# ENVIRONMENT

SAN MOTOR CORPORATION SUSTAINABILITY REPORT 2015

INTRODUCTION

SAFETY

CEO MESSAGE

PHILANTHROPY

CONTENTS

ENVIRONMENT

The increasing global population and the rapid growth of the world economy have complex and diverse connections with the global environment. They also affect the environment in numerous ways. It is essential to protect the world's irreplaceable natural capital—biodiversity and the air, water and soil that sustain it—for future generations. 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 quality and other natural capital, efficient use of mineral resources, management of chemical substances, waste reduction, recycling and health issues. 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 environmental effects of its activities, as well as those of its business partners throughout the value chain. The company pursues needed technologies and processes to help minimize the impact of its products on people and communities throughout their lifecycle, while also engaging in communication with society. The company provides customers with innovative products and promotes effective use of energy and resources by 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."

WORKING TOWARD A SUSTAINABLE

MOBILITY SOCIETY

QUALITY

BLUE CITIZENSHIP: NISSAN'S CSR

VALUE CHAIN

RENAULT-NISSAN ALLIANCE

EMPLOYEES

CSR DATA

ECONOMIC CONTRIBUTION

THIRD-PARTY ASSURANCE

**CORPORATE GOVERNANCE &** 

INTERNAL CONTRO

Improvement in corporate average fuel efficiency (avg. in Japan, U.S., Europe and China, 2016; compared to 2005):



CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

# ENVIRONMENT

# SCORECARD

# FY2014 TARGET ACHIEVEMENT RATE: VV ACHIEVED V MOSTLY ACHIEVED × NOT ACHIEVED

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.

Nissan Priorities	Nissan Objectives	Indicators of Progress	FY2013 Results	FY2014 Results	Assessment	Action Planned for Next Year Onward	Long-Term Vision
	Introduce four EVs including Nissan LEAF	Number of models introduced	Announced e-NV200, the second EV model, for European market	Launched e-NV200, the second EV model; launched the Venucia e30 for the Chinese market	~~	Continue development	
	Prepare to introduce fuel-cell electric vehicle (FCEV) into market	Results of initiatives	Development underway	Development underway	~~	Continue development	
Zero-emission vehicle	Take global leadership in supplying batteries for electric-drive	Results of initiatives	Production ongoing	Some processes for battery production started by Nissan Motor Iberica (Spain) and Dongfeng Motor Company Ltd. (China)	~~	Undertake continuous production of batteries for EVs sold	
penetration	Help create zero-emission society utilizing EVs and their derivative technologies with partners	Results of initiatives	Based on "LEAF to Home," began "Vehicle-to-Building" test using multiple Nissan LEAFs simultaneously	End of the Yokohama Smart City Project, which achieved 25% CO <sub>2</sub> reductions through solar power, "Vehicle to Home" and EVs	~~	With partners, promote commercialization of "Vehicle to Home" and EVs	
	Provide energy storage solution with used EV batteries through "4R" business	Results of initiatives	Developed world's first high- capacity energy storage system built with used batteries (Japan)	Began testing of high-capacity energy storage system built with used Nissan LEAF batteries in Osaka's Konohana Ward	~~	Make preparations for further expansion of reuse business	
	Improve CAFE* by 35% from FY2005 (Japan, U.S., Europe, China) * Corporate average fuel economy; meet or exceed regulatory requirements	CAFE	Improved by 31.5%	Improved by 36.4%	~~	Promote expansion of fuel- efficient vehicles	Achieve 90% reduction
	Introduce top fuel-efficiency models in various classes	Model introductions	DAYZ (Japan) Infiniti OX60 (U.S.) Note, Oashqai (Europe)	X-Trail (Europe) Murano (U.S.)	~~	Continue development	in CO <sub>2</sub> emissions from new vehicles by 2050 (vs. 2000)
	Introduce front-wheel-drive hybrid vehicles (HEVs) in C class and above; expand rear-wheel-drive HEV offerings	Model introductions	Skyline (Japan) Infiniti Q50, Pathfinder, Infiniti QX60 (U.S.)	Development underway	~~	X-Trail (Japan)	
	Promote plug-in hybrid vehicle (P-HEV) development	Model introductions	Development underway	Development underway	~~	Continue development	
Fuel-efficient vehicle expansion	Introduce next-generation CVT globally; expand CVT sales to 20 million cumulative units from 1992	Number of CVT-equipped vehicle sales	Annual total: 2.79 million Cumulative total: 16.15 million	Annual total: 2.95 million Cumulative total: 19.10 million	~~	Promote expansion of CVT- equipped vehicles	
	Develop lightweight technologies with structure optimization, new materials and new manufacturing processes	Results of initiatives	6 models launched in FY2012 and FY2013 achieved best-in-class vehicle weight	Increased use of 1.2 gigapascal (GPa) Ultra High Tensile Strength Steel with High Formability in the new Murano, launched in North America, reducing total weight by 66 kg	~~	Continue development	-
	Contribute to CO <sub>2</sub> reduction with ITS technologies	Results of initiatives	Announced results of Beijing dynamic route guidance test conducted with Beijing Municipal Commission of Transport: 5.1% decrease in travel time, 7.6% increase in fuel economy	Promoted widespread adoption	~~	Promote widespread adoption	

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

# ENVIRONMENT

Nissan Priorities	Nissan Objectives	Indicators of Progress	FY2013 Results	FY2014 Results	Assessment	Action Planned for Next Year Onward	Long-Term Vision
	Reduce $CO_2$ emissions of global corporate activities by 20% (t- $CO_2$ / vehicle, vs. FY2005)	CO <sub>2</sub> emission reduction rate	Reduced by 15.4%	Reduced by 22.6%	~~	Expand Nissan Energy Saving Collaboration (NESCO) diagnoses worldwide	
	Reduce by 27% in all manufacturing sites (t-CO <sub>2</sub> /vehicle, vs. FY2005)	CO <sub>2</sub> emission reduction rate	Reduced by 21.8%	Reduced by 23.9%	~~	Adopt three-wet paint process	Achieve 80%
Corporate carbon footprint	Reduce by 6% in logistics (Japan, North America, Europe, China, t-CO <sub>2</sub> /vehicle, vs. FY2005)	CO <sub>2</sub> emission reduction rate	Increased by 2.1%	Reduced by 3.3%	~~	Promote modal shift and increased filling rate	reduction by 2050 (t-CO <sub>2</sub> /
minimization	Reduce by 1%/year in offices (Japan, North America, Europe, China, t-CO <sub>2</sub> /floor area, vs. FY2010)	CO <sub>2</sub> emission reduction rate	Increased by 6.1%	Reduced by 1.8%	~	Expand PPS adoption	vehicle, vs. 2005)
	Reduce by 1%/year in dealers (Japan, t-CO <sub>2</sub> /floor area, vs. FY2010)	CO <sub>2</sub> emission reduction rate	Increased by 7.1%	Increased by 14.4%	~	Introduce energy-saving equipment in new outlets and expand PPS adoption	
	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	~~	Promote activities	
	Expand closed-loop recycling scheme with business partners	Results of initiatives	Continued to reduce the steel and aluminum scrap generated during production, collecting and reusing it as material for new vehicles	Bolstered cooperation with partners aimed at increasing recovery rate for interior plastic from scrapped vehicles	~~	Promote activities	
New natural resource use	Improve end-of-life vehicle (ELV) recovery rate - Achieve top-level ELV recovery rate (Japan) - Promote proper treatment and resource recovery globally	Recovery rate	99.5% (Japan) Efforts underway globally	99.6% (Japan) Work carried out on system to recover, recycle used lithium-ion batteries globally	~~	Promote activities	Reduce ratio of new natural resources per
minimization	Reduce scarce resource usage	Results of initiatives	Promoted development aimed at reducing rare earth usage	Introduced magnets for HEV motors with reduced rare earth usage, starting with newly launched North American Pathfinder HEV and Infiniti QX60 HEV	~~	Expand adoption of developed technologies in new HEV models and begin development of magnets with even lower rare earth usage	vehicle by 70% (vs. 2010)
	Reduce waste 2%/year in Japan and 1%/year worldwide	Waste reduction rate	Reduced by 10.9% (Japan) Reduced by 5.5% globally	Reduced by 3.5% (Japan) Reduced by 7.0% globally	~~	Expand resource NESCO diagnoses worldwide	
	Promote management and reduction of water usage at all production sites	Results of initiatives	Set global target of water use and promoted activities	Further bolstered usage reduction initiatives at vehicle production plants worldwide	~~	Promote activities	
	Enhance and promote environmental management throughout supply chain (consolidated companies, sales companies, suppliers)	Results of initiatives	Continued activities to reduce environmental impact through understanding upstream in the supply chain	Participated in CDP supply chain program and adopted global standards for supplier surveys	~~	Promote understanding of environmental impact and improve its accuracy	Promote comprehensive
Environmental management promotion	Promote reduction, substitution, and management of environment- impacting substances	Results of initiatives	Continued management of environment- impacting substances, creation of well- planned schedule for their reduction and use of alternative substances	Continued management of environment-impacting substances, creation of well-planned schedule for their reduction and use of alternative substances	~~	Further strengthen management of environment-impacting substances	and effective initiatives for supporting management decisions and
	Reduce environmental impact of products with lifecycle assessments (LCAs)	Results of initiatives	Obtained TÜV Rheinland certification for LCA methodology	Continued activities for reducing environmental impact of products under TÜV Rheinland certification for LCA methodology	~~	Promote reduction of environmental impact of products	achievement of Nissan Green Program goals





Click here for detailed information on our environmental data.



## 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" CO<sub>2</sub> 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 zero-emission vehicles—battery electric and fuel-cell electric (EVs and FCEVs)—and to promote the use of renewable energy to power these technologies.

Nissan is advancing technological development on the basis of a zero-emission future scenario. Specifically, it is concentrating its efforts on two pillars: zero emission, which involves widespread use of zero-emission vehicles in a holistic approach to promote a sustainable society, and PURE DRIVE, which reduces CO<sub>2</sub> emissions by developing fuel-efficient internal combustion engine technologies and introduces them to the market.



Nissan has also calculated that it needs to reduce CO<sub>2</sub> emissions from its corporate activities by 80% by 2050 compared with levels in 2005. Accordingly, it plans to continue its energy efficiency measures, leverage the power storage ability of EV batteries and expand its use of renewable energy.

#### Our CO<sub>2</sub> Reduction Scenario



Created by Nissan on basis of Intergovernmental Panel on Climate Change Fourth Assessment Report.

#### 23

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

# **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 assessments focusing on factors with critical impact. 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 and resource circulation by means of efficient use and recycling of both energy and resources, expanding 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: zero-emission vehicle penetration, fuel-efficient vehicle expansion, corporate carbon footprint minimization and new natural resource use minimization.

Thanks to Nissan Green Program activities, the company forecasts that CO<sub>2</sub> 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.

Click here for more information on Nissan Green Program 2016. ▶ website

Promoting Energy and Resource Diversity, Efficiency and Recycling



**Thermal Radiation** 

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

## **COMPANY ORGANIZATIONS FOR THE ENVIRONMENT**

To achieve the NGP2016 goals, Nissan has created a global framework for environmental management and is setting targets and implementing closely coordinated action plans across 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 Environmental Management Committee (G-EMC), including a board member as cochair, meets twice annually to determine with corporate officers chosen based on the issues being discussed the overall policies and the content of reports to be put before the Board of Directors. The Global Environmental Planning Department, part of the Corporate Strategy 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 North 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 Global Environmental Planning Department while reporting to the G-EMC.

Nissan's strategy is built on the concept of listening to the views of wider society and identifying potential opportunities and risks. 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.

 Description
Click here for more information on our environmental management promotion.

#### Nissan's Framework for Global Environmental Management



## Environmental Management Organization



CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

## Stakeholder Engagement

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.

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 business people from various sectors. They discuss the direction and appropriateness of Nissan's business strategies; this input is considered in those strategies going forward.

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

## **Materiality Analysis**

The automotive industry is subject to environmental regulations and standards around the world, covering areas like CO<sub>2</sub> and other exhaust emissions, energy, fuel efficiency, noise, material resources, water, chemical substances, waste and recycling. These regulations are becoming more stringent year by year. Consumer needs and wishes concerning environmental performance are also changing.

To meet these various social demands, Nissan uses materiality assessments to analyze potential opportunities and risks. The company identifies those priority issues viewed by both Nissan and stakeholders as important, sets necessary policies and targets for tackling them effectively and works them into its environmental strategy.



 For the results of the company's materiality assessments, see the Materiality Matrix.

# **ZERO-EMISSION VEHICLE PENETRATION**

Electric vehicles (EVs) demonstrate that what is good for drivers and the planet is also good business. Nissan, including in its Alliance with Renault, 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 its mass-produced 100% electric vehicle, the Nissan LEAF. In 2014 Nissan expanded its leadership in zero-emission mobility into the LCV segment with the launch of the e-NV200, the company's second all-electric vehicle, in the European and Japanese markets. The e-NV200 is Nissan's first commercial EV; its use as a mobile power source has potential for application in a range of business contexts. Together with Renault, which already offers four EV models, Nissan will maintain its dominant position in the EV market.

## Nissan LEAF Sales Reach 170,000

The Nissan LEAF is powered by a lithium-ion battery pack and an electric motor, and emits no  $CO_2$  or other exhaust emissions during operation. The Nissan LEAF 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 the Nissan LEAF high marks from drivers since its debut in 2010.

The Nissan LEAF has been introduced in more than 40 markets with sales steadily increasing. In March 2015, total sales worldwide reached 170,000 vehicles, making the Nissan LEAF the best-selling EV in the world. While the vehicles' low environmental impact is attractive, consumer awareness of other characteristics of EVs, such as the low charging and operation costs and their superior acceleration and steering performance, is likely to have been a factor in these strong sales.

The 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 deploy charging 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 the Nissan LEAF and other EVs produce considerably less CO<sub>2</sub> emissions over their entire lifecycle, from manufacturing to end-of-life disposal, compared to gasoline-powered vehicles of the same class.

▶ page 43

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

#### **NISSAN MOTOR CORPORATION SUSTAINABILITY REPORT 2015**

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

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.



The Nissan LEAF.



#### Nissan LEAF Launched in Jeju Island, Korea

Jeju Island in Korea has set the goal of becoming a "Carbon-Free Island" by 2030. In the future, it plans to supply all its electricity through wind and solar power. By expanding installation of chargers and offering subsidies to EV purchasers, it is also promoting the adoption of EVs with the aim of ensuring all vehicles on the island are electric by 2030. Nissan decided to launch the Nissan LEAF locally in support of these activities by the Jeju Island government. In December 2014, the company held a delivery ceremony for 15 owners selected by public lottery, and it has also donated quick chargers to the island. In March 2015, it exhibited the Nissan LEAF at the second International Electric Vehicle Expo held on Jeju Island.

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

Based on the Nissan NV200, a multi-purpose commercial van, the e-NV200 combines the interior roominess and versatility of the NV200 with the acceleration performance and refinement of an EV. With its convenient onboard power outlets, the e-NV200 can supply electrical power while on the go, giving it added utility in the field as a mobile power source.

Compared to commercial vehicles using internal combustion engines, the e-NV200 reduces operating costs and contributes to an enhanced environmental image thanks to the vehicle's zero exhaust emissions and reduced noise pollution. Additionally, the vehicle offers smooth, strong acceleration performance while being extremely quiet.

The inclusion of a hydraulic brake system makes the vehicle's regenerative braking more effective, enabling a driving range of 185 km to 190 km on a full charge (in JC08 mode).

The e-NV200 is produced at Nissan's Barcelona Plant in Spain, allowing Japanese and European urban goods delivery and taxi businesses to realize zero-emission operations. With five-seat and seven-seat wagon versions available, the vehicles can also be used for carrying passengers.

#### Power Storage Battery

Two 100V power outlets that can draw a total of a maximum of 1,500 W of power from the battery are installed in the front-seat side and the cargo area (of the Japan model). They provide a convenient and safe electrical power source that comes in handy for offsite jobs or events, or in the case of an emergency.

The driver can also manually set the remaining battery level. By halting the power supply automatically at a predetermined level, the driver ensures that the vehicle has enough energy left in the main battery pack for the ride home.



As a mobile power source, the e-NV200 has potential for application in a range of business contexts.



The e-NV200 gives Japanese and European urban goods delivery and taxi businesses the opportunity for zero-emission operations.



## **Commercial Viability of Fuel-Cell Electric Vehicles**

Fuel-cell electric vehicles (FCEVs) are another type of zeroemission vehicle producing no CO<sub>2</sub> or other harmful emissions. Powered by electricity generated from hydrogen and oxygen, FCEVs 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.

In the same year Nissan also unveiled the fuel-cell stack for its FCEVs, featuring dramatically improved power density<sup>®</sup> and reduced use of platinum and variation of parts<sup>®</sup> to achieve major size and cost reductions.<sup>®</sup>

- Power density is 2.5 kW per liter, or 2.5 times more than for the Nissan-developed 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).

In 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. In February 2015, Nissan announced an agreement to work together with other Japanese automotive manufacturers to support hydrogen station infrastructure development.

## Pursuing a Zero-Emission Society

The widespread use of zero-emission vehicles, which produce no CO<sub>2</sub> 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.

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, sale of quick-charging equipment, construction of vehicle-charging infrastructure and standardization of charging methods with other manufacturers. Increased uptake of zeroemission vehicles will bring changes to people's lifestyles, laying the groundwork for a sustainable mobility society. Nissan provides more than just EVs themselves; it embraces the new values that they represent 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 MOTOR CORPORATION SUSTAINABILITY REPORT 2015**



#### **Testing Begins of e-NT400 Truck**

From April 2014, Nissan conducted testing of its 100% electric truck, the e-NT400 Test Truck, together with the government of Toyama City. For approximately two months, Nissan loaned the e-NT400 to Toyama, which used it for the Toyama Municipal Environmental Center's recyclable collection to gauge its practicality. Nissan is using the data gathered from this real-life experiment to fine-tune future development of the vehicle's driving performance, battery charging and other aspects. In September 2014, Nissan conducted more testing with Sagawa Express Co., Ltd., receiving strong positive feedback from drivers regarding the lowered noise and vibrations and the acceleration performance that represent the strengths of zero-emission vehicles.



## Launch of e30 in China, Venucia's First 100% EV

In September 2014, Dongfeng Nissan Passenger Vehicle Company, a division of Nissan's joint venture with Dongfeng Motor Company Ltd., launched the e30 as local brand Venucia's first 100% electric vehicle. The e30 will bring Chinese consumers a reliable and enjoyable EV experience at affordable running costs.



## 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 continuing to increase the number of Japanese Nissan dealerships with quick chargers, which stood at 1,640 as of March 2015.

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 May 2014, Nissan jointly established a new company, Nippon Charge Service (NCS), with other Japanese automotive manufacturers to promote installation of chargers for electricpowered vehicles (including EVs and plug-in hybrid vehicles). Under NCS management, the companies aim to provide a convenient charging network service letting drivers charge their vehicles anywhere with a single card.

Nissan has also started working with companies that support the spread of EVs by installing EV chargers in their workplaces to make it easier for employees to commute using the Nissan LEAF.

In the United States, Nissan launched its "No Charge to Charge" program, which provides free access to selected charging stations for two years with the purchase or lease of a new Nissan LEAF. As of March 2015, the program is running in 15 cities where Nissan LEAF sales are high, including San Francisco, Los Angeles, Seattle and Portland, and the company plans to expand to more cities in the future.



In Europe, too, Nissan is focusing efforts on infrastructure by working with companies in the energy industry and others to install more than 1,500 quick chargers compliant with the CHAdeMO standard as of February 2015.

## Nissan LEAF: Contributing to Realization of Smart Grids

The Nissan LEAF can provide electricity to households through the Power Control System. The "LEAF to Home" power supply system lets a 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 additional value. The connector conforms to CHAdeMO, a fastcharging protocol in use in global markets where Nissan EVs are sold, and ensures a high level of versatility, stability and reliability.

Nissan is also participating in a "vehicle-to-grid" project at Los Angeles Air Force Base, in collaboration with the U.S. Department of Defense and the California Energy Commission. The project is deploying 13 Nissan LEAFs to supply power to base facilities. By feeding EV battery power back into the grid, it is possible to earn revenue while cutting the total cost of vehicle ownership. There are plans for the Nissan LEAF to be a part of similar projects at other bases. Nissan is building on this experience to explore the potential for making its vehicles part of an even larger-scale electric power management system.

#### **Overseas Production of Lithium-Ion Batteries**

In Japan, Nissan and NEC Corporation's joint-venture company Automotive Energy Supply Corporation (AESC) produces lithiumion batteries for the 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 the 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.

Since fiscal 2011, with cooperation from Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Nissan has held driving trials together with corporations and local governments 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 22 areas. Expanding beyond tourism, their main area of application to date, the vehicles are now being used for nursing visits by a care facility for the elderly in Atsugi, Kanagawa Prefecture, and for medical and nursing visits by a service in Takamatsu, Kagawa Prefecture, among others. In October 2013, Nissan launched "Choimobi Yokohama," a one-way car-sharing service using the Nissan New Mobility Concept in Yokohama, Kanagawa Prefecture. The service now has more than 10,000 members able to experience the comfort of EVs. November 2014 saw the start of the second phase of testing, in which Nissan aims to make the service more sustainable through deeper cooperation with local businesses, shopping centers and public transportation in and around Yokohama.

Nissan carries 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 lithium-ion batteries used in Nissan's EVs retain capacity well beyond the useful life 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 already started sales of them for houses and apartment buildings.

4R Energy has developed the world's first → high-capacity energy storage system built with 16 used Nissan LEAF lithium-ion batteries. With funding from Japan's Ministry of the Environment, the system is being used in an experiment in Osaka's Konohana Ward. In November 2014, Nissan announced another experiment to test application of this system in building power management. The testing will integrate this large-capacity system with the Demand Response Service of Eneres Co., Ltd.—which charges different fees for electricity usage at different times and pays rewards to consumers who limit usage at peak times—with the aim of reducing utility costs while ensuring a stable power supply.

■ As of January 2014, according to 4R Energy Corporation.

## 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 fuelefficient 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 CO<sub>2</sub> 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 2014 was 36.4% improvement from the fiscal 2005 level. As a result, the target was achieved ahead of the schedule.



#### 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.

The company is improving the performance of its gasoline and diesel engines. In the new Infiniti Q50, launched in fiscal 2014 and known as the Skyline in Japan, a 2.0-liter directinjection turbo engine has replaced the 2.5-liter gasoline engine in the previous model, giving the vehicle class-leading engine performance and boosting fuel efficiency by around 20%. The Juke's 1.6-liter gasoline direct-injection turbo engine has also undergone major improvement, increasing fuel efficiency by about 10% through the addition of features like the world's first lowpressure cooled exhaust gas recirculation system and mirror bore coating inside cylinders. The Navara has boosted fuel efficiency by some 20% with the replacement of its former 2.5-liter diesel engine with a 2.3-liter direct-injection turbo engine, while the Atlas has added around 10% fuel efficiency by going from a 4.5-liter diesel engine to a 3.0-liter direct-injection turbo engine.

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 maximum 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). In fiscal 2014, Nissan offered the Xtronic in the Qashqai diesel vehicles sold in Europe, and continues to expand its use to further vehicles.

In fiscal 2014, these technologies helped to give the Murano class-leading fuel efficiency at its launch in the U.S. market.

Nissan's goal is to ship 20 million Xtronic-equipped vehicles, with their fuel efficiency benefits, by fiscal 2016 from their first launch in 1992, thereby helping to reduce global  $CO_2$  emissions. Nissan sold 2.95 million Xtronic vehicles in fiscal 2014, bringing the cumulative total to 19.10 million.

As of time of sale: Murano (both 2WD and 4WD), 24 MPG fuel economy combined city/highway driving.

#### Number of Xtronic-Equipped Units Sold





# A Broader Lineup of Hybrid Vehicles

Hybrid vehicles, which run on a combination of a gasoline-powered engine and an electric motor, offer improvement of fuel efficiency and considerable reductions in CO<sub>2</sub> 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. Nissan introduced the system into rear-wheel-drive vehicles in 2010 and front-wheel-drive vehicles in 2013; as of the end of fiscal 2014, a total of seven models were using it. The company plans to expand the system to further vehicles in the future.

Nissan has also developed a simple, compact hybrid system, which includes an auxiliary motor with enhanced energy regeneration capacity and power output, as well as a sub-battery to boost storage capacity. This system was introduced in the Serena S Hybrid, launched in 2012.

## Progress in Plug-in Hybrid Vehicles

Plug-in hybrid electric vehicles (PHEVs) feature both an internal combustion engine and one or more electric motors, similar to those of electric vehicles, on which they are capable of running. The motors are powered by a small lithium-ion battery pack. The batteries can be charged from an external source or by a generator driven by the engine. Nissan is developing PHEVs with a view to a future 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, to streamline structure, it is reducing component thickness by optimizing layout of support elements. In the manufacturing process, the company is opting for internal component resins that have been foamed to reduce weight.

Nissan is seeking weight reduction in steel parts and promoting the use of Advanced High Tensile Strength Steel (AHSS). Nissan first used its 1.2 gigapascal (GPa) Ultra High Tensile Strength Steel with High Formability in fiscal 2013 in its Infiniti Q50 (known in Japan as the Skyline). In fiscal 2014, this steel appeared in the new Murano, launched in North America, greatly increasing the proportion of high tensile material in the vehicle. In combination with other measures, this achieved a total weight reduction of 66 kg in the vehicle body. This 1.2 GPa steel achieves both robust strength and high formability with its optimized compound of materials. The steel allows the creation of thinner, lighter components, and 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.

## 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 eco-driving 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<sub>2</sub> emissions would decrease by approximately 10%.

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.



The Beijing Municipal Commission of Transport presented Nissan with an award for its major contributions to easing congestion, saving energy and improving the environment in Beijing through this successful project. Nissan will actively promote the adoption of these kinds of systems as it strives to improve urban environments and air quality.



# CORPORATE CARBON FOOTPRINT MINIMIZATION

In a world often said to be carbon-constrained, reducing  $CO_2$  emissions is a task to be tackled by all companies. Nissan is improving energy efficiency and promoting renewable energy adoption to reduce  $CO_2$  emissions.

## A 20% Emission Reduction in Corporate Activities

By fiscal 2016, Nissan aims to reduce the CO<sub>2</sub> emissions associated with its corporate activities by 20% globally from 2005 levels, as measured by the index of "CO<sub>2</sub> 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 2014 was a 22.6% reduction from the fiscal 2005 t-CO<sub>2</sub>/vehicle level.

To reach its CO<sub>2</sub> 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 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.

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.

## Falling Global Emissions from Corporate Activities



#### **Energy Saving in Global Production**

Most of the  $CO_2$  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  $CO_2$ emissions of any automobile manufacturer.

In production technology, the company is introducing highly efficient equipment, improving manufacturing techniques and adopting energy-saving lighting. Another key approach is Nissan's three-wet paint process. Approximately 30% of all CO<sub>2</sub> emissions from plants come from the painting process. Shortening or eliminating baking stages within this process brings about a reduction in emissions.

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 CO<sub>2</sub> 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

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

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 CO<sub>2</sub> 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) diagnoses energy loss at the plants and proposes new energysaving countermeasures. These contributed to a reduction in CO<sub>2</sub> emissions of 50,000 tons in fiscal 2014, according to Nissan calculations. A NESCO team was established for Japan in 2003, and teams for Europe, Mexico 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 first Aguascalientes Plant in Mexico uses energy generated from biomass gas and wind power, achieving a renewable energy usage rate of 50% in 2014. 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 2014,  $CO_2$  emissions per global vehicle were approximately 0.56 tons, a reduction of 23.9% from the fiscal 2005 level.

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



#### Oven process

Reduces CO<sub>2</sub> 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).



## **Global Energy Consumption**



\* Figures are for the Nissan Group worldwide, including consolidated companies



\* Figures are for the Nissan Group worldwide, including consolidated companies

Global energy consumption and CO<sub>2</sub> Emissions from manufacturing activities have received third-party certification. For details, please refer to the environmental data at the end of ▶ page 135 this report.

0.00

# 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 across the company, including at its overseas manufacturing siteshas 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. Through a 2014 expansion of this approach to include cooperative transport of production parts with other OEMs, in addition to complete vehicles and service parts, the company is targeting further efficiency in this area. Nissan 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 94.2% in fiscal 2014.

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 energy-efficient vessels for sea shipments of our vehicles. By 2014 the fleet had grown to include five eco-ships.<sup>■</sup>

#### M Click here for more information on Nissan's eco-ships. ▶ website

While expanding its global logistics operations, Nissan is increasing efficiency and implementing a modal shift in transportation targeting a 6% reduction in CO2 emissions by fiscal 2016 from the fiscal 2005 level, as measured by the index of "CO2 emissions per vehicle.<sup>\*\*</sup> In fiscal 2014, CO<sub>2</sub> emissions per global vehicle were approximately 0.39 tons, a decrease of 8.9% from the fiscal 2005 level.

32 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.

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

#### **Our Efforts at Dealerships and Offices**

Nissan is promoting CO<sub>2</sub> emission management at all business locations and dealerships in Japan, as well as at bases of operations in North America, Europe and China. It aims to reduce total 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 high-efficiency 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 CO<sub>2</sub> emissions and costs have been taken into account through Japan's Power Producers & Suppliers (PPS) system. In 2014, approximately 6,700 kW of energy was supplied to four Japanese business locations including the company's Global Headquarters. Nissan is also broadening supply to dealerships from Nissan and other PPS systems. These systems supply around 870 sales outlets in the Kanto, Chubu, Tohoku, Kansai and Kyushu areas with around 62,000 kW of energy, equivalent to an annual reduction of some 9,900 tons in CO<sub>2</sub> emissions.

The company's efforts go beyond CO<sub>2</sub> 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.

Global Headquarters, Sagamihara Parts Center, Nissan Education Center and Customer Service Center (all in Kanagawa Prefecture).



Solar panels are 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 CO<sub>2</sub> 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-of-life aluminum wheel rims are also collected for recycling. In fiscal 2014, Nissan collected about 2,680 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 the 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 2014, Nissan collected about 181,000 pieces of bumpers.

#### **Closed-Loop Recycling**



Recovered Bumpers (parts) 300,000 230,000 200,000 195,000 195,000 195,000 100,000 0 2010 2011 2012 2013 2014 (FY)

## **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.

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 recovery rate for its ELVs in Japan has consistently been 95% or greater since fiscal 2006 and the recovery rate for fiscal 2014 was 99.6%.

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

## **Reducing Scarce Resource Usage**

Hybrid vehicles and electric vehicles (EVs) emit less CO<sub>2</sub> 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 the Nissan LEAF. Nissan is successively installing the reduced-Dy motor in 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 first 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

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.

Click here for more information on Nissan Green Parts.

# Water-Use Management

As the global population grows, water use increases and water scarcity becomes a more serious problem. 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 built a reservoir for rainwater at the Chennai Plant in India and has installed wastewater recycling equipment at the Chennai Plant, the Huadu Plant in China and the Oppama Plant in Japan. The company is implementing best practices globally 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.

▶ page\_116

## Cleaner Effluent Through Wastewater Treatment

Nissan thoroughly processes wastewater at its various plants. Wastewater from the company's two plants in Aguascalientes, Mexico, is used to maintain greenery on the sites, with no offsite 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, had 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 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 enabled 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 CO<sub>2</sub> 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 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.

Nissan publishes a monthly newsletter, printing 30,000 copies that are distributed to retired as well as current employees.

## Employee-Initiated Activities and Evaluation System

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. 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 CO<sub>2</sub> emissions reduction, energy management, water conservation, and waste and landfill reduction have been compiled in a best-practices manual and shared among global

```
Click here for more information on Nissan Power 88.
website
```



facilities. A system to reduce cooling-tower water use was born from this activity. Nissan also holds contests in some facilities during officially designated months in Japan to keep employees motivated to participate in environmental activities. These include a Water Usage Reduction Idea Contest in environmental month in June, a Waste Reduction Idea Contest in 3R month in October and an Energy Efficiency Contest in energy conservation month in February.

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 "THANKS CARD" 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 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., Ltd. As of the end of March 2015, the system has certified 2,700 dealership outlets of 158 sales companies, including parts dealers.

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 ensure full understanding of CSR and compliance with regulations in the supply chain through *The Renault-Nissan Purchasing Way* and the *Renault-Nissan CSR Guidelines for Suppliers*. In the environmental aspect, they carry out supply chain management in line with 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 conducts surveys to gather information each year from suppliers on their performance and environmental targets like CO<sub>2</sub> emission levels and water use. In fiscal 2014, it gained an understanding of the environmental impact of its suppliers by working together with CDP, an international nonprofit organization that manages a global system for disclosure of companies' environmental impact and strategies. Further, the company institutes mandatory questionnaires concerning handling of environment-impacting substances and environmental management when suppliers are selected for each project. There are also briefing sessions on NGP2016 for suppliers where Nissan fully shares its targets, action plans and understanding of what constitutes environmental impact.

## **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 CO<sub>2</sub> 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.

The CDP Climate Change Program, a global survey on climate change initiatives by major corporations, praised Nissan for the high

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.



transparency of its environmental information disclosure, selecting the company for the Climate Disclosure Leadership Index with a maximum score of 100. The company was also recognized for its steady efforts to reduce CO<sub>2</sub> emissions in the production process, earning a place in the Climate Performance Leadership Index with the highest ranking of A.

## 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, the European Union's Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, which went into force in June 2007, and Japan's Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, Etc. 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 environmentimpacting 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. 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 reflect changes in international laws and regulations and to add new substances covered by its voluntary standards. This NES incorporates banned and restricted substances as defined in the Global Automotive Declarable Substances List (GADSL), prepared by a global team made up of auto manufacturers, parts suppliers and materials manufacturers.

Together with its suppliers, Nissan builds and maintains communication and management systems internally and within its supply chain. For example, the company discloses information and is registered with and submits REACH-compliant reports to the relevant authorities 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.

## 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 the Nissan LEAF produces CO₂ 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 bases LCAs for new vehicles on its certified methodology. The company continues to lower its vehicles' environmental impact by adopting new technology and more efficient processes in manufacturing, aiming for further CO<sub>2</sub> emission reductions over the lifecycle of its new vehicles.

<u>...[</u> ▶ page\_132  For details on the LCA for the Nissan LEAF, etc., see the CSR data section in this report.

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

#### **TÜV Rheinland certificate**



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," 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.

	日本市場
and the second second	
MAN	
No. 1	
	Ecosystem
	Services
	and the
	Automotive
	Sector
and the second second	Sector
and the second	
	(3)
20-20	LINID MATIONS
	Include of Advanced Robert
	NISSAN

Website Automotive Sector."

Forest Conservation Through the Nissan Zero Emission Fund

In 2012, Nissan launched the Nissan Zero Emission Fund, based on CO<sub>2</sub> emissions offset through Nissan LEAF usage. The fund calculates offset CO<sub>2</sub> emissions for participating Nissan LEAF drivers through comparison with gasolinepowered vehicles of the same size. The offsets are then monetized through the J-Credit Scheme, overseen by the Ministry of Economy, Trade and Industry, the Ministry of the Environment and the Ministry of Agriculture, Forestry and Fisheries in Japan. This capital is used to conserve the forests that sustain Japan's clean and abundant water and to expand charging facilities and other infrastructure that supports further adoption of EVs.

In November 2014, Nissan used part of this money to fund conservation activities carried out together with the forest preservation organization More Trees at LEAF Forest in the village of Kosuge, Yamanashi Prefecture.



Conducting thinning to let more light into the undergrowth (LEAF Forest in Kosuge, Yamanashi Prefecture).

## 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 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,<sup>™</sup> Nissan has evaluated its value chain from the

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.

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

#### **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 emission regulations in each country as quickly 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.\*\*

<u>□□[]</u> ▶ page\_130

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.

Nissan's Sentra CA, released in the United States in January 2000,<sup>20</sup> was the first gasoline-powered vehicle in the world to receive Partial Zero Emissions Vehicle (PZEV) certification<sup>20</sup> 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

\* This vehicle is no longer produced.

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. Tourism) as an Ultra-Low Emission Vehicle (U-LEV).<sup>∞</sup> In addition, this model became Japan's first vehicle to receive Super Ultra-Low Emission Vehicle (SU-LEV) certification<sup>∞</sup> in 2003.

- U-LEV: Ultra-Low Emission Vehicles produce 50% less nitrogen oxide (NOx) and nonmethane hydrocarbon (NMHC) than the 2005 emission standards level.
- SU-LEV: Super Ultra-Low Emission Vehicles produce 75% less emissions than the 2005 emission standards level.

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.<sup>30</sup> 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 CO<sub>2</sub> emissions. An X-Trail 20GT with a 6-speed automatic transmission (including manual mode) was introduced in 2010.

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.

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.

page\_34
Dick here for more information on Nissan's ITS initiatives.

## 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 quarter 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 at two plants in Aguascalientes 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.

#### **NISSAN MOTOR CORPORATION SUSTAINABILITY REPORT 2015**

CONTENTS	INTRODUCTION	CEO MESSAGE	WORKING TOWARD A SUSTAINABLE Mobility Society	BLUE CITIZENSHIP: NISSAN'S CSR	RENAULT-NISSAN ALLIANCE	CSR DATA	THIRD-PARTY ASSURANCE
ENVIRONMENT	SAFETY	PHILANTHROPY	QUALITY	VALUE CHAIN	EMPLOYEES	ECONOMIC CONTRIBUTION	CORPORATE GOVERNANCE & Internal control

#### **Messages from Our Stakeholders**

# Aiming to Be an Advanced Environmental and Transportation City

Atsugi is a hub city for logistics and business in the Tokyo metropolitan area and is also home to two of Nissan's vehicle development centers. These sites apply some of the world's most advanced technologies to R&D activities, and in 2010 created the world's first mass-produced EV, the Nissan LEAF. Embodying Nissan's knowledge, experience and superb cutting-edge technology, the LEAF, developed in Atsugi, has won fans around the world. I personally feel a strong attachment to the car as well as a powerful sense of pride that it was created in Atsugi.

In November 2013, Atsugi and Nissan concluded the Green Mobility Project Agreement to boost community development through civil, corporate and administrative cooperation. Based on this agreement, citizens, Nissan and Atsugi representatives work together toward the construction of a new community, promote the development and adoption of next-generation vehicles and encourage environmentally friendly activities. They also implement various initiatives targeting the realization of an advanced environmental and transportation city, such as installing charging infrastructure and conducting practical experiments on ultracompact mobility, a concept that is currently receiving much attention as a new way of getting around local areas. I am also extremely grateful that Nissan is striving to improve the education of the children of Atsugi. For example, it holds Nissan Waku-Waku Eco School classes at all of the city's elementary schools, providing environmental education through study of the structure of an eco-car.

Nissan is a valuable asset to Atsugi and a source of pride to the city on the global stage. I look forward to next-generation vehicle R&D making further strides in Atsugi in the future. I would like to continue to expand activities involving citizens into a range of fields and collaborate to pursue advanced possibilities, such as proposals for new ways of living and business models.

Kobayashi Mayor of Atsugi Kanagawa Prefecture

Tsuneyoshi

