CLIMATE CHANGE

GRI103-1 GRI103-2

Toward a Carbon-Neutral Society

In 2015, the United Nations Climate Change Conference (COP21) adopted the historic Paris Agreement to keep the increase in global temperature to "well below" 2 degrees Celsius.
At COP24, held in 2018, parties agreed on concrete guidelines to achieve the goals of the Paris Agreement, namely, to peak-out global greenhouse gas (GHG) emissions as early as possible and to strike a balance between GHG emissions from human activity and carbon absorption by nature by the second half of this century.
One of the United Nations' Sustainable Development Goals (SDGs), announced in 2015 as part of its 2030 Sustainable Development Agenda, set goal for climate actions. Nissan is responding to these developments by focusing on electrification and other innovative technologies and by promoting decarbonization through reductions in CO_2 emissions throughout the value chain, including by suppliers.

Nissan's Steps to Reduce CO_2 Emissions

The business structure of the automobile industry is changing greatly in the face of demands to reduce CO_2 emissions and dependence on fossil fuels. As a global automaker, Nissan considers emissions across the entire value chain it shares with its suppliers, from procurement of raw materials to transportation and operation of vehicles. We understand how important it is to balance environmental initiatives with business activities, and strive to reduce emissions through new technology development, renewable energy use and other measures.

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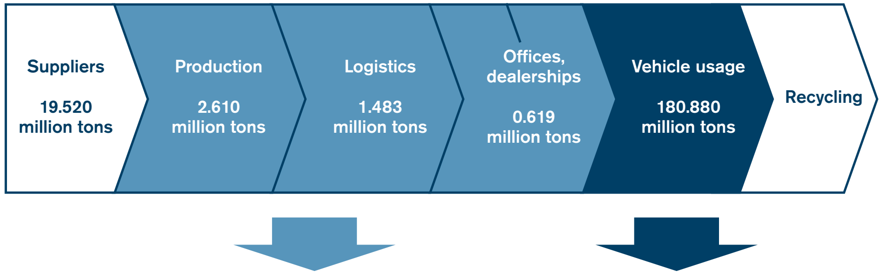
Efforts at Every Link in the Value Chain

The Nissan Green Program 2022 (NGP2022) aims to achieve carbon neutrality by reducing emissions from our corporate activities, products and services.

CO_2 Emissions in the Value Chain*



Reducing CO_2 emissions from corporate activities

Reducing CO_2 emissions from products and service

* Actual emissions in 2018.

Building a Resilient Climate Change Strategy

The incremental move toward decarbonization could generate major new risks for businesses. In addition to transition risks resulting from changes in policies and regulations, technologies, markets and reputation, there are also growing physical risks, as climate change raises the frequency of extreme weather conditions. Recognizing climate change as a risk for the financial system, the G20 Financial Stability Board established the Task Force on Climate-related Financial Disclosures (TCFD) to encourage disclosures that would enable investors to make informed decisions. In its June 2017 final report, the Task Force proposed a recommendations framework for information disclosure.

Nissan considers climate change to be an issue that goes to the heart of its operations. The Global Environmental Management Committee (G-EMC), co-chaired by a board member, identifies trends in climate-related risks and business opportunities and adopts strategies accordingly. Climate change and other environmental risks comprise a category of risks for corporate management and are regularly monitored by the Internal Control Committee to strengthen corporate governance.

We analyze climate-related risks on an ongoing basis, and have specified as major risks tighter regulations on fuel economy and CO_2 emissions, intensifying competition in the EV market and physical damage due to extreme weather conditions. We determine specific measures to be taken by each division after clarifying the risks and opportunities—including those relating to climate change—for our company.

Additionally, climate change also greatly heightens customer needs for energy-efficient mobility. We are meeting those needs by clearing stringent CO_2 emissions regulations, as outlined in the Nissan NEXT*[1] midterm plan

calling for annual aggregate sales of 1 million 100% EV and e-POWER vehicles by fiscal 2022. In our corporate activities, we are actively advancing energy-saving measures, shifting to climate-efficient logistics and introducing renewable energy sources.
In the light of these climate-related risks and opportunities, we established a long-term vision for climate change*2 objective of reducing CO_2 emissions from new vehicles in the year 2050 by 90% compared to emissions in fiscal 2000, while at the same time engaging in corporate activities aimed at achieving the target of reducing CO_2 emissions in the year 2050 by 80% compared to emissions in fiscal 2005.

In addition to establishing the Nissan Green Program 2022 (NGP2022)*3 midterm environmental action plan, we will formulate various future climate change scenarios to reinforce the resilience of our climate change strategy. We also seek to disclose information in line with the TCFD framework in order to facilitate further awaness of our actions among investors and other stakeholders.

*1 Click here for more information on Nissan NEXT
https://www.nissan-global.com/EN/IR/MIDTERMPLAN/
*2 Long-term vision for climate change:
·Products: Reduce CO_2 emissions from new vehicles by 90% compared to 2000 levels by 2050.
* For more information on Policies and Philosophy for Product Initiatives.
>>> P059
·Corporate activity: Reduce overall corporate CO_2 emissions by 80% compared with 2005 levels by 2050.
* For more information on Policies and Philosophy for Corporate Activity Initiatives.
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·Climate change indices, targets and achievements, along with Scope 1, 2 and 3 emissions are contained in this report under "NGP2022 Framework and Action Plan," "Product Initiative: Achievements" and "Environmental Data."

GRI103-1 GRI103-2

Policies and Philosophy for Product Initiatives

Reduction of Emissions from Products and Services

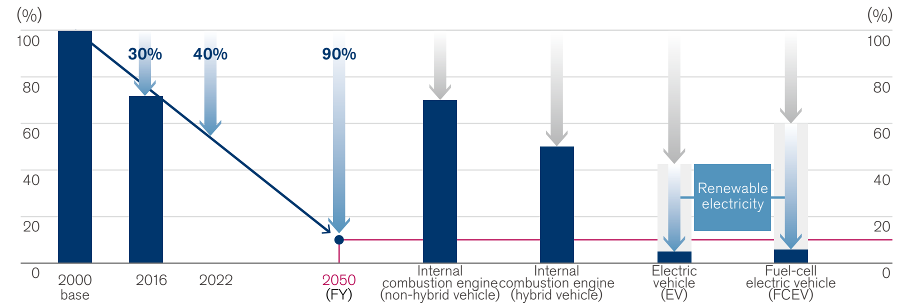
According to a 2014 report from the Intergovernmental Panel on Climate Change (IPCC), the transport sector was responsible for 14% of anthropogenic greenhouse gas emissions from all economic sectors in 2010. As a business in this sector with continued growth in both unit sales and amount of passenger activity, Nissan is aiming to decouple emissions from company growth.

Our Long-Term Vision

In 2006, based on calculations incorporating the findings of the IPCC's Third Assessment Report and the goal of keeping global temperatures from rising more than 2 degrees Celsius, we set a scientifically grounded target for 2050 of reducing product CO_2 emissions from new vehicles by 90% compared to 2000 levels.
Recognizing that this would require drastic reduction of "well-to-wheel" CO_2 emissions from new vehicles, we set about developing a new scenario for powertrain technologies.
Under the Nissan Green Program 2022 (NGP2022), to remain on track with this target, we are aiming to reduce CO_2 emissions from new vehicles by 40% compared to fiscal 2000 by 2022 (in Japan, the U.S., Europe and China) throughout the value chain as a whole.
As a global leader in technological advancements through the electrification of our products, we believe we can substantially contribute to the global efforts to keep the temperature increase "well below" 2 degrees Celsius. These initiatives also reinforce the sustainability of our own business.
We are driving the evolution of new technologies and businesses. Under the umbrella of Nissan Intelligent Mobility,* we take a unified approach to introducing, marketing and deploying new technologies, functions, businesses and services.

* Click here for more information on Nissan Intelligent Mobility.
https://www.nissanusa.com/experience-nissan/intelligent-mobility.html

CO_2 Reduction Scenario

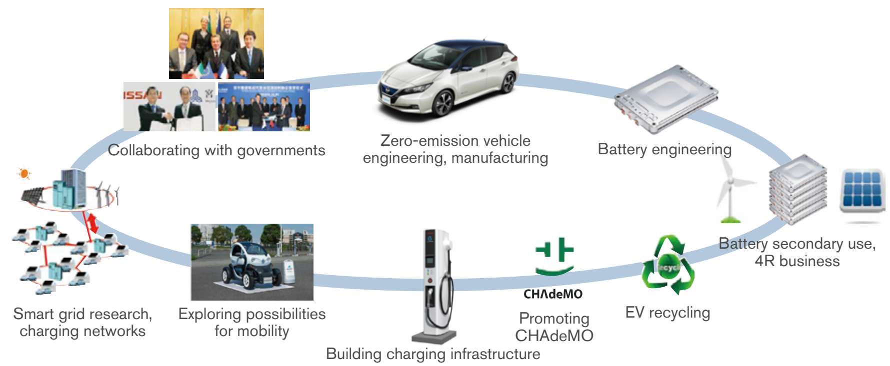


Pursuing a Zero-Emission Society

Electric vehicles (EVs) demonstrate that what is good for drivers and the planet is also good for business. Widespread use of zero-emission vehicles, which produce no CO_2 emissions during operation, is an effective way of moving toward a sustainable society. The auto industry must go beyond simply producing and selling these vehicles to help establish the infrastructure necessary to make them economical to use. No company can achieve this on its own. We consider the introduction and adoption of zero-emission vehicles one of the pillars of our corporate strategy. We are taking a comprehensive approach that involves boosting production and sales of zero-emission vehicles along with other activities coordinated with a variety of partners to popularize their use. We are committed to becoming a leader in the field of zero-emission vehicles. Not only are we increasing our development and production of zero-emission vehicles, we are forging numerous zero-emission partnerships with national and local governments, electric power companies and other industries to promote zero-emission mobility and explore how the necessary infrastructure can be built.

We participate in a comprehensive range of vehicle-related initiatives, including the development of lithium-ion batteries, secondary use and recycling of batteries, construction of vehicle-charging infrastructure, helping to make smart grids a reality and standardization of charging methods with other manufacturers.
Increasing uptake of zero-emission vehicles will bring lifestyle changes that lay the groundwork for a new mobility society. We provide more than just EVs themselves—we also embrace the new values that they represent.

Building a Zero-Emission Society with EVs



Establishing Leadership in the EV Sector

Our commitment to sustainable mobility addresses concerns over climate change and supports the sustainable growth of the company.
Our 2010 launch of the first Nissan LEAF made us pioneers of mass-produced EVs. Since then, we have sold more than 620,000 EVs (including joint venture sales) around the world in total, and our transformation plan, Nissan NEXT, calls for even more Nissan EVs, designed to appeal to customers with an ever-wider range of needs.
Furthermore, our history with EVs goes deeper than simply manufacturing and selling the vehicles themselves. We helped to establish an environment allowing EVs to become part of our customers' lifestyles, and developed the Nissan Energy solution for enjoying life with an EV to the fullest. Together, these initiatives created what we call the Nissan EV Ecosystem.
As we continue to strive for a zero-emission society, we will expand and develop the Nissan EV Ecosystem even further.

Nissan EV Ecosystem

Nissan EV Ecosystem

Nissan EVs | **Nissan Energy**

Nissan Energy Supply	Nissan Energy Share	Nissan Energy Storage
Provides a range of charging solutions to promote convenience and peace of mind for EV owners.	Enables customers to use the electricity stored in the high-capacity batteries of Nissan EVs for various purposes. Electricity can be "shared" with homes, workplaces and local communities to provide new value to everyday life.	The lithium-ion batteries used in Nissan EVs are highly functional even after the end of their first life powering an EV. With an eye to further adoption of EVs in the future, we are working on initiatives for secondary use.

GRI103-2

Management of Product Initiatives

Key Activities in NGP2022

The CO_2 emissions of a vehicle in use are influenced not only by engine performance and fuel type but also by traffic conditions and driving skills. Decarbonizing society will require new vehicle usage patterns. Nissan takes a threefold approach to mitigating real-world CO_2 emissions that addresses vehicle, driver and new mobility value.

1. Adopt cleaner energy to reduce vehicle CO_2 emissions

Extend electrification across all brands under the Nissan Intelligent Mobility strategy.*1 Expand electric vehicle (EV) lineup and deploy e-POWER technology in core Nissan products.

2. Promote technology-based driver assistance and accelerate connected car development and commercialization

In consideration of environmental performance, Nissan developed the ECO Pedal to control excess fuel consumption during vehicle start and acceleration in an effort to promote technologies that support eco-driving.

3. Provide new mobility value

Provide new mobility services and expand the value of vehicle use. Pursue global expansion of V2X*2 energy management solutions (commercialization in the United States and Europe, and expansion of LEAF to Home in Japan) and engage with stakeholders to support V2X device commercialization.

*1 Click here for more information on Nissan Intelligent Mobility.
https://www.nissanusa.com/experience-nissan/intelligent-mobility.html
*2 V2X: Abbreviation for Vehicle to Everything, a term describing technology and systems for handling communication in vehicles. One example of V2X technology is Vehicle-to-Grid (V2G), which allows smart optimization of electricity supply according to demand.

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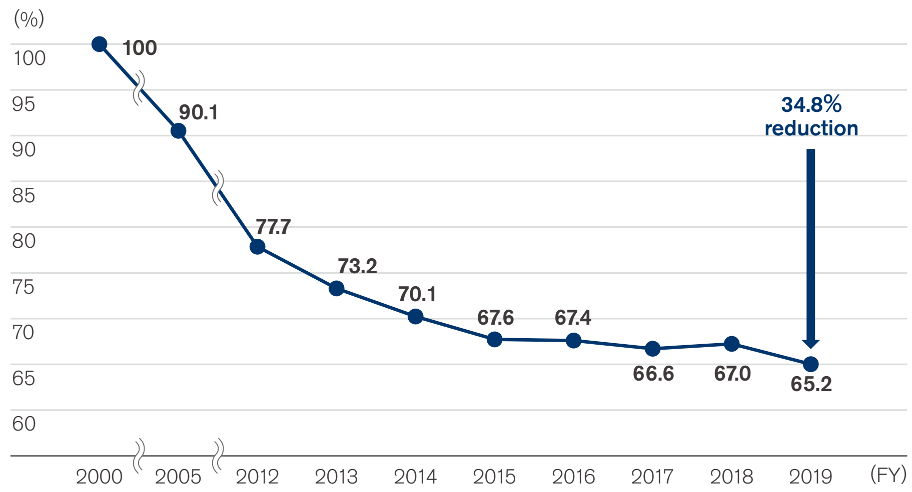
Product Initiatives: Achievements

Toward a 40% Reduction in New Vehicle CO_2 Emissions

Nissan strives to develop technologies that maximize the overall energy efficiency of conventional internal combustion engines and improve transmission performance. We are also working to boost the efficiency of electrification systems that capture and reuse kinetic energy from braking. Electrification is just one of our concrete monozukuri initiatives in technical innovation. We select the optimal fuel economy technologies for particular vehicles, taking into consideration factors like space within the vehicle, usage and economics, and bring them to market. Our goal is to reduce fuel consumption and CO_2 emissions without sacrificing the pleasure and ease of driving.
By fiscal 2022, we aim to achieve a 40% reduction in CO_2 emissions* compared to fiscal 2000 levels.

* From new vehicles in the Japanese, U.S., European and Chinese markets.

CO_2 Emissions from New Vehicles (Global)*



In fiscal 2019, CO_2 emissions in Nissan's main markets of Japan, the U.S., Europe, and China were 34.8% lower than fiscal 2000 levels, as measured by Corporate Average Fuel Economy (CAFE). Especially, improved in China from 2018 due to EV expansion and fuel consumption improvement.

* Reduction in CO_2 emissions calculated by Nissan.

GRI302-5

Electrification and Internal Combustion Engine Initiatives

Nissan LEAF Sales Exceed 470,000, Further Reducing Environmental Burden

The Nissan LEAF emits no CO_2 or other exhaust during operation. Since its launch in 2010, it has earned high praise for the smooth, strong acceleration and quiet operation of its electric motor powered by a lithium-ion battery.
As part of our midterm plan, Nissan NEXT,, we are aiming for annual aggregate sales of 1 million 100% electric vehicles (EVs) and e-POWER vehicles by fiscal 2022. Total cumulative sales of the Nissan LEAF worldwide exceeded 470,000 vehicles as of March 2020. In China, we manufacture the Nissan Sylphy Zero Emission model, which inherits the core technologies of the Nissan LEAF, for the local market. While the low environmental impact of Nissan's EVs is attractive, these figures were likely driven at least in part by consumer awareness of other factors, such as low fuel and maintenance costs and superior acceleration and steering performance.
Nissan calculations show that the Nissan LEAF and other EVs can produce fewer CO_2 emissions over their entire lifecycle compared to gasoline-powered vehicles of the same class—from the extraction of raw materials, manufacturing, logistics and use, to end-of-life disposal. By contributing to the shift to renewable energy, EVs play an essential role beyond transportation in helping to achieve a low-carbon society.

* For more information on Nissan LEAF lifecycle assessment.
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Nissan LEAF

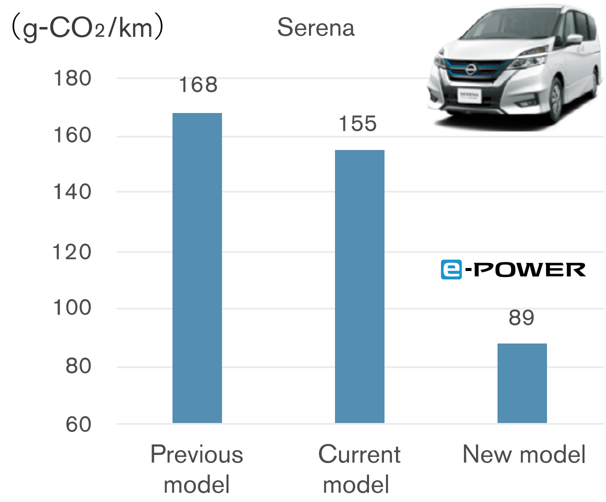
Launched in October 2017, the new Nissan LEAF is a zero-emission vehicle equipped with innovative semi-autonomous drive technologies like ProPILOT, ProPILOT Park and e-Pedal. It offers greater power output, a longer driving range and more convenience than ever.
The Nissan LEAF rated highly throughout the world, in Japan, it won the Japan Automotive Hall of Fame (JAHFA) "Car Technology of the Year" award. In the United States, at the 2018 CES®, it was among the "Best of Innovation Award" winners for 2018; at the 2018 New York International Auto Show, it was recognized as the "2018 World Green Car" and it also received the "J.D. Power Engineering Award for Highest-Rated Vehicle Redesign" at the 2019 SAE International World Congress Experience. In Europe, it received the "Best Electric Car" award at the 2018 What Car? Awards.
This significant improvement in power output and driving range is made possible by a lighter and more compact high-capacity lithium-ion battery. By adopting a new material*1 capable of storing energy at a higher density, Nissan is able to decrease the battery's size while increasing its capacity. This innovation made it possible to expand the Nissan LEAF's driving range from 200 kilometers (JC08 mode) to 400 kilometers*2 for the new Nissan LEAF, while at the same time improving electricity consumption.
In January 2019, Nissan introduced the Nissan LEAF e+, equipped with a

newly developed electric powertrain that further enhances its acceleration capabilities during high speed operation and increases its maximum speed by about 10%.*3

*1 Our newly adopted layered structure for cathode material contributes to larger battery capacity by helping to store lithium ions at high density.
*2 322km in WLTC mode, 150 miles under U.S. EPA standards.
*3 458 km in WLTC mode. The maximum range is 226 miles under U.S. EPA standards and 385 km in European WLTP (combined cycle).

Enhancing Our 100% Electric-Motor-Powered e-POWER Drivetrain

In November 2016, in Japan, we launched the first vehicle to feature our innovative new e-POWER drive system: the new compact Note e-POWER. In March 2018, the e-POWER system was further expanded to the Serena, also for the Japanese market. Both the Note e-POWER and the Serena e-POWER have received high praise from customers, achieving No. 1 sales rankings in their respective segments again in 2019 as in the previous year. Favorable evaluations also included receiving the 2019 annual "RJC Technology of the Year" award, the Global NEV Top Innovation Technology Award at the first 2019 World New Energy Vehicles Congress (WNEVC) sponsored by the China Association for Science and Technology and other organizations, and "The Ichimura Prize in Industry for Distinguished Achievement" by the Ichimura Foundation for New Technology.



* CO_2 emissions calculated from the fuel consumption rate in JC08 mode (measurement method of Japan's Ministry of Land, Infrastructure, Transport and Tourism).

The e-POWER system combines an electric motor, which drives the wheels, with a gasoline engine that charges the vehicle's battery. e-POWER is a technology that balances smoothness and the strength of a 100% motor drive with the highest level of fuel efficiency. In addition, because the actual drive comes from an electric motor, it offers driving comfort similar to that of an EV, making e-POWER a new powertrain completely different from the hybrid systems commonly used in previous compact cars.
As the gasoline engine does not directly drive the wheels, it can be run under optimal conditions (RPM, load) at all times to generate electricity. In city driving, where it is expected to see frequent use, the Serena e-POWER achieves top-class fuel economy* compared with standard hybrid vehicle types.

In e-POWER Drive mode, the driver can accelerate or decelerate simply by using the accelerator pedal, while the regenerative brake system also helps improve fuel economy by charging the battery.

* As of when the model first went on sale, as measured in JC08 mode: Serena e-POWER, 26.2 km/L.

The e-NV200: A Practical, Sustainable City Delivery Vehicle

Based on the Nissan NV200, a multipurpose commercial van, the e-NV200 retains the roominess and versatility of the NV200 and adds the acceleration performance and refinement of an EV. It has been produced at our Barcelona Plant in Spain since June 2014 and is sold mainly in Europe as well as Japan. The e-NV200 is used by taxi services in Barcelona and Amsterdam. In Japan, it has been adopted by a wide range of customers, from urban delivery businesses to local authorities.
Compared to commercial vehicles using internal combustion engines, the e-NV200 reduces operating costs and excels in environmental performance with reduced noise pollution and other features. Equipped with two power outlets that can draw a maximum of 1,500 watts of power from the battery, the vehicle provides a convenient and safe electrical power source that comes in handy for offsite jobs and outdoor events as well as emergencies. At construction sites, the e-NV200 contributes to reducing noise levels by providing electricity in place of engine generators.


As a mobile power source, the e-NV200 has a range of business applications.

Progress in Plug-in Hybrid Vehicles

Plug-in hybrid electric vehicles (PHEVs) are hybrid cars that can run on electricity charged from an external source as well as fuel. With this combination of engines and electric motors, they provide motor operation equivalent to EVs. We are actively developing PHEVs, leveraging Alliance technologies with a view to launching them in the future.

Fuel-Cell Electric Vehicles

Powered by electricity generated from hydrogen and oxygen, fuel-cell electric vehicles (FCEVs) are another type of zero-emission vehicle that does not produce CO_2 or other harmful emissions. We believe that, as part of building a sustainable mobility society, both FCEVs and EVs are viable options from an energy diversity perspective.
In alignment with Japanese government policies, we joined forces with Toyota Motor Corp., Honda Motor Co. and other companies to establish Japan H2 Mobility, LLC (JHyM), targeting the full-fledged development of hydrogen stations for FCEVs in Japan. Addressing the key issues raised during the initial stage of FCEV promotion, JHyM will ensure that infrastructure developers, automakers and investors all do their part to support the successful strategic deployment of hydrogen stations and effective operation of the hydrogen station business in Japan.

New e-Bio Fuel-Cell Technology Announcement

In June 2016, Nissan unveiled an e-Bio Fuel-Cell system that runs on bio-ethanol electric power. The new system—a world first for automotive use—features a solid oxide fuel-cell (SOFC) power generator. SOFC technology can produce electricity with high efficiency using the reaction of oxygen with multiple fuels, including ethanol and natural gas.

Infrastructure to support e-Bio Fuel-Cell usage is relatively easy to deploy, and vehicles using this technology feature running costs as low as those of EVs, promising a smooth introduction to the market. Because our technology combines the efficient electricity generation of SOFC with the high energy density of liquid fuels, it can enable driving ranges on a par with gasoline-powered vehicles. Commercial users that require higher uptime for their vehicles should increasingly be able to take advantage of this solution thanks to the short refueling times it offers.

VC-Turbo : World's first variable compression ratio engine in the market

The VC-Turbo is the world's first mass produced variable compression ratio engine, first deployed in November 2017 in the new QX50, part of our INFINITI brand's premium vehicle lineup. The VC-Turbo has also been deployed in the United States and China, in the new Altima. This technology, which realizes a significant improvement in fuel efficiency, has received high praise and several awards, which in Japan include the Society of Automotive Engineers of Japan, Inc., "Technological Development Award," the 54th Japan Society for the Promotion of Machinery Industry "Chairman's Award," and in the United States, the 2020 Wards "Wards 10 Best Engines." The engine swiftly selects the optimum compression ratio between 8:1 (for high performance) and 14:1 (for high efficiency) based on driving conditions and driver input. In addition to being lighter and more compact than comparable non-turbocharged engines, the VC-Turbo delivers reduced fuel consumption and emissions, lower noise levels and reduced vibration.

Development and Introduction of New Powertrains

Nissan is working to enhance fuel economy by improving gasoline-powered engines, the engines that are still the most widely used in the automobile market.
In Europe, we adopted a new 1.0-liter, three-cylinder turbo gasoline engine in the Nissan Juke. The new engine features gasoline particulate filters to reduce air pollution, and improves fuel economy by 11% compared to the previous model equipped with a diesel engine through reduced wear loss and optimized designs for the combustion chamber and turbo system.
The new "kei" minicar Nissan Roox released in Japan in March 2020 provides significantly improved fuel efficiency through the adoption of a new 0.66 liter gasoline engine and a newly designed powertrain that combines a new CVT with a smart and simple hybrid system.

Initiatives for Lighter Vehicles

Toward Lighter Vehicles

Making vehicles lighter is an important part of improving fuel economy. Nissan promotes three methods to achieve this aim: substituting materials, developing better forming and joining techniques and optimizing vehicle body structure. In terms of materials, we are rapidly expanding the adoption of ultra-high tensile strength steel facilitating both high strength and formability, and in recent years, we have adopted this material for use in body frame parts in a wide range of vehicle models, including "kei" vehicles such as the Nissan Dayz and Nissan Roox.
Further, in 2018, we adopted highly processible 980 megapascal (MPa) Ultra High Tensile Strength Steel for the INFINITI QX50 that can be processed using conventional methods making it applicable for a wide range of parts. This results in the realization of enhanced driving performance and weight reductions, and achievement that was recognized in 2019 with the SAE/AISI Sydney H. Melbourne Award for Excellence in the Advancement of Automotive Steel Sheet. It also contributes to a reduction in total costs by reducing the amount of steel used and utilizing existing production lines.
In addition to technological advances in materials and production methods, platform improvements, high-efficiency three-cylinder engines and other advances were adopted for the 2019 Nissan Juke and it realized to reduce vehicle weight by more than 20 kg while improving vehicle size and performance.
Nissan will proactively promote the development of weight reduction technologies to reduce CO_2 emissions and dependence on newly extracted natural resources.

GRI103-1 GRI103-2

Initiatives for Partnerships with Society

Nissan Energy: Solutions that Enrich Life and Society with EVs

As part of our efforts to help build the EV ecosystem, we launched a group of solutions we call Nissan Energy. Nissan Energy has three main components, each of which is designed to support our customers' lifestyles with EVs in a different way.

Nissan Energy Supply

Nissan Energy Supply includes various electric charging solutions that bring ease and convenience to the lifestyles of our EV customers.
The majority of our EV customers find it convenient to charge their EVs at home. To help ensure that our vehicles can be safely charged, we guide customers to use suitable charging equipment and engage qualified installers to install electrical outlets dedicated to EVs.
The Nissan LEAF, which offers an ample driving range for daily use, utilizes a fast-growing charging network, providing drivers with confidence during longer distance drives and short outings.
Our dedicated EV app lets customers find and check the real-time status of charging stations. This not only makes charging easier and more convenient but also provides a seamless charging experience. As of the end of fiscal 2019, approximately 32,300 quick chargers conforming to the CHAdeMO protocol have been installed worldwide.

Nissan Energy Share

The electricity stored in the Nissan EV's battery can do more than just power the vehicle; it can be shared with homes, buildings and local communities through power conditioning systems.
Using inexpensive electricity during off-peak periods and excess electricity generated by solar panels during daytime reduces electricity bill and helps promote a model of local generation of electricity for local-consumption. Furthermore, Nissan Energy Share makes it possible for EVs to provide backup power during blackouts or emergencies.
Local communities can connect multiple EVs to regional power grids to store or discharge electricity in accordance with power supply and demand balance, which contributes to the stability of the entire community's power supply and promotes renewable energy use. EV's high capacity batteries are highly expected as usage as social infrastructure, which enables to store renewable energy like solar power of which generation is difficult to control.

Local Energy Production and Consumption and EVs

Since 2018, Nissan along with Nippon Telegraph and Telephone West Corporation and NTT Smile Energy has verified the efficacy and business potential of Vehicle-to-Building (V2B) by conducting projects combining remote control EV charging and discharging with solar power generation systems in an attempt to simultaneously reduce both electric power consumption and CO_2 by reducing office building peak energy consumption.
Also, since 2018, Nissan, the Tohoku Electric Power Co., Ltd., and other companies have participated in the Ministry of Economy, Trade and Industry Agency for Natural Resources and Energy "Virtual Power Plant Construction

Demonstration Project That Utilizes Demand-side Energy Resources." In anticipation of the introduction of wind power and other energy sources of which generation varies at any time, we are conducting technical verifications to understand how EVs are effective in adjusting supply and demand aiming for Vehicle to Grid (V2G), by remotely controlling the charging and discharging of multiple EVs.

Nissan Energy Storage

The life of an EV battery is not over when it has finished its first life of powering a car. As more and more customers switch to EVs, the supply of batteries capable of secondary use is expected to increase significantly.
In 2010, Nissan, as an EV pioneer, joined forces with Sumitomo Corp. to establish 4R Energy Corp., which specializes in repurposing lithium-ion batteries. The intention is to fully utilize resources by promoting the four Rs of lithium-ion batteries—reuse, resell, refabricate and recycle—with the aim of building an efficient cycle of battery use.

Reuse system realized using EV batteries

In conjunction with 4R Energy Corp., Nissan aims to create secondary usage method business models compatible with the capacity changes of individual Nissan EVs and batteries that will be fully utilized (cascade reuse) throughout the electric vehicle lifecycle.
In September 2019, Nissan and 4R Energy announced the establishment of a new solution for fixed storage batteries built with used batteries from the Nissan LEAF. To get started, we launched a proof-of-concept demonstration of "procuring electric power from renewable energy " at 7-Eleven stores in 10 locations across Kanagawa Prefecture. Under this scheme, 7-Eleven will introduce a package consisting of the Nissan LEAF electric vehicle and fixed storage batteries built with used batteries from the Nissan LEAF. The Nissan LEAF, which will be introduced as a commercial vehicle, will become a stationary storage battery after its use as a car has ended. The introduction of a package like this facilitates the creation of a circular system that takes into account the reuse of batteries.

Launched Testing to Expanding EV Usage in California

California's active promotion of five million zero-emission vehicles by 2030 has helped make it the U.S. state with the largest volume of private EV sales. Even so, drivers still tend to use EVs for short-distance travel such as shopping or commuting. At the request of NEDO, and with the California government's cooperation, Nissan Motor Co., Ltd. (NML) and Kanematsu Corp. started a project in November 2016 in partnership with U.S. charging infrastructure service provider EVgo to install over 55 fast chargers in more than 25 new locations along one of California's most important travel arteries. Additionally, the project has created information service systems to guide EV users to the most appropriate fast charger. These initiatives are part of a pilot business to demonstrate the efficacy of expanding the driving range of EVs. The project is designed to expand the driving range of EVs to include intercity travel, and will run until September 2020, collecting and analyzing a range of EV data to establish models for further expansion of EV usage.

The Nissan New Mobility Concept

The Nissan New Mobility Concept is an ultracompact 100% electric vehicle that was developed in response to social trends like rising numbers of senior citizens, single-member households and the increasing use of automobiles for short-distance trips by just one or two people. Even smaller than a “kei” minicar, the Nissan New Mobility Concept offers the driver excellent visibility and a good feel for the dimensions of the vehicle, making it an ideal choice for use in residential neighborhoods and other areas with narrow streets and poor visibility, as well as regional cities and islands pursuing compact-city policies.

Since fiscal 2011, with cooperation from Japan’s Ministry of Land, Infrastructure, Transport and Tourism (MLIT), we have conducted tests and surveys through driving trials held together with corporations and local governments. Based on MLIT’s January 2013 announcement of an authorization system for use of ultracompact vehicles on public roads, we are currently testing vehicles in 25 areas, including the area covered by Choimobi Yokohama, a round-trip urban ride-sharing service that we operate together with the city of Yokohama. To date, the vehicles have mainly been used for tourist purposes as part of regional revitalization, but, in preparation for the 2020 Tokyo Olympics and Paralympics, we have been testing ultracompacts as rental cars for sightseeing on the island of Shikine-jima, Tokyo, since May 2018. This is a trial business aimed at expanding the use of EVs on small islets, an idea promoted by the Tokyo metropolitan government. We make full use of the knowledge and information acquired from all of our nationwide projects, offering advice on new uses for EVs and ways to improve traffic flow and implement smart mobility for the next generation.

* For more information on Climate Change (Products)
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The Choimobi Yokohama round-trip ride-sharing service using the Nissan New Mobility Concept.

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Policies and Philosophy for Corporate Activity Initiatives

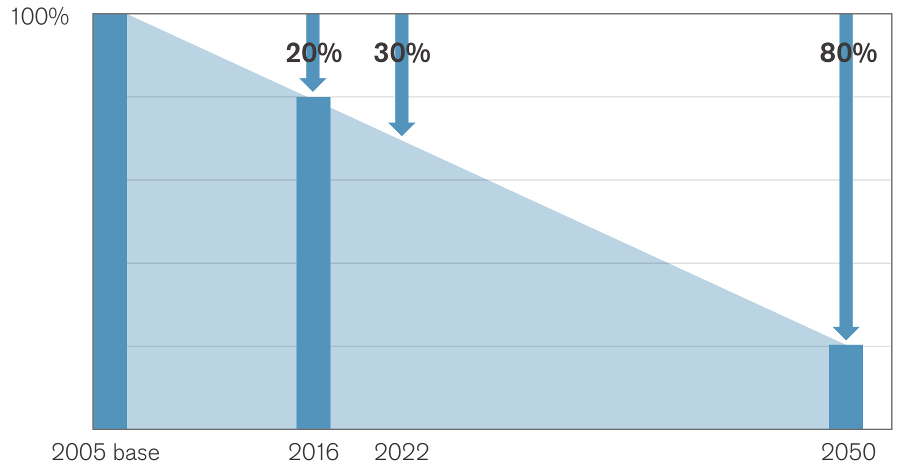
Reducing CO_2 Emissions from Corporate Activities

Nissan is taking steps to reduce its greenhouse gas emissions from corporate activities by promoting energy efficiency measures and also the use of renewable energy.
Based on calculations incorporating the findings of the Fourth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC), Nissan established the goal of reducing its overall corporate CO_2 emissions by 80% compared with 2005 levels by 2050. As part of the Nissan Green Program 2022 (NGP2022), we set the midterm goal of a 30% reduction in overall corporate CO_2 emissions by 2022. Manufacturing is our largest emissions source, but we are also aiming to reduce greenhouse gas emissions from logistics, offices and dealerships, setting targets and taking action in each area.

Long-Term Vision and Road Map

Long-Term Vision of Reducing CO_2 Emissions from Corporate Activities
As a long-term vision for climate change, we aim to realize an 80% reduction in CO_2 emissions per vehicle from corporate activities by 2050 (vs. 2005).

NGP2022 Long-Term Vision



* CO_2 emission per vehicle

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Management of Corporate Activity Initiatives

NGP2022 Objectives

Targets for each link in the value chain under the Nissan Green Program 2022 (NGP2022) aimed at achieving our long-term goals in 2050 are as follows:
Overall: 30% reduction in CO_2 emissions from global corporate activities by 2022 (vs. 2005/per vehicle sold)

Manufacturing

36% reduction in CO_2 emissions from global manufacturing sites by 2022 (vs. 2005/per vehicle manufactured)

Logistics

12% reduction in CO_2 emissions from logistics in Japan, North America, Europe and China by 2022 (vs. 2005/per vehicle manufactured)

Offices

12% reduction in CO_2 emissions from global offices by 2022 (vs. 2010/per floor area)

Dealerships

12% reduction in CO_2 emissions from dealerships in Japan by 2022 (vs. 2010/per floor area)

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Corporate Activity Initiatives: Achievements

30% Reduction in Emissions from Corporate Activities

In fiscal 2011, Nissan broadened the scope of its CO_2 reduction objectives to include logistics, offices and sales companies, as well as production sites. We expanded our emission-related initiatives, introducing high-efficiency equipment, energy-saving measures and the use of renewable energy, and also strengthened our management of these initiatives. Our objective is to reduce CO_2 emissions associated with corporate activities by 30% globally by fiscal 2022 compared to fiscal 2005 levels, as measured by the index of CO_2 emissions per vehicle (total emissions generated from Nissan global corporate activities divided by total Nissan vehicles sales volume). In fiscal 2019, we achieved a 34.0% reduction from the fiscal 2005 t-CO_2/vehicle level.

* Global CO_2 emissions per vehicle: The total volume of CO_2 emissions produced through Nissan's corporate activities globally divided by the number of Nissan vehicles sold globally.

Next-Generation Vehicle Manufacturing Concept: Nissan Intelligent Factory

In line with the acceleration of vehicle electrification, intelligence and the Nissan Intelligent Mobility concept promoted by Nissan, vehicle functions and construction are becoming increasingly complex. As further technological innovations will be essential in the production process, we announced the Nissan Intelligent Factory vehicle manufacturing concept. These innovations include Nissan's development of a new water-based paint that successfully controls the viscosity of body paint, which had been difficult to control at low temperatures, realizing a low-temperature body paint. This enables the simultaneous painting of the body and bumpers, reducing CO_2 emissions by 25%. In the past, residual airborne paint was mixed with water and disposed of as waste. However, the adoption of dry booths do not use any water at all and enable to collect 100% of the residual airborne paint, which is reused as an alternative to auxiliary agents to remove impurities in the iron casting process.

* Click here for more information on Nissan Intelligent Factory
https://global.nissannews.com/en/releases/release-ca298f94d2418782118342f5fd0448b6-191128-02-e

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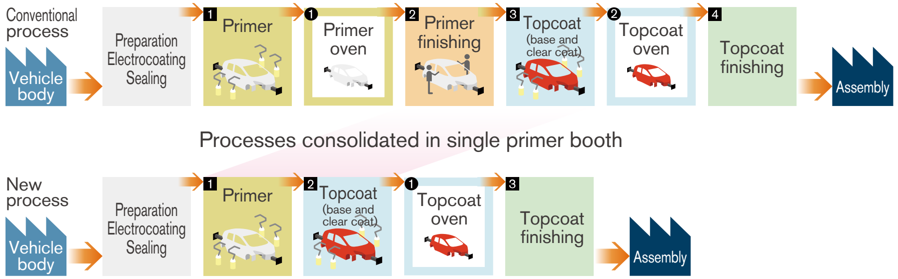
Saving Energy in Global Production

Most CO_2 emissions in the manufacturing process come from the consumption of energy generated by fossil fuels. We engage in a variety of energy-saving activities in the manufacturing process in pursuit of the lowest energy consumption and CO_2 emissions of any automaker.
In the realm of automotive production technology, we are introducing highly efficient equipment, improving manufacturing techniques and using energy-saving lighting in our assembly plants. Another key approach is our three-wet paint process. Vehicle painting is responsible for approximately 30% of all CO_2 emissions from plants; and shortening or eliminating baking stages substantially reduces emissions.
The three-wet paint process adopted by Nissan removes the need to bake between the primer and the topcoat layers. Instead, layers are applied successively before baking, reducing CO_2 emissions by more than 30%*1, according to our calculations. Starting in 2013, we introduced this process at Nissan Motor Kyushu (NMK), the Smyrna Plant in the United States, the second Aguascalientes Plant in Mexico (operational since November 2013), the Resende Plant in Brazil (operational since February 2014) and the COMPAS (Cooperation Manufacturing Plant Aguascalientes) manufacturing complex, a joint venture with Daimler México that started operations in December 2017, as well as the Sunderland Plant in the United Kingdom (operational since September 2018). At NMK, we were able to adopt the three-wet process with no shutdown of production lines, and as a result successfully shortened total production time. We also adopted dry paint booths at our Sunderland Plant in the United Kingdom. Previously, systems for recycling air expelled from booths for reuse needed dehumidifying processing to ensure that the air was at the humidity required. Dry paint booths can reuse air without dehumidifying it, reducing energy consumption to less than half its previous levels.

*1 Source: Nissan

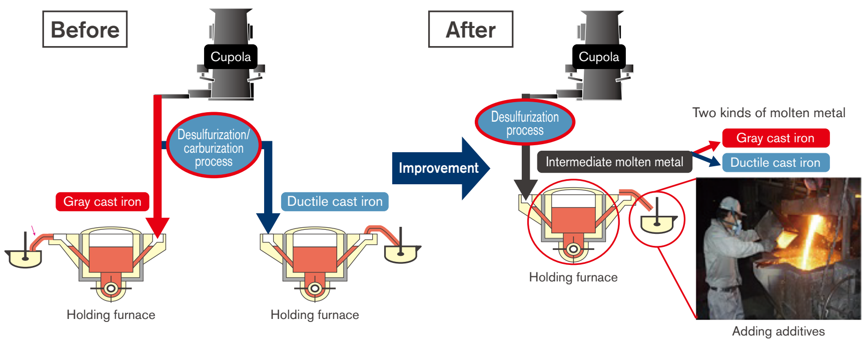
Three-Wet Paint Process (Combined Primer and Topcoat Application)



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

At the same time, in the powertrain production technology area, Nissan is working to reduce holding furnace energy usage in cast iron melting processes conducted by the Casting Division. Traditionally, in the melting process, two holding furnaces were used to store two types of cast iron melts with adjusted carbon and sulfur component contents. Now, intermediate molten metal with a low carbon and sulfur content is stored in one holding furnace. When transporting from the holding furnace to another process, the ingredients are adjusted by adding additive materials, creating two types of molten metal and making it possible to eliminate one holding furnace. As a result, power consumption was reduced by approximately 3,600 MWh per year (CO_2 conversion: Approximately 1,700 tons per year; oil conversion amount: Approximately 900 kiloliters per year). This corresponds to about 11% of the power consumed in the melting processes conducted by the cast iron factory located onsite at the Tochigi Plant. In light of this achievement, Nissan won the Agency for Natural Resources and Energy Award in the Small Group Activities category at the Energy Conservation Grand Prize Awards for fiscal 2019, sponsored by The Energy Conservation Center, Japan (ECCJ).

Cast iron melting process



To reach our defined objectives for CO_2 emissions and energy use, we solicit facility proposals from each global site, preferentially allocating investment based on the potential CO_2 reduction compared to project costs. Making the value of carbon a key factor in internal evaluations lets us invest more efficiently and be more competitive. In Japan, we converted outdated facilities into cutting-edge high-efficiency facilities with investments to improve energy efficiency, including energy-saving roof insulation upgrades. Our plants use finely controlled lighting and air conditioning for low-energy-use and low-energy-loss operations. We promote CO_2 emission reduction activities and introduced cutting-edge energy-conservation technology from Japan in our plants worldwide. Around the globe, our plants learn and share best practices with each other, while Nissan Energy Saving Collaboration (NESCO)*2 diagnoses energy loss at plants in regions where it is active and proposes new energy-saving countermeasures. These proposals amount to a potential reduction in CO_2 emissions of some 53,000 tons*3 in fiscal 2019, according to our calculations.

When sourcing energy, we consider the balance of CO_2 emissions for the entire company alongside renewable energy usage rate and cost, choosing suppliers best suited for achieving each goal. Through such activities, CO_2 emissions per vehicle produced in fiscal 2019 were brought down to approximately 0.51 tons, a reduction of 30.1% from the fiscal 2005 level.

*2 Established in Japan in 2003, then in Europe, Mexico and China in 2013
*3 Source Nissan

Energy Input

(FY)

	Unit	2015	2016	2017	2018	2019
Total	MWh	9,683,528	10,189,082	9,532,840	9,252,737	8,443,465
By region						
Japan	MWh	4,115,353	4,497,562	4,084,912	3,700,532	3,522,281
North America	MWh	2,583,613	2,643,303	2,452,299	2,570,438	2,269,797
Europe	MWh	1,107,279	1,093,103	1,126,186	1,048,201	838,714
Other	MWh	1,877,283	1,955,115	1,869,443	1,933,566	1,812,673
By energy source						
Primary						
Natural gas	MWh	3,346,141	3,537,674	3,701,640	3,579,998	3,126,933
LPG	MWh	303,826	249,426	179,945	191,405	175,996
Coke	MWh	206,307	217,431	218,618	200,527	172,500
Heating oil	MWh	188,943	209,232	147,522	113,200	91,315
Gasoline	MWh	302,564	303,040	299,000	259,045	241,010
Diesel	MWh	55,099	57,488	48,259	53,074	23,044
Heavy oil	MWh	34,289	43,853	27,652	15,995	16,287

(FY)

	Unit	2015	2016	2017	2018	2019
External						
Electricity (purchased)	MWh	4,979,114	5,247,663	4,755,897	4,711,467	4,445,380
Renewable energy*1	MWh	141,076	157,226	133,212	135,574	153,773
Chilled water	MWh	12,116	12,919	6,661	7,487	7,025
Heated water	MWh	4,630	4,690	5,000	5,000	5,000
Steam	MWh	100,000	136,593	128,038	102,324	126,811
Internal						
Electricity (in-house generation)	MWh	9,423	11,847	14,609	13,214	12,164
Renewable energy*2	MWh	9,423	11,847	14,609	13,214	12,164
Total renewable energy	MWh	150,499	169,073	147,821	148,788	165,937

*1 Volume of renewable energy in electricity purchased by Nissan.

*2 Volume of renewable energy generated by Nissan at its facilities and consumed for its own purposes.

Energy Inputs and Energy Consumption

The total energy consumption of our global corporate activities during fiscal 2019 was about 8.443 million MWh, a 9% decrease from fiscal 2018. This reduction was primarily due to the promotion of energy-saving activities at facilities and a decline in total production volume. Production sites globally accounted for 7.486million MWh* of total energy consumption.

* This figure is subject to assurance by KPMG AZSA Sustainability Co., Ltd. For details, please see here.
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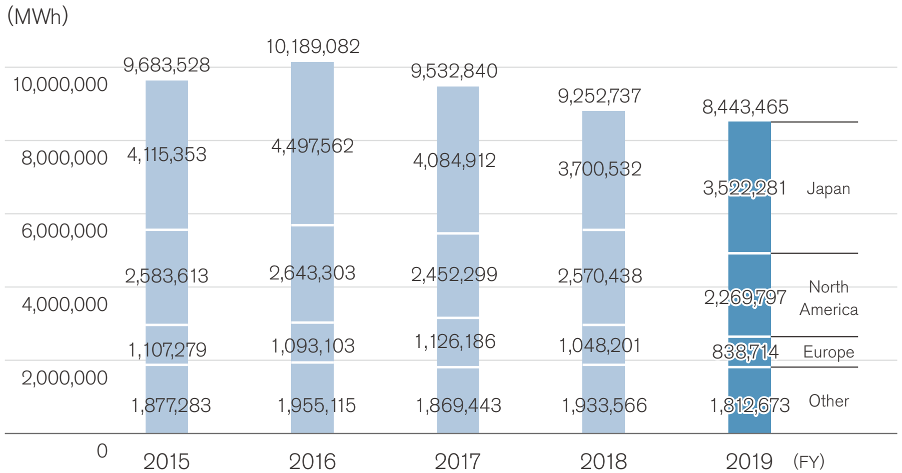
* Energy inputs and CO2 emissions at global production sites are assured by a third party.



Carbon Footprint of Corporate Activities

(FY)

	単位	2015	2016	2017	2018	2019
Scope 1	t-CO_2	926,790	963,661	912,476	889,444	765,370
Scope 2	t-CO_2	2,547,951	2,614,028	2,394,109	2,339,883	2,173,236
Scope 1+2	t-CO_2	3,474,741	3,577,689	3,306,584	3,229,327	2,938,606
Japan	t-CO_2	1,479,572	1,579,089	1,333,335	1,208,303	1,142,233
North America	t-CO_2	800,724	823,340	683,332	738,234	607,605
Europe	t-CO_2	208,088	176,285	228,998	221,692	182,973
Other	t-CO_2	986,359	998,976	1,060,920	1,061,098	1,005,794
Scope 3	t-CO_2	144,145,000	150,462,000	213,715,000	203,106,900	173,138,601

In fiscal 2019, the total of Scope 1 and 2 emissions was 2.939 million tons. Total CO_2 emissions from manufacturing processes were 2.408million tons (Scope 1 emissions: 0.670million tons; Scope 2 emissions: 1.738million tons).*

* This figure is subject to assurance by KPMG AZSA Sustainability Co., Ltd. For details, please see here.
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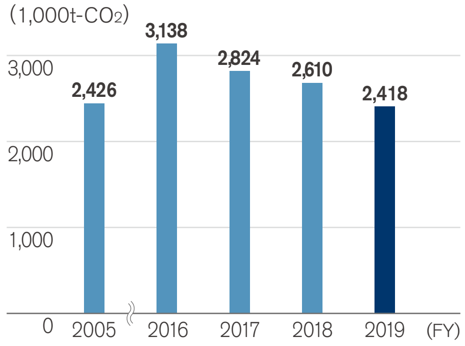
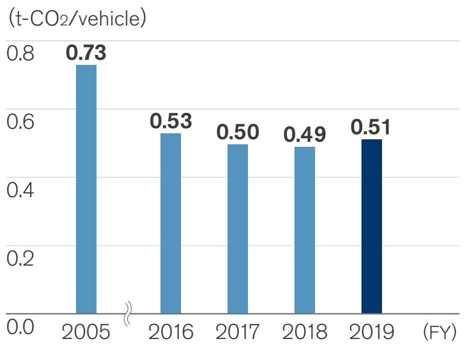
Carbon Footprint of Manufacturing Activities



Manufacturing CO_2 per Vehicle Produced



In fiscal 2019, our manufacturing CO_2 emissions per vehicle produced were 0.51 tons, 30.1% less than fiscal 2005.

Promoting Renewable Energy

Nissan takes three approaches toward promoting the adoption and integration of renewable energy in line with the characteristics of each region: (1) generating our own power in company facilities; (2) sourcing energy with a higher proportion of renewables; and (3) leasing land, facilities and other assets to power companies.

As an example of the first approach, our Sunderland Plant in the United Kingdom introduced 10 wind turbines supplying up to 6.6 MW of power. The plant also has a 4.75-MW solar farm, installed in 2016, and together these renewable sources account for about 8% of the power it uses. At our Iwaki Plant, the guest hall for plant visitors is powered by solar energy. By storing surplus electricity in secondhand Nissan LEAF batteries, the plant both stabilizes the energy supply and uses resources more effectively. At the Huadu Plant of Dongfeng Nissan Passenger Vehicle (DFL-PV) in China, solar panels with a total capacity of 30 MW have been in operation since 2017, providing roughly 8% of the electricity used at the plant

Regarding the second approach, our first Aguascalientes Plant in Mexico actively uses energy generated from biomass gas and wind power and has achieved a renewable energy usage rate of 50% since 2013.

Finally, we leased 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's Samukawa Plant was leased for the same purpose in January 2014.

Through these efforts, we have enhanced the renewable energy usage rate at our production plants as part of reducing CO_2 emissions. In fiscal 2019, our renewable energy usage rate reached 10%.

*In addition, we installed a solar farm (with an output of approximately 200 kW) at a plant in Spain.

More Efficient Logistics and Modal Shifts

In 2000, Nissan began sending chartered trucks for pickup and delivery of parts. This approach—adopted widely across the company, including at overseas manufacturing sites—has increased global operational efficiency. We work together with suppliers to optimize the frequency of deliveries and transport routes and improve packaging specifications for better loading ratios so fewer trucks are required. We are also pursuing a modal shift from trucks to rail for transport.

Through a 2014 expansion of this approach to include cooperative transport of production parts with other original equipment manufacturers (OEMs), in addition to complete vehicles and service parts, we are seeking further efficiency in this area. We work from the design stage of new vehicles to reduce transportation distances by sourcing necessary production components for plants through localization as much as possible.

Our engineers devise efficient packaging for the huge number of parts of different shapes and materials that go into automobiles. Through simultaneous-engineering logistics, we work from the design stage to create parts and develop new vehicles that enhance transportation efficiency, as well as reduce parts shipments per vehicle.

In container transport, we have taken a range of measures to improve container filling rates for parts transport, from 40-foot “high cube” containers to software simulations that reduce wasted container space.

We constantly review transport methods and are currently undertaking a modal shift to rail and maritime transport. Some 80% of completed vehicles in Japan are now transported by sea. Parts shipments to NMK from the Kanto area in and around Tokyo are nearly all conducted 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 or ship, depending on the destination. In China, we are increasing the proportion of completed vehicles that are transported domestically by ship or rail.

Since 2010, we have also been promoting the use of energy-efficient vessels for sea shipments of our vehicles. Today, our fleet has grown to include seven energy-efficient car carriers.*1

As we expand our global logistics operations, we will continue to increase efficiency and effect a modal shift in transportation, targeting a 12% reduction in CO_2 emissions by fiscal 2022 compared to fiscal 2005 levels, as measured by the index of CO_2 emissions per vehicle.*2 In fiscal 2019, CO_2 emissions per global vehicle were approximately 0.38 tons—a reduction of about 11.5%.

*1 More information can be accessed on Nissan’s energy-efficient car carriers’ page.
*2 Total emissions generated from transportation to Nissan manufacturing sites and retail outlets in Japan, North America, Europe and China divided by the total number of vehicles transported.
* Data related to climate change (initiatives through corporate activities) is also available here.
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CO_2 Emissions from Logistics

(FY)

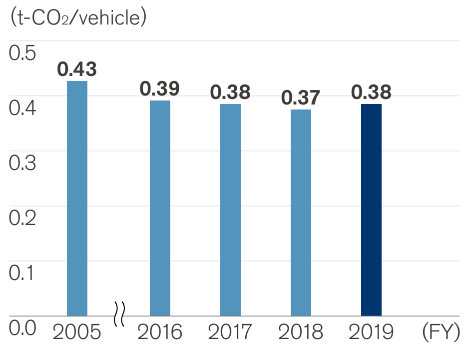
	Unit	2015	2016	2017	2018	2019
Total	t-CO_2	1,598,891	1,926,477	1,567,248	1,482,982	1,144,338
Inbound*	t-CO_2	797,034	809,088	739,610	762,314	582,957
Outbound*	t-CO_2	801,857	1,117,389	827,638	720,667	561,381

Sea	%	18.3	17.8	20.0	19.9	21.1
Road	%	65.7	62.1	64.6	60.3	64.1
Rail	%	5.4	5.6	7.0	6.7	5.9
Air	%	10.6	14.5	8.4	13.1	8.9

* "Inbound" includes parts procurement from suppliers and transportation of knockdown parts; "Outbound" includes transportation of complete vehicles and service parts.
* Value in 2016 were corrected after recalculation.

In fiscal 2019, CO_2 emissions from logistics were 1,144,338 tons, down approximately 23% from the previous fiscal year. Emissions from transportation of parts and completed vehicles declined due to air freight reduction and production volume reduction in China and North America decreasing our overall CO_2 emissions.

CO_2 Emissions per Vehicle Transported



In fiscal 2019, CO_2 emissions per vehicle transported were 0.38 tons.

Office Initiatives

We promote efforts to reduce CO_2 emissions at Nissan offices in Japan, North America, Europe and China.
In Japan, through Nissan Trading, we operate the Nissan Power Producers and Suppliers (PPS) scheme, sourcing clean energy for which CO_2 emissions and costs have been taken into account through Japan's PPS system. In 2019, approximately 26,657 MWh of clean energy was supplied to five Japanese business locations.*
NESCO teams have also expanded the scope of their activities beyond production plants to contribute to reducing emissions in the Nissan Technical Center in Atsugi.
Our efforts go beyond just CO_2 management. We are pursuing other environmentally-friendly policies, such as improving our video and telephone conference facilities and using software to bring participants in multiple locations together when they need to share documents. This reduces the

number of business trips required worldwide, improves workplace efficiency and reduces costs.

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

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Green Building Policy

Based on ISO 14001 management processes to evaluate environmental impact, we make it a key task to optimize our buildings during construction or refurbishing to make all our structures greener. Evaluation metrics in this area include environmental footprint, such as CO_2 emissions; waste and emissions from construction methods; and use of hazardous materials and other quality control issues. Furthermore, one performance index for Nissan in Japan is MLIT's Comprehensive Assessment System for Built Environment Efficiency (CASBEE)*.
Among our current business facilities, our Global Headquarters in the city of Yokohama has earned CASBEE's highest "S" ranking, making it the second Nissan structure to do so following the Nissan Advanced Technology Center (NATC) in Atsugi, Kanagawa Prefecture.
Global Headquarters gained a Built Environment Efficiency Rating of 5.6, the highest CASBEE rating for a new structure, making it one of Japan's greenest office buildings. The building's use of natural energy sources to reduce its energy usage and its CO_2 emissions were evaluated highly, as were its methods of water recycling and its significant reduction in waste produced.

* Comprehensive Assessment System for Built Environment Efficiency

Dealership Initiatives

Nissan promotes CO_2 management at dealerships with the aim of reducing total emissions per floor area by 1% each year. Our retail outlets also work continually 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, as well as insulated roofs. In addition, to source electricity with low environmental load, we have broadened supply from PPS systems, including our own, to provide 123,115 MWh of power (equivalent to an annual reduction of some 1,045 tons in CO_2 emissions) to 760 retail outlets in the Kanto, Chubu, Tohoku, Kansai, Chugoku and Kyushu regions.
Since April 2000, we have run a unique environmental facility certification system based on ISO 14001 for dealerships called "Nissan Green Shop." Our environmental policy requires all dealerships in Japan to meet certain standards and undergo annual audits performed by our teams. The dedicated evaluation sheet has a total of 84 key performance indicators (KPIs) and is regularly revised to reflect the requirements of national legislation, local communities and the Nissan Green Program (NGP).


Solar panels installed on the roof of a Kanagawa Nissan dealership. Power from the panels is supplied to dealerships through the Nissan PPS system.