiniti QX60 (hvbrid

model, 26 MPG fuel

economy combined city/ highway driving):

7-passenger in the Ward's

- Note (4.3L/100km with

manual transmission on the NEDC combined cycle): B-MPV segment petrol model

– Qashqai (5.6L/100km

for petrol, 3.8L/100km for

diesel on the NEDC

combined cycle): the C-crossover segment petrol and diesel models

2013 Luxury Large SUV

Segment

JC08 mode): wagon-type kei minicars with a height



Nissan's Xtronic transmission (CVT) provides "stepless" gear shifting, enabling the optimal RPM level for the vehicle at any speed. This allows for a balance of smooth, powerful driving and fuel efficiency when accelerating. Nissan employs Xtronic transmission in a wide range of vehicles, from "kei" minicars to mid-size cars in the 3.5-liter class. The new-generation Xtronic transmission (for use in cars with 2.0- to 3.5-liter engines) has been installed in products worldwide since 2012. This system's ratio coverage of 7.0 and friction reduction of around 40% improve fuel efficiency by up to 10% (in-house measurement using U.S. Environmental Protection Agency combined mode).

Our vehicles achieving class-leading fuel efficiency at their launches during fiscal 2013 with these technologies were the DAYZ in the Japanese market, the Infiniti QX60 in the U.S. market and the Note and Qashqai in the European market.*

Nissan's goal is to ship 20 million CVT-equipped vehicles, with their fuel efficiency benefits, by fiscal 2016 from their first launch in 1992, thereby helping to reduce global CO₂ emissions. Nissan sold 2.79 million CVT vehicles in fiscal 2013, bringing the cumulative total to 16.15 million.



A Broader Lineup of Hybrid Vehicles

Hybrid vehicles, which run on a combination of a gasoline-powered engine and an electric motor, can allow improvement of fuel efficiency and considerable reductions in 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. Vehicles using the system deliver both fuel efficiency and powerful responsiveness.

In fiscal 2010, the Nissan Group launched its first vehicles equipped with an original hybrid system, the Fuga in Japan and the Infiniti M in the European market. The company further enhanced this system to increase fuel efficiency and responsiveness before installing it in two rear-wheeldrive vehicles, the Skyline and the Infiniti Q50, in fiscal 2013.

Nissan is also expanding use of its hybrid system for front-wheel-drive vehicles. The extremely compact system is combined with Xtronic transmission in the fiscal 2013 Pathfinder and Infiniti QX60.

A simple, compact hybrid system is onboard the Serena S-Hybrid, launched in 2012. The system includes an auxiliary motor with enhanced energy regeneration capacity and power output, as well as a sub-battery added in the engine room to boost storage capacity.



The Skyline uses Nissan's hybrid system (left).



Progress in Plug-in Hybrid Vehicles

Plug-in hybrid electric vehicles (plug-in HEVs) have batteries that are recharged with power generated during gasoline-powered driving or from external power sources. They are capable of running on motors similar to those of electric vehicles. Nissan is developing plug-in HEVs with a view to an early launch.

Toward Lighter Vehicles

Vehicle weight reduction makes important contributions to improve fuel efficiency. Nissan is promoting vehicle weight reduction by optimizing vehicle body structure, developing better forming and joining techniques and substituting materials. For example, it is reducing the thickness of components to optimize structure and using lightweight foamed materials for internal component resins.

Nissan is seeking weight reduction in steel parts and promoting the use of Advanced High Tensile Strength Steel (AHSS). In fiscal 2013, Nissan used 1.2 gigapascal (GPa) Ultra High Tensile Strength Steel with High Formability in its Skyline and Infiniti Q50. In combination with other measures, this achieved a total weight reduction of about 40 kg. This type of steel enables considerable weight reduction by remaining strong even when thin. Its greater elongation through an optimal combination of materials offers high formability, and it can be used in vehicle parts with highly complex shapes. Employing 1.2 GPa Ultra High Tensile Strength Steel with High Formability allows usage of less material per vehicle produced, all without requiring major modification to existing production lines. This results in a reduction in total cost per unit. Nissan will expand the use of AHSS up to 25% of the vehicle parts (measured by weight) installed in its new production models starting in 2017.

Through these initiatives, in addition to the above two models, the Altima and three other Nissan models launched in fiscal 2012 and 2013 led their class for vehicle weight (at time of sale, based on Nissan research).

Reducing Traffic Congestion with ITS

An automobile's fuel efficiency depends not just on the car's own capabilities but also on the driving environment and the way it is driven. Nissan is actively working to create infrastructure that will help to improve the traffic environment. Intelligent Transport Systems (ITS) are a particularly important part of its efforts, and the company is collaborating with others in a variety of industries to craft solutions to tough problems like road congestion that automakers cannot tackle on their own.

Under commission from Japan's New Energy and Industrial Technology Development Organization (NEDO), Nissan has been working with the Beijing Municipal Commission of Transport since 2010. It is conducting tests with a dynamic route guidance system (DRGS) using IT terminals and eco-driving support to alleviate traffic congestion in the city.

In one experiment, around 12,000 ordinary drivers in Beijing's Wangjing district used Portable Navigation Devices with DRGS and ecodriving support. Results from the experiment, which lasted around one year, showed that DRGS cut travel time by 5.1% and increased fuel economy* by 7.6%. Enabling drivers to avoid congested roads led to the dispersion of traffic flow, enhancing overall speed within the area. Furthermore, by helping users cultivate better driving habits, eco-driving support increased fuel economy by 6.8%.

A simulation conducted at the same time calculated that if 10% of all traffic in Beijing used DRGS, travel speed throughout the city would increase by approximately 10% and both fuel consumption and CO_2 emissions would decrease by approximately 10%.

Nissan will apply the results of these experiments as it strives to improve urban environments and air quality.

Fuel consumption is calculated by Chinese standards (L/100km). The results calculated by Japanese standards (km/L) are 8.3% by DRGS and 7.4% by EMS.



CORPORATE CARBON FOOTPRINT MINIMIZATION

In a world often said to be carbon-constrained, reducing CO₂ emissions is a task to be tackled by all companies. Nissan is improving energy efficiency and promoting renewable energy adoption to reduce CO₂ emissions.

A 20% Emission Reduction from Corporate Activities

By fiscal 2016, Nissan aims to reduce the CO₂ emissions associated with its corporate activities by 20% globally from the level in fiscal 2005, as measured by the index of "CO₂ emissions per vehicle" (total emissions generated from Nissan global corporate activities divided by the total Nissan vehicle sales volume). In fiscal 2011 Nissan strengthened its management and broadened the scope of measurable objectives to include logistics, offices and dealerships in addition to production sites. At the same time, the company expanded its emission-related initiatives, introducing high-efficiency equipment, energy-saving measures and the use of renewable energy. The result in fiscal 2013 was a15.4% reduction from the fiscal 2005 t-CO₂/vehicle level.

To reach its CO₂ emission goals, Nissan has set a target of raising the usage rate of renewable energy in its global business activities to 9% by fiscal 2016. Nissan is taking three approaches to increasing the adoption of



Falling Global Emissions from Corporate Activities

renewable energy, considering the conditions where its production sites are located. These are power generation in company facilities; purchase of power from other companies; and leases of land, facilities and other Nissan assets to power producers.*

Energy Saving in Global Production

Most of the CO₂ emissions in the manufacturing process come from the consumption of energy generated with fossil fuels. Nissan engages in a variety of energy-saving activities in the manufacturing process in pursuit of the lowest energy consumption and CO₂ emissions of any automobile manufacturer.

Nissan leased out approximately 350,000 square meters of unused land in Oita Prefecture for solar power generation in May 2013, and the roof of group company Nissan Kohki Co., Ltd.'s Samukawa Plant for the same purpose in January 2014.

In production technology, the company is introducing highly efficient equipment, improving manufacturing techniques and adopting energysaving lighting. Another key approach is Nissan's three-wet paint process. Approximately 30% of all CO₂ emissions from plants come from the painting process. Shortening or eliminating baking stages within this process brings about a reduction in emissions.

Three-Wet Paint Process (Combined Primer and Topcoat Application)





Oven process

Reduces CO_2 emissions by applying Primer and Topcoat (base coat and clear coat) layers in succession, combining two processes (1 and 2 in the upper diagram) into one (1 in the lower diagram).



The three-wet paint process adopted by Nissan removes the need to bake in between the primer layers and the topcoat layers. Instead, the layers are applied successively before baking, achieving a reduction in CO₂ emissions of more than 30%, according to Nissan calculations. In 2013, the company introduced this process in Nissan Motor Kyushu Co., Ltd., the Smyrna Plant in the U.S., the second Aguascalientes Plant in Mexico (which started operations in November 2013) and the Resende Plant in Brazil (which started operations in February 2014). At the Kyushu plants, the company was able to adopt the three-wet process with no shutdown of production lines and successfully shorten total production time.

Nissan plants use finely controlled lighting and air conditioning for low-energy-use, low-loss operations. The company is promoting CO₂ emission reduction activities and introducing cutting-edge energy conservation technology from Japan in its plants worldwide. Meanwhile, Nissan plants in all countries learn and share best practices with each other. In addition, Nissan Energy Saving Collaboration (NESCO) surveys energy loss at the plants and proposes new energy-saving countermeasures that will contribute to an annual reduction in CO₂ emissions of 30,000 tons, according to Nissan calculations. A NESCO team was established for Japan in 2003, and teams for Europe, North America and China in 2013.

Renewable energy in the form of 10 wind turbines supplies 6,500 kW, or around 5% of the power used by the Sunderland Plant in the United Kingdom. Solar panels also produce approximately 200 kW at Nissan's plant in Spain. The Aguascalientes Plant in Mexico proactively uses energy generated from biomass gas and wind power, achieving a renewable energy usage rate of 50% in 2013. In addition, at the Zama Operation Center in Japan Nissan is developing small-scale hydropower generators, capable of creating around 0.5 kW of power from a drop of 2.5 meters from drainage pipes, and testing their usage in production plants.

With these activities, Nissan has set a target of reducing CO_2 emissions by 27% below the fiscal 2005 level by fiscal 2016 at all of its production sites, as measured by the index of " CO_2 emissions per vehicle" (total emissions generated from global Nissan vehicle manufacturing sites divided by the total Nissan vehicle production volume). In fiscal 2013, CO_2 emissions per global vehicle were approximately 0.57 tons, a reduction of 21.8% from the fiscal 2005 level.



 Figures are for the Nissan Group worldwide, including consolidated companies.

Global CO₂ Emissions from Manufacturing Activities



 Figures are for the Nissan Group worldwide, including consolidated companies.



CO2 emissions of 1,846 kton from Japan, the United States and Europe have received third-party certification. For details, please refer to the environmental data at the end of this report.



Lowest-Environmental-Impact Plant Begins Operations in Brazil

In February 2014, the Resende Plant in the state of Rio de Janeiro, Brazil, began operations. It has the lowest environmental impact of any plant in the Nissan Group. Hydropower provides around 80% of Brazil's electricity, making it an ideal country for sustainable manufacturing practices. Nissan has adopted the three-wet paint process and other cutting-edge production technologies at the Resende Plant, reducing CO₂ emissions during the manufacturing process.

Around the facility, a "Green Belt" will be built with 9,000 plants, helping to neutralize CO₂ emissions while also reducing noise levels for the surrounding environment. Wetlands have been created within the Green Belt to contribute to maintaining the balance of the local ecosystem.

The plant's consideration for the environment is not limited to its emission reductions. Waste products are carefully separated in a plan aiming to achieve 100% recycling of materials. Nissan has also set targets to manage water usage in the production process.

Nissan's environmentally friendly Resende Plant produces the March for customers in the rapidly expanding Brazilian market.



The new Resende Plant, to be surrounded by a "Green Belt" that helps absorb CO₂ and reduces noise levels.

More Efficient Logistics and Modal Shifts

In 2000, Nissan began sending chartered trucks for pickup and delivery of parts, an uncommon method among automobile manufacturers in Japan at the time. This approach—adopted widely throughout the company, including at its overseas manufacturing sites—has been increasing global operational efficiency. Nissan works together with suppliers to optimize the frequency of deliveries and transport routes and to improve packaging specifications for better loading ratios so fewer trucks are required.

Company engineers devise efficient packaging for the huge number of parts of different shapes and materials that go into automobiles. Through simultaneous-engineering logistics activities, Nissan works from the design stage to create parts and develop new vehicles with consideration for transportation efficiency, as well as to reduce the part shipments per vehicle. The aim is to decrease transport volumes.

In the area of container transport, Nissan has long made use of 40-foot "high cube" containers and runs software-based simulations to reduce wasted container space. As a result of these activities, the container filling rate for parts rose from 89.6% in fiscal 2010 to 93.8% in fiscal 2013.

The company constantly reviews transport methods and is currently undertaking a modal shift to rail and maritime transport. Some 70% of completed vehicles in Japan are now transported by sea. Part shipments from the Kanto area around Tokyo to Nissan Motor Kyushu Co., Ltd. are nearly all by rail and ship. The Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has recognized Nissan as an outstanding enterprise for this modal shift to sea transport.

At Nissan sites outside Japan, transport methods are selected to best match the local geographical conditions. Transport of completed vehicles is increasingly shifting from truck to rail and ship, depending on the destination. In China, the company is increasing the proportion of completed vehicles that are transported domestically by ship or rail.

Since 2010 Nissan has also been promoting the use of energyefficient vessels for sea shipments of our vehicles. By 2013 the fleet had grown to include four eco-ships. ^{*1}

▶ website

^{*1} Click here for more information on Nissan's eco-ships.



¹² Total emissions generated from transportation to Nissan manufacturing sites and sales outlets in Japan, North America, Europe and China divided by the total number of vehicles transported. While expanding its global logistics operations, Nissan is increasing efficiency and implementing a modal shift in transportation targeting a 6% reduction in CO_2 emissions by fiscal 2016 from the fiscal 2005 level, as measured by the index of " CO_2 emissions per vehicle".² In fiscal 2013 CO_2 emissions per global vehicle were approximately 0.42 tons, an increase of 2.1% from the fiscal 2005 level.

Our Efforts at Dealerships and Offices

Nissan is promoting CO_2 emission management at all business locations and dealerships in Japan, as well as at bases of operations in North America, Europe and China. In all four of these markets the aim is to reduce emissions by 1% each year.

At business locations in Japan, Nissan is expanding ecological initiatives including digitization of pay slips. Nissan's sales outlets are also continually working to increase energy efficiency: many have adopted highefficiency air conditioning, insulation films, ceiling fans and LED lighting. During renovation work, some outlets have installed lighting systems that make use of natural daylight and insulated roofs. In addition, Nissan sources clean energy for which CO₂ emissions and costs have been taken into account through Japan's Power Producers & Suppliers (PPS) system. Since April 2013, approximately 7,700 kW of energy has been supplied to four Japanese business locations^{*} including our Global Headquarters. About 20% of this energy is renewable. In October 2013 the company also began sourcing approximately 4,500 kW of energy for 66 sales outlets run by Kanagawa Nissan Co., Ltd. Nissan will continue expanding its reliance on

Global Headquarters, Sagamihara Parts Center, Nissan Education Center and Customer Service Center (all in Kanagawa Prefecture). clean energy through the PPS system with the goal of increasing renewable energy usage at its Japanese business locations from the current level of 0.4% to 2.1% by fiscal 2016.

The company's efforts go beyond CO₂ management. Nissan is pursuing other environmentally friendly policies, such as improving its video and telephone conference facilities and using Microsoft's Office Live Meeting web conferencing service to bring participants in multiple locations together when they need to share documents. This reduces the number of business trips needed worldwide, improves workplace efficiency and reduces costs.



Solar panels on the roofs of some Kanagawa Nissan dealerships. Power from the panels is supplied to dealerships through the PPS system.



NEW NATURAL RESOURCE USE MINIMIZATION

Nissan is making efforts to use resources more efficiently and to diversify its supplies with renewable resources and recycled materials. The company aims to address the risk of rising costs or depletion of mineral resources caused by growing demand for them and to reduce the environmental impact of their extraction.

Increasing Usage of Recycled Material to 25%

Economic development in emerging countries is rapidly increasing demand for mineral and fossil resources. Some predictions forecast that all currently known mineral resources will have been extracted by 2050 if present trends continue. Some mining sites currently in operation and new exploration sites are located in areas where local ecosystems need to be preserved, and there is concern about the environmental effects of topsoil excavation, deforestation and wastewater.

To address these issues, Nissan is taking measures to minimize the volume of newly extracted natural resources. As well as using resources more efficiently, it is increasing the proportion of renewable resources and recycled materials and increasing diversification. The company's recycling efforts are based on the policy that once a natural resource is extracted it should continue to be used, while maintaining quality, to minimize environmental impact. Nissan has set a target of increasing the recycled material usage ratio per new vehicle for which production begins in fiscal 2016 by 25% in Japan, the United States and Europe. In the long term, through promotion of activities, the company aims to maintain the total volume of new natural resource usage at the 2010 level.

Nissan's Closed-Loop Recycling System

Closed-loop recycling is a way of recycling waste generated during vehicle production and scrap from end-of-life parts into recycled material that has equal quality as new resources, using it as material in the same type of products. With this method, the same material can be used repeatedly, thus greatly reducing CO₂ emissions and the environmental impact over the product lifecycle. The company is focusing its efforts on closed-loop recycling of steel, aluminum and plastic. These materials, which account for

a large proportion of the content of a vehicle, have a major environmental impact when they are extracted and require a large amount of energy for production and disposal.

Nissan is working to reduce the steel and aluminum scrap left over in the manufacturing process. The company is also working with business partners to collect and reuse this scrap as material for new vehicles. End-oflife aluminum wheel rims are also collected for recycling. In fiscal 2013, Nissan collected about 2,700 tons of wheel rims.

In Japan, Nissan is collecting plastic in the form of finished bumper scrap generated at its plants and turning it into recycled plastics in a finished bumper reprocessing line set up in the Oppama Plant. Recycled plastics have already been given new life as bumpers in Nissan LEAF and many other new vehicles. Exchanged bumpers collected from dealerships are being recycled as materials for under covers and other components. In fiscal 2013, Nissan collected about 195,000 pieces of bumpers.

Vehicle Usage Vehicle Usage ELV Treatment Material Recycling ELV Treatment Minimizing impact by reducing resource extraction and waste production Resource extraction

Closed-Loop Recycling

Recovered Bumpers





Recyclability Rate and Recovery Rate

Nissan considers the three Rs—reduce, reuse and recycle—starting with the design stage for new vehicles. It takes into account the whole lifecycle when designing and developing vehicles, ensuring ease of dismantling and recycling after they are scrapped. Since fiscal 2005, all new models launched in the Japanese and European markets have achieved a 95% or greater recyclability rate.*

*Calculated based on 1998 Japan Automobile Manufacturers Association definition and calculation guidelines (in Japan) and ISO 22628 (in Europe).

Nissan also carries out experimental studies to optimize processing and improve the recovery rate for end-of-life vehicles (ELVs). The studies first aimed to establish methods for processing waste oil, waste liquids, lead and other substances that impact the environment, and now focus on reuse of valuable materials. Feedback from the studies has led to improvements in dismantling techniques and has aided the company's product design division in choosing suitable materials and designing vehicles that are easier to dismantle. Nissan calculates that the recoverability rate for its ELVs in Japan has been 95% or greater since fiscal 2006 and the recoverability rate for fiscal 2013 was 99.5%.

Reducing Scarce Resource Usage

Hybrid vehicles and electric vehicles (EVs) emit less CO₂ over the lifecycle of the product than gasoline-powered vehicles, but scarce resources called rare earths are a necessary component of their motors. Uneven distribution of rare earth elements and the forces of demand and supply give rise to concern about price changes, making it important to reduce their usage.

In 2012, Nissan developed a new electric motor that requires 40% less dysprosium (Dy) compared to conventional EV motors. This motor is currently used in Nissan LEAF. The motor is only the first step in the process to limit the use of rare earth elements. Nissan plans to adopt the reduced-Dy motor for its hybrid vehicles, with the ultimate goal of achieving zero usage of Dy in other components as well.

Nissan aims to reduce and optimize the usage of other rare earth elements. The plan is to reduce annual use of rare earth elements by 30% by fiscal 2016 compared to the projected usage if no particular countermeasures had been implemented from fiscal 2011 onward.

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 thoroughly sorting waste. Its efforts have paid off. In Japan, since fiscal 2010 the company has achieved a 100% recovery rate at all of its production sites, including five manufacturing plants, two operations centers and five affiliates. In Mexico, the Aguascalientes Plant achieved this in 2011. Nissan is working to bring this rate to an industry-leading level in each region of the globe.

Nissan has been making great efforts to reduce the number of wooden pallets and cardboard boxes used in import and export parts shipping. The company began replacing them with units made from steel more than 30 years ago, rolling out plastic substitutes more than 20 years ago as well. These are foldable and can be returned for reuse. Nissan has also been working with its Alliance partner Renault to expand the use of globally standardized, returnable containers. Through design activities carried out concurrently with logistics operations, Nissan has recently been considering ways to optimize the shape of parts from the development stage, thus helping to reduce the packaging materials required.

Through these efforts, Nissan plans to reduce the amount of waste from its production factories by 2% annually in Japan and by 1% annually worldwide compared to waste levels expected if no special steps had been taken from fiscal 2011 onward.*



* For details, please refer to the environmental data at the end of this report.



Sales of Nissan Green Parts

▶ website

▶ page_123

report.

* For more details, see the

CSR data section in this

Click here for more information on 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. Those that receive a passing grade are sold through its sales outlets as Nissan Green Parts. Nissan sells 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.

Water-Use Management

As the global population grows, water use increases and the need for water resources becomes more serious. Climate change also has the potential to bring about reductions in glacial water resources and changes in precipitation patterns, further driving the need for water usage reduction.

Plants producing Nissan vehicles and parts are located all over the world, and they all use water as part of the production process. The company is making efforts to manage and reduce water usage at all of its production plants. It plans to achieve a 15% reduction from fiscal 2010 levels in water usage per vehicle produced by fiscal 2016.* To achieve this, Nissan has carried out water usage surveys at each of its plants and developed an index for assessing future water risks. The company sets targets based on the level of risk as it works to reduce water usage.

Nissan is also working to reduce water usage at its Global Headquarters by processing rainwater and wastewater from kitchens and other sources to use for flushing toilets and watering some plants.

Cleaner Effluent Through Wastewater Treatment

Nissan thoroughly processes wastewater and reuses water within its operations to reduce water usage. At the Chennai Plant in India, processed water is reused in a closed-loop recycling system rather than discharged. Wastewater from the company's Aguascalientes Plant in Mexico is used to maintain greenery on the site, with no off-site discharge.

Nissan is also strengthening water pollution measures in its Japanese plants. In preparation for unexpected occurrences, such as the discharge of oil, it has attached water quality sensors to the discharge ports of wastewater treatment facilities. Discharge of water outside the grounds is automatically suspended if water quality problems are detected.

Wastewater Release





ENVIRONMENTAL MANAGEMENT PROMOTION

Nissan is introducing environmental management systems at all its operations sites worldwide. It is also working with consolidated affiliates, sales companies and suppliers to reduce environmental impact during all stages of the supply chain.

Improving Environmental Management

As of January 2011, the Nissan Global Headquarters and all other main Nissan facilities in Japan, including those for R&D, production and logistics, along with all product development processes, acquired integrated ISO 14001 certification for environmental management systems. The company has appointed an environmental manager to oversee Nissan's environmental activities. Through steady application of the PDCA (plan, do, check, act) cycle, the company is improving its environmental performance. The coordinated goals set by the environmental manager for the entire company are cascaded down to the employees working in all facilities through local offices.

Nissan's ISO secretariat oversees companywide efforts, and the local offices in Japan are responsible for activities at each facility and division and for coordinating the proposals from employees. The secretariat and local offices engage in discussions at least once a month to confirm the progress being made toward established goals, share best practices, improve management systems, draw up plans for the next fiscal year and communicate requests from local facilities and divisions. The items discussed are reported to the environmental manager twice a year (once during the management review conference) so that the company can decide on improvements that are needed.

To confirm that this management is functioning properly, Nissan annually undergoes audits by third-party organizations, and carries out its own internal audits of its environmental systems and environmental performance to strengthen the company's measures based on the PDCA cycle.

The company has also obtained ISO 14001 certification at its main production plants outside Japan. Nissan's policy is to extend environmental management systems with these same criteria to regions of new expansion.

Product Development Policy

Nissan aims to become a "sincere eco-innovator," taking steps to help the natural environment by reducing its business impact in real-world terms and providing customers with innovative products that contribute to the development of a sustainable mobility society. In order to achieve this goal, Nissan has introduced "QCT-E," adding an environmental component to the traditional QCT indices of quality, cost and time. The company has also crafted a global environmental management policy, setting targets for environmental performance in all areas of its business.

Under the Nissan Green Program 2016 (NGP2016), the company's environmental action plan, Nissan annually invests 70% of its research and advanced engineering budget in environmental technologies. The company is also promoting its Common Module Family concept, sharing platforms and module components with its Alliance partner Renault. Savings from reduced costs are invested in new solutions, including cutting-edge environmental technologies.

Raising Employee Awareness

Nissan's environmental activities are sustained by the knowledge, awareness and competency of its employees. Based on ISO 14001 activities, the company conducts employee education rooted in NGP2016 regarding reduction of CO₂ emissions, energy and water consumption and waste. In addition, education regarding environmental accident prevention, including the management of hazardous materials, is provided to all employees including those from affiliated companies working in Nissan production facilities. At production plants, ongoing improvements of employee competency to reduce environmental impact are promoted through not only education and training programs but also the quantitative evaluation of each employee. The content of these training programs is updated once a year.

In Japan, Nissan implements its own curriculum for the education provided to new employees during orientation and to mid-ranking and management personnel during the seminars in order to deepen their understanding of environmental issues surrounding the auto industry, as well as the substance of the NGP2016 program. The company also holds "town hall" style meetings that bring executives together with employees. Employees can stay up to date on Nissan's latest environmental initiatives



* Nissan publishes a bimonthly newsletter, printing 60,000 copies that are distributed to retired as well as current employees. through features in the intranet, internal newsletters^{*} and in-house video broadcasts. All employees also receive an Environmental Policy Card with a pledge to pursue personal environmental activities, which they carry at all times.

Overseas, Nissan shares information and provides education to employees through the intranet, videos, events and various other communication approaches suited to each region.

Employee-Initiated Activities and Evaluation System



* Click here for more information on Nissan Power 88. In fiscal 2008, Nissan added the "environment" factor to the range of *kaizen* activities carried out by quality control (QC) circles. This creates a mechanism that encourages employees to think proactively and propose ideas to improve environmental aspects of Nissan's business. Managers encourage employees' active participation by communicating how these QC circle activities are linked to achievement of the goals in Nissan Power 88,* the company's mid-term business plan through fiscal 2016. The ideas proposed by employees go to managers and QC circle secretariats for assessment of their potential contribution to environmental improvement, among other factors, after which Nissan implements them.

The knowledge and skills of the frontline employees on CO₂ emissions reduction, energy management, water conservation, and waste and landfill reduction have been compiled in a best-practices manual and shared among global facilities. A system to reduce cooling-tower water use was born from this activity. An Energy Efficiency Contest is also conducted in some facilities during February, the officially designated energy conservation month in Japan. These programs keep employees motivated to participate in environmental activities.

Nissan uses various methods to reward employees for their contributions toward environmental improvement activities. One is inclusion of these activities in the "commit and target" annual performance goals used at some Japanese and overseas locations. This system assesses employees' achievement of goals, reflecting this in performance-related elements of bonuses. Employees are also recognized for environmental improvement through Nissan Prizes presented by the CEO or other executives, awards given by plant heads and thank-you cards from managers for excellent work or achievements.

Working with Consolidated Production Companies

Nissan encourages its consolidated production companies in a variety of markets to acquire ISO 14001 certification and to undertake other

environmental initiatives based on their respective policies. Meetings with major consolidated production companies in Japan are held to exchange views on cooperation toward the goals outlined in NGP2016. The meetings lead to a deeper shared understanding of the details of NGP2016 and the initiatives being undertaken by each company.

Working with Sales Companies

Nissan's sales companies in Japan have introduced an original approach to environmental management based on ISO 14001 certification called the Nissan Green Shop certification system. This system is managed through internal audits conducted by the sales companies every six months, in addition to regular annual reviews and certification renewal audits carried out every three years by Nissan Motor Co. As of the end of March 2014, 2,700 dealership outlets of 158 sales companies, including parts dealers, have been certified under the system.

Nissan conducts an annual survey of its sales companies in Japan, collecting comments and requests regarding Nissan's environment-friendly vehicles and other environment-related initiatives. The findings are shared with the presidents of sales companies and incorporated into the PDCA cycle involving Nissan and all sales companies, which is used to guide actions toward improved performance.

Working with Suppliers

The purchasing divisions of Nissan and Renault carry out supply-chain management* in line with *The Renault-Nissan Purchasing Way*, the *Renault-Nissan CSR Guidelines for Suppliers* and, in the environmental aspect, the Nissan Green Purchasing Guidelines.

Nissan works with its suppliers to understand and reduce the environmental impact of upstream processes in the supply chain. The company has a dedicated website to gather information each year from suppliers on their environmental targets, CO₂ emission levels and energy use, as well as their management of environmentally hazardous substances, recycling of resources and water-conservation efforts. There are also briefing sessions on NGP2016 for suppliers where Nissan fully shares its targets, action plans and understanding of what constitutes environmental impact. In fiscal 2013, around 1,200 suppliers took part in sessions in North America, Europe, Asia and other regions. ▶ page_71

* Click here for more information on supply-chain management.



Disclosure of Environment-Related Information

Companies today are being called upon to disclose a wide range of information about how they are managing risks related to such environmental issues as climate change and natural resources. Nissan makes detailed disclosure of its environmental performance on its website for stakeholders including investors, rating agencies and other specialists in accordance with Global Reporting Initiative (GRI) guidelines.* Among the data disclosed are CO₂ emission and waste discharge levels, as well as the amount of energy, water, materials and other resources consumed. Nissan's communication efforts also include briefings to describe its environmental initiatives.

Nissan's Tough Voluntary Standards

Stricter controls on environment-impacting substances are being implemented in countries around the world. Examples include the European 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 volatile organic compounds (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 is strengthening its management of environment-impacting substances, adhering to a well-planned schedule for their reduction and advancing the use of alternative substances. In 2005, the company drew up policies regarding the use of substances scientifically recognized as being

hazardous or carrying high hazard risks, as well as those identified by NGOs as dangerous. In 2007, these policies became unified global standards for Nissan, restricting environment-impacting substances to a stricter degree than the domestic laws of the countries where it operates.

Based on this policy, the company has developed the Nissan Engineering Standard (NES) for the "Restricted Use of Substances." The standards identify the chemical substances whose use is either prohibited or controlled. Nissan applies them in selecting all materials, components and parts used in its vehicles from initial development onward. For example, four heavy metal compounds (mercury, lead, cadmium and hexavalent chromium) and the polybrominated diphenyl ether (PBDE) flame retardant have been either prohibited or restricted in all new vehicles (excluding OEM vehicles) launched globally since July 2007. Nissan is registered and submits reports according to REACH about the vehicles and parts produced in or imported to Europe from Japan and other countries (including some from the United States). The company also complies with Classification, Labeling and Packaging of Substances and Mixtures (CLP) regulations. To control VOCs in car interiors, Nissan has adopted the voluntary targets of the Japan Automobile Manufacturers Association as its own standards for global operations and is reviewing and reducing their use in materials and adhesives for seats, door trim, floor carpet and other parts.

Every year, Nissan revises the "Restricted Use of Substances" NES to address changes in the substances of very high concern (SVHC) and substances requiring authorization for use, as defined by the REACH Regulation and in the Global Automotive Declarable Substances List (GADSL), prepared by a global team made up of auto manufacturers, parts suppliers and materials manufacturers.

These international guidelines, published by the NGO Global Reporting Initiative, promote actions by companies to define overall policy direction toward environmental, social and economic development and to disclose information on their overall plans and specific initiatives.



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* For details on the LCA for Nissan LEAF, etc., see the CSR data section in this report.

Lifecycle Assessment to Reduce Environmental Impact

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

The company's calculations show that over its lifecycle Nissan LEAF produces CO_2 emissions up to 40% lower than gasoline-powered vehicles of the same class. In 2010, this assessment was certified by a third-party LCA organization, the Japan Environmental Management Association for Industry.

In December 2013, TÜV Rheinland in Germany also certified Nissan's LCA methodology. This certification is based on ISO 14040/14044 standards and guarantees the soundness of the environmental impact calculations in Nissan's product LCAs. Nissan will base future LCAs for new vehicles on its certified methodology. The company will also continue working to lower its vehicles' environmental impact by adopting new technology and more efficient processes in manufacturing, aiming for further CO₂ emission reductions over the lifecycle of its new vehicles.

TÜV Rheinland certificate



Protecting the Air, Water, Soil and Biodiversity

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 on a number of ecosystem services, including provision of food and fresh water, climate regulation and protection from natural disasters. The automotive industry must recognize both its impact on ecosystems and its dependence on these services. Companies today face the pressing need to balance environmental preservation and economic progress as they pursue their business activities.

Using the methods identified in the Corporate Ecosystem Services Review,^{*1} Nissan has evaluated its value chain from the extraction of material resources to vehicle production and operation. Based on the results, the company has identified its three priority areas as an automobile manufacturer: energy sourcing, mineral material sourcing and water usage. Nissan has followed up by positioning the business risks and opportunities, reevaluating and further developing its traditional environmental initiatives. In 2010, Nissan published "Ecosystem Services and the Automotive Sector,"² a report collating the outcome of this work. Company calculations in June 2013 showed that more than 20 times as much water was used upstream in the supply chain than by Nissan itself.

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.

website

*2 Click here for more information on "Ecosystem Services and the Automotive Sector."





FOREST CONSERVATION THROUGH THE NISSAN ZERO **EMISSION FUND**

*1 Automatically collected by the Nissan Carwings Data Center through vehicles' onboard communication units. Offset CO2 emissions are calculated from distances using Domestic Clean Development Mechanism standards.

² Approved at the 32nd meeting of the Domestic Credit Certification Committee under the Domestic Clean Development Mechanism, an emission reduction certification mechanism managed by the Ministry of Economy, Trade and Industry, the Ministry of the Environment and the Ministry of Agriculture, Forestry and Fisheries in Japan.

In 2012, Nissan launched the Nissan Zero Emission Fund, based on CO₂ emissions offset through Nissan LEAF usage. The fund calculates annual offset CO₂ emissions from the distance^{*1} driven by individual customers and the average CO₂ emissions for gasoline-powered vehicles. The offsets are then sold to the Green Investment Promotion Organization and the profits used to install quick chargers for EVs and to conserve forests.

In fiscal 2012, 1.710 tons¹² of CO₂ offset credits were sold for ¥2.66 million. Nissan used part of this money to conserve around 16,000 m² of forests, roughly equivalent to the area of 60 tennis courts, and another portion was used for managing the Zero Emission Fund. Going forward, the fund will continue to contribute to CO₂ emission reductions and the spread of EVs.

Cleaner Exhaust Emissions

Nissan proactively sets strict environmental goals and targets, pursuing development of cleaner combustion technologies, catalysts for purifying emissions and other solutions. The ultimate goal is for automotive emissions to be as clean as the atmosphere. The company introduces vehicles that meet emissions regulations in each country as guickly as possible. Nissan aims to reduce the environmental impact of society as a whole by offering vehicles with highly efficient, cutting-edge emission-reduction technologies at reasonable prices.*

Nissan's Sentra CA, released in the United States in January 2000,*2 was the first gasoline-powered vehicle in the world to receive Partial Zero Emissions Vehicle (PZEV) certification^{*3} in compliance with the emission requirements of the California Air Resources Board.

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).⁴ In addition, this model became Japan's first vehicle to receive Super Ultra-Low Emission Vehicle (SU-LEV) certification*5 in 2003.

Later, the X-TRAIL 20GT was the first vehicle in the world to meet Japan's 2009 Emission Regulations, among the most stringent in the world; it was launched in 2008, the year before the regulations came into effect."6 The X-TRAIL 20GT carries a diesel filter that traps and eliminates particulate matter, NOx absorption and oxidation catalysts and an M9R clean diesel engine developed through the Renault-Nissan Alliance. The company has thus overcome the difficult challenges of making diesel vehicle exhaust cleaner, achieving both energy efficiency and reduced CO2 emissions. An X-TRAIL 20GT with a 6-speed automatic transmission (including manual mode) was introduced in 2010.

Furthermore, Nissan is working to improve air quality through the use of Intelligent Transport Systems (ITS) that tackle traffic congestion and other urban environmental issues.

*2 This vehicle is no longer produced.

- *3 PZEV vehicles must meet requirements in the areas of Super Ultra Low Emission Vehicle tailpipe emission level and zero-evaporative emissions, be equipped with an onboard diagnostic system and have an extended warranty of 150.000 miles or 15 years.
- *4 U-LEV: Ultra-Low Emission Vehicles produce 50% less nitrogen oxide (NOx) and nonmethane hydrocarbon (NMHC) than the 2005 emission standards level.
- *5 SU-LEV: Super Ultra-Low Emission Vehicles produce 75% less emissions than the 2005 emission standards level.
- *6 The 2009 emission standards stipulate reductions of NOx by 47% and particulate matter by 64% from the levels required by the 2005 emission standards (applicable to vehicles weighing more than 1,265 kg). The regulations went into effect for new models in October 2009 and have been applied to existing models and imported cars since September 2010.



*7 Click here for more information on Nissan's ITS initiatives

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¹ Click here for more information on how Nissan is meeting emission regulations in different countries. For more details, see the CSR Data section in this report.



Plant Emission Management

Nissan thoroughly implements systems and control standards at its production plants to reduce the amount of air pollutants emitted during operations. The company's own air pollution control targets are more stringent than those mandated by the countries in which it operates.

In Japan, Nissan has taken strict measures for emissions of NOx and SOx pollutants from its 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. Nissan has lowered NOx and SOx emissions by introducing low-NOx burners in the ovens and boilers that provide heat for its painting lines and by switching from heavy oil and kerosene to fuels with low SOx 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 compounds account for approximately 90% of the chemicals released in Nissan's vehicle production processes. The company is working to increase the recovery of cleaning solvents and other chemicals and to reduce the amounts of these substances emitted from its plants ahead of the implementation of new regulations in each country where it operates.

Nissan is also introducing water-based paint lines that limit VOC emissions to less than 20 grams per square meter of painted surface. The company has adopted these lines in the Nissan Motor Kyushu Co., Ltd. Plant as well as the Aguascalientes Plant in Mexico, the Resende Plant in Brazil, the Smyrna Plant in the United States and the Huadu Plant in China. Nissan has set a target for fiscal 2016 of a 15% reduction in VOC emissions by painted surface area from fiscal 2010 levels.

Messages from Our Stakeholders

When ENER-G entered Mexico approximately 10 years ago, we were purely looking at carbon destruction opportunities under the Clean Development Mechanism of the Kyoto Protocol. With the changing economics and requirements for better environmental control on waste management facilities, the focus moved to renewable energy generated from landfill gas. ENER-G has been developing these types of projects now for 20 years, and has in excess of 170 MW of installed capacity around the world. These projects not only generate energy, they assist both the municipalities and our private-sector clients to meet their corporate social responsibilities in terms of dealing with waste and the byproduct. "biogas," which is well known to be a very harmful greenhouse ga

ENER-G was delighted to be welcomed to look at the San Nicolas facility by the City and State of Aguascalientes, where Nissan also has its manufacturing facility. The landfill gas to energy project was successfully commissioned in December 2011 and through proactive discussions it was contracted that Nissan Mexicana, S.A. de C.V., would receive the electricity supplied by ENER-G.

The \pounds 4.4 million investment by the ENER-G is reducing carbon dioxide emissions at the landfill site by approximately 90,000 tons per year. This is equivalent to the environmental benefit of 7,045 hectares (17,409 acres) of pine forest.

We are proud of our partnership with Nissan and the City of Aguascalientes in this project, and with further projects being developed in México we hope to be able to supply further renewable energy going forward.



lan Cooper BEng (Hons) IEng AMICI Country Manager, Mexico Business Development Director—Landfill & Specialist Gases (México, Romania, Poland and the U.K.) ENER-G S.A. de C.V.

