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# Environmental

Key areas	Sustainability vision	Main goals / approaches for 2022	Related materiality issues	SDG areas where Nissan's environmental strategy mainly adds value
Climate change	Achieve carbon neutrality by 2050 across the life cycle of its products by the early 2030s all new vehicles offering in major markets will be electrified	Reducing products and manufacturing CO <sub>2</sub> emissions · Product CO <sub>2</sub> emissions reduction: 40% reduction of CO <sub>2</sub> emission from new cars (vs. FY2000; Japan, U.S., Europe, China) · Overall reduction of CO <sub>2</sub> emissions from corporate activities: 30% reduction of CO <sub>2</sub> emissions per vehicle sold (vs. FY2005; global)	· Vehicle electrification · Renewable energy · Community development · Life cycle management · Pursuit of energy efficiency · Ecosystem services and biodiversity	
Resource dependency	Zero new material resource use · Using materials that do not rely on newly mined resources for 70% of the materials used in each vehicle in 2050	Minimizing usage of new resources, with the efforts of waste to landfill reduction and waste reduction, etc. · More than 30% (in weight) of a new vehicle to be non-new material resources	· Sustainable resource management	
Air quality	Zero impact	Improving exhaust emissions from products and manufacturing. · Cabin air quality improvement: Promote research on technical solutions · Reduce VOC from manufacturing: Promote reduction of VOC per paint area (vs. FY2010)	· Cleaner emissions · Product quality · Preservation of water, air, and soil	
Water scarcity	Zero stress	· Reducing water withdrawal from manufacturing: 21% reduction of water withdrawal per global production (vs. FY2010)	· Risk hedge for physical hazards · Preservation of water, air, and soil	
Business foundation	· Promoting supplier engagement · Green purchasing guidelines etc.		· Supply chain management · Community development	

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# Environmental policies and philosophy

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## Environmental principles

We provide customers with innovative products and services, by promoting the effective use of energy and resources, diversifying our sources, and actively using renewable energy and recycled materials. These are just some of the ways in which Nissan is striving to achieve “a Symbiosis of people, vehicles, and nature.”

To achieve our environmental principles, we have clearly defined our ultimate goal: “To manage the environmental impact caused by our operations and products to a level that can be absorbed by nature and pass on rich natural capital to future generations.” and set what we want to be: “A sincere eco-innovator”. This means endeavoring to leave as small an ecological footprint as possible for the Earth’s future. Beyond deepening our awareness of the environment, we strive to conduct all business activities with consideration and kindness for people, society, nature and the Earth, as a means of contributing to the development of a better society.

## Nissan’s environmental philosophy: A symbiosis of people, vehicles, and nature

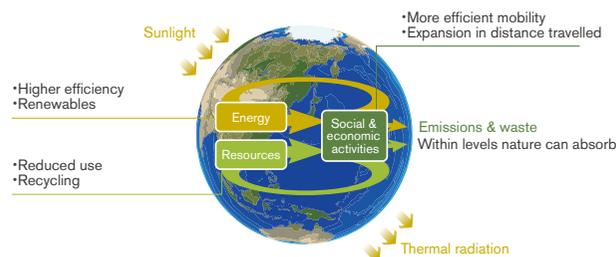
In addition to deepening our understanding of the environment, we conduct all of our operations, including production and sales, with consideration for people, society, nature and the earth, as a means of contributing to the building of a better society.

### Ultimate goal

We will reduce the environmental impact and resource consumption of our corporate operations and vehicles throughout their life cycle to a level that can be absorbed naturally by the nature and pass on rich natural capital to future generations.

### What we want to be: A sincere eco-innovator

Sincere: Proactively address environmental challenges and reduce our impact on the environment.  
 Eco-Innovator: Develop a sustainable mobility society through innovative technology in products and services.



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

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## Nissan’s understanding of environmental issues

Environmental and social issues are attracting more and more attention in recent years. With the world’s population expected to reach 9.7 billion by 2050, society faces problems in areas such as poverty and hunger, energy, climate change, and various conflicts. Among these, the issue of climate change is considered to be the cause of widespread natural disasters that occur frequently all over the world every year, thus it is more need than ever to curb the effects of climate change. To address these issues, the UN adopted 17 Sustainable Development Goals (SDGs) and 169 targets, and there are high expectations that corporations as well as nations will play a major role in realizing the SDGs. Nissan supports the SDGs, recognizing the growing importance of delivering safe, secure, and sustainable mobility for all and providing value to society. The auto industry is dependent on the global environment in complex and diverse ways, while also having a significant impact on the environment.

Nissan is tackling a range of issues to promote sustainability by advancing measures to mitigate climate change and conserve energy, preserve air quality and other natural capital, use mineral resources efficiently, properly manage chemical substances, efficiently allocate scarce resources, and promote good health. We are also improving our business to reduce our dependence on fossil fuels.

As a global automaker, we take active steps to identify direct and indirect environmental impacts of our activities, working with business partners and society to minimize the negative impacts of our products and services throughout their life

cycle. We acknowledge that our activities and efforts must be continuously improved and advanced; we seek to provide greater value for society by delivering sustainable mobility for all while alleviating environmental impacts associated with climate change, natural resource dependency, water use, and other issues.

## Nissan’s strategic approach to environmental issues

To solidly contribute to global environmental issues, Nissan engages in direct discussions with environmental experts, investors, NGOs, NPOs and other organizations throughout the world and identifies, we analyze opportunities and risks facing the Company and decide on material issues recognized as important by both stakeholders and Nissan, contributing to the formulation of Nissan’s medium- and long-term environmental strategies.

Climate change, resource dependence, and water resources/air quality were set as the scope of Nissan’s environmental strategy for consideration. These approaches respond to the SDGs\*<sup>1</sup> and contribute to their attainment. \*<sup>2</sup>

\*1 Click here for more information on SDGs areas where Nissan’s environmental strategy mainly adds value. >>> [P014](#)

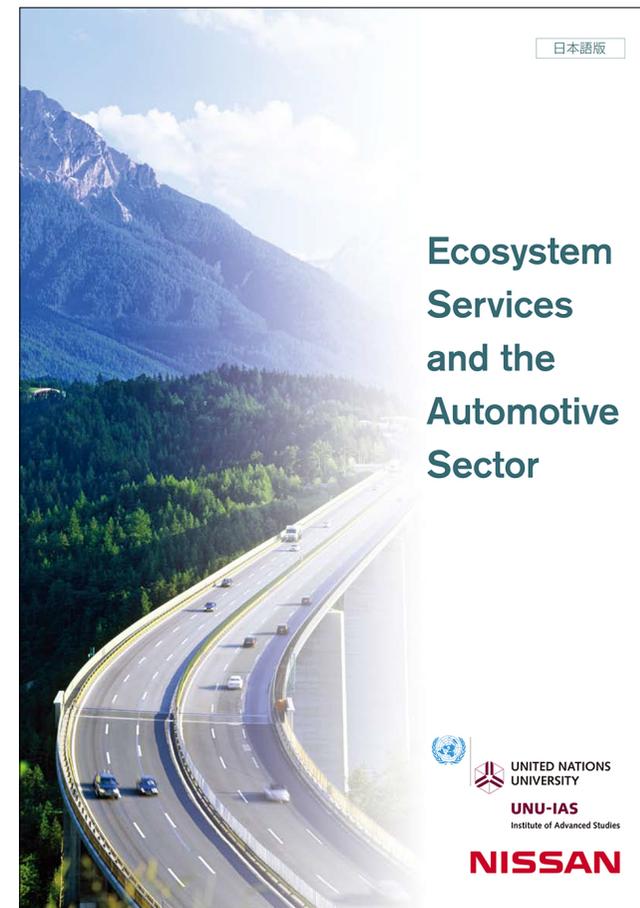
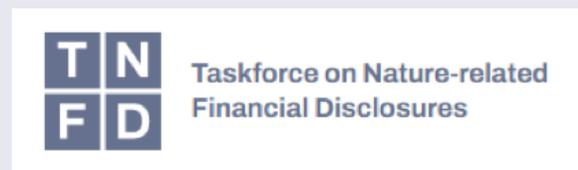
\*2 Click here for more information on the Nissan’s materiality including environmental issues. >>> [P005](#)

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### Initiatives to specify dependencies on the ecology and impact as a manufacturer

At the 15th United Nations Biodiversity Conference (COP15) held in 2021 and 2022, it was discussed that we are on the verge of an unprecedentedly multifaceted crisis, including significant loss of biodiversity and degradation and pollution of the both land and sea. That same year, University of Cambridge Emeritus Professor Sir Partha Dasgupta published *The Economics of Biodiversity: The Dasgupta Review* espousing the idea of introducing natural capital into the economy, which was referenced at the G7 Summit and contributed to influencing international politics. These international discussions are backed by scientific evidence acquired in the world's first Millennium Ecosystem Assessment conducted by the United Nations from 2001–2005. This assessment focused on two main points, the first was deterioration of global ecosystems, which is progressing at an unprecedented rate and scale, and the second was ecosystems that create many ecosystem services such as food, freshwater supplies, climate control and protection from natural disaster, all of which substantially benefit humanity. At the same time, Nissan incorporated the Corporate Ecosystem Services Review\*1 method, which considers the necessity of grasping the impact and dependence of corporate activities on ecosystems, and launched assessments of the overall value chain including vehicle operation. In 2010, the results of research conducted with

the United Nations University were published in the report *Ecosystem Services and the Automotive Sector*\*2. Through these assessments, we identified three priority areas on which we should focus as an automaker: Procurement of Energy, Procurement of Material Resources and Usage of Water Resources. We also estimate that in 2013, the use of water resources in the upstream resource procurement process was more than 20 times the amount of water used by Nissan. Ecosystem and biodiversity assessments are reflected in revised materiality\*3 decisions and incorporated into specific actions as Nissan Green Program policies and strategies. Nissan endorsed the TNFD\*4's recommendations and joined the TNFD Forum to support its activities believing that it is important to communicate more clearly and accurately these initiatives to investors and other stakeholders. We will consider further disclosure in line with the recommended framework.



\*1 Developed by the World Resources Institute (WRI) in cooperation with the World Business Council for Sustainable Development (WBCSD) and the Meridian Institute based on the UN Millennium Ecosystem Assessment (MA).

\*2 Click here to read "Ecosystem Services and the Automotive Sector": [https://www.nissan-global.com/EN/DOCUMENT/PDF/ENVIRONMENT/SOCIAL/ecosystem\\_services\\_and\\_the\\_automotive\\_sector.pdf](https://www.nissan-global.com/EN/DOCUMENT/PDF/ENVIRONMENT/SOCIAL/ecosystem_services_and_the_automotive_sector.pdf)

\*3 Click here for more information on the Nissan's materiality including Environmental issues. >>> P005

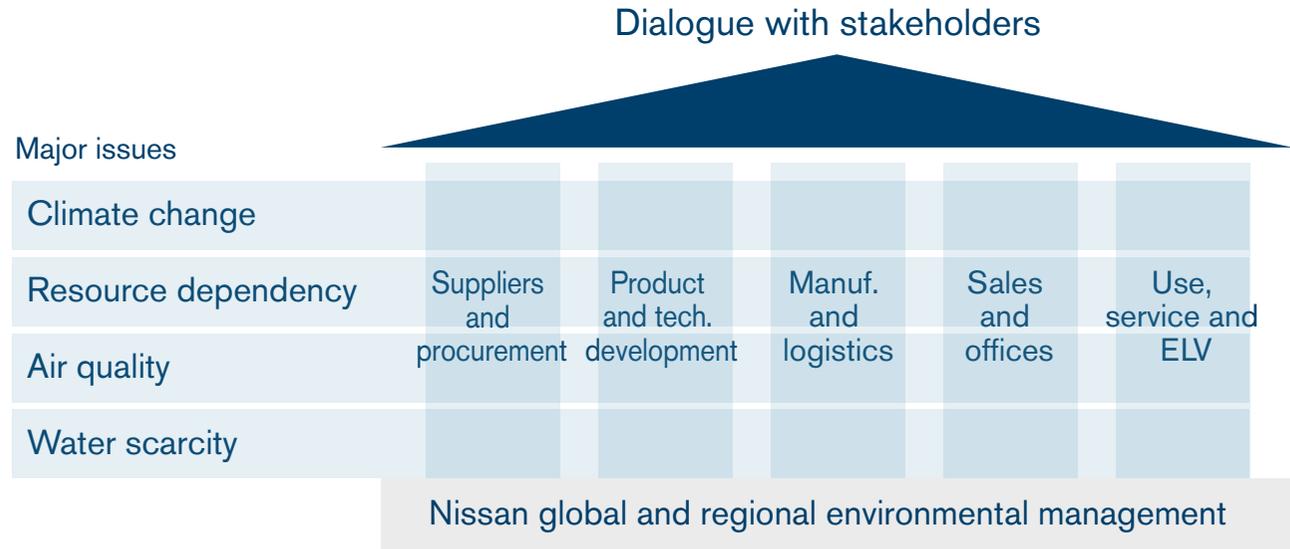
\*4 TNFD: Taskforce on Nature-related Financial Disclosures

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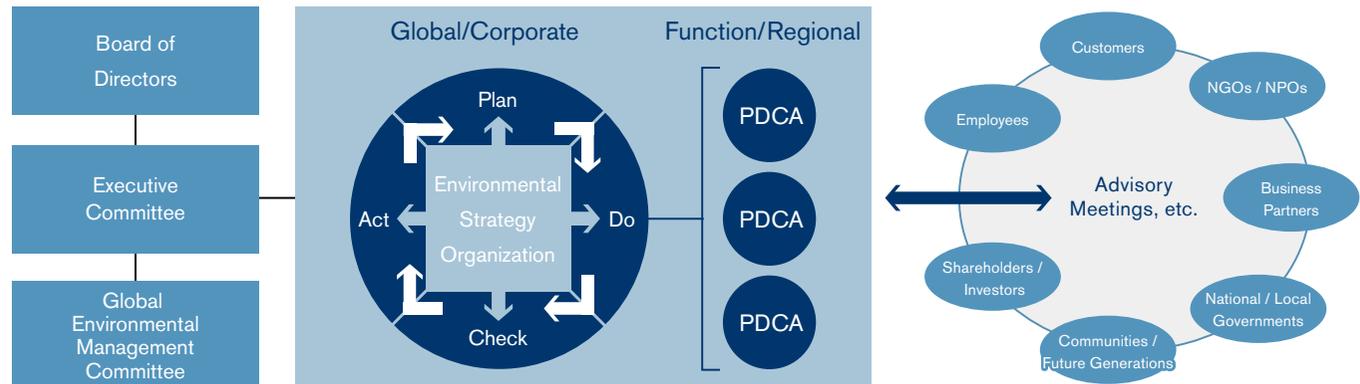
## Global environmental management framework and governance system

To promote comprehensive environmental management as a global company while responding to a diverse array of environmental issues, Nissan has a governance system built on dialogue and partnership with each region and many corporate functions, as well as with a variety of stakeholders. The Global Environmental Management Committee (G-EMC), co-chaired by a Board member, determines overall policies and the content of reports before the Board of Directors. Its meetings are attended by related corporate officers to cover whole value chain. Executives also clarify risks and opportunities at the corporate level and determine the specific programs to be undertaken by each division, using the PDCA cycle to manage and operate the environmental programs efficiently. Environmental risks are regularly reported in the Internal Control Committee meetings to strengthen corporate governance. We actively communicate with a broad range of stakeholders through our ESG data book and by answering inquiries from various environmental rating agencies.

## Global environmental management framework



## Environmental management organization



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## Further alignment with governments and partner companies

Since 2006, Nissan has estimated long-term CO<sub>2</sub> reductions based on the latest Intergovernmental Panel on Climate Change (IPCC) reports, set retroactive medium-term goals in the Nissan Green Program, and made efforts to realize a society that is “a Symbiosis of People, Vehicles and Nature” by ensuring these goals are achieved every year.

The Paris Agreement was adopted at COP21 in 2015. At that time Nissan recognized the importance of the common goals of “holding the increase in the global average temperature to well below 2°C and pursuing efforts to limit the temperature increase to 1.5°C above preindustrial levels,” and reaffirmed the consistency between these goals and Nissan’s long-term vision.

In addition to support and endorsement of the Paris Agreement, from the IPCC special report Nissan recognized the need to further enhance its vision. In January 2021, Nissan declared the goal of carbon neutrality in 2050 across the product life cycle including business operations. Nissan announced Nissan Ambition 2030 in November 2021, which includes promoting electrification initiatives that combine ambitious actions. Activities included the creation of an EV ecosystem require collaborations with governments, and a wide range of partners including companies in other industries.

With regard to coordination with governments, Nissan made the decision to participate in the GX League\*1 to expand opportunities for collaborations. As one of 440 member companies participating in the GX League, Nissan strives to enhance the efficacy of its climate change initiatives.

We also reviewed the stances of our industry associations on climate change and confirmed that they are in alignment with the direction Nissan should be heading. We will continue to collaborate within the automotive industry through the activities of our industry associations and take on the challenge of becoming carbon neutral together with our partners.

### Results of reviews of stances at industry organizations to which Nissan is a member

Group	Paris Agreement Stance (the source)*2	Nissan stance alignment with Paris Agreement
Japan Automobile Manufacturers Association (JAMA)	<ul style="list-style-type: none"> <li>All out to achieve carbon neutrality (CN) in 2050</li> <li>CN by 2050 is not achievable without breakthrough technologies, premised on inexpensive and stable CN electricity and requiring strong support incl. policy and financial measures (April 8, 2021: Probing deeper into energy conservation, issues and requests targeting CN in 2050)</li> </ul>	<ul style="list-style-type: none"> <li>JAMA’s goal of CN in 2050 aligned with Paris Agreement goals and Nissan’s vision</li> <li>CEO Uchida is the JAMA vice chair, Nissan executive officers are subcommittee chairs</li> <li>Developing fair and equitable LCA evaluations for autos focused on CN, promoting LCA international standardization through its subcommittee</li> <li>Nissan and JAMA aligned and will continue to cooperate toward CN in 2050</li> </ul>
Japanese Business Federation (Keidanren)	<ul style="list-style-type: none"> <li>Environment is the foundation of business activities and daily life; a sustainable society is the business community’s top concern.</li> <li>Keidanren works with the government toward “CN by 2050” with unwavering determination (December 15, 2020: Toward CN by 2050 (“Society 5.0 with CN”) Determination and Actions of the Business Community)</li> </ul>	<ul style="list-style-type: none"> <li>Confirmed Keidanren’s goal of CN in 2050 is consistent with Paris Agreement and Nissan’s vision</li> <li>Nissan and Keidanren aligned and will continue to cooperate toward CN in 2050</li> </ul>
Alliance for Automotive Innovation (AAI)	<ul style="list-style-type: none"> <li>Auto industry is poised to target a 40–50% EV ratio by the end of this decade (October 12, 2021: President and CEO John Bozzella)</li> </ul>	<ul style="list-style-type: none"> <li>AAI’s ambitious EV ratio of 40-50% consistent with Nissan’s goal for a 40% EV ratio in U.S. by 2030</li> <li>Nissan and AAI aligned and will continue to cooperate to achieve these goals</li> </ul>

\*1 Click here for more information on “GX League”. (Japanese only) <https://gx-league.go.jp/>

\*2 Following text is translated by Nissan.

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## Environmental action plan: Nissan Green Program (NGP)

We first announced the Nissan Green Program (NGP) medium-term environmental action plan in 2002 to achieve our environmental philosophy of “a Symbiosis of People, Vehicles, and Nature” and to ultimately reduce our environmental dependence and impact to levels that nature can absorb.

## NGP2022 key issues and challenges

Based on environmental materiality analysis, Nissan has identified “climate change,” “air quality,” “resource dependency,” and “water scarcity” as important issues under NGP2022\*1, started from fiscal 2017. Furthermore, in order to contribute to the resolution of these four important issues and create new value, we also worked to strengthen the business foundation related to environmental issues through stakeholder engagement aimed at understanding the needs of stakeholders.

NGP2022 discloses indicators and progress on initiatives related to the four identified material issues every year. In addition to the development and production departments involved in car manufacturing, the sales and service departments and Nissan as a whole also accelerated efforts related to environmental issues while strengthening our business foundation and working to create social value. We took on the challenge of addressing the following key issues, striving not just to attain compliance but also to meet society’s expectations and to realize our long-term vision, we achieved our objectives with the exception of some activities impacted by COVID-19 and lower production volumes owing to semiconductor shortages.

During 2023, we will launch NGP 2030 as 5th program, which strives for climate change, minimizes resource dependency, and conserves water/air quality by 2030 as key issues.

### Evolution of NGP



### NGP2030 key issues and challenges

Climate change: Toward the goal of carbon neutrality by 2050, strive for electrification potential and Monozukuri advantage. Also, we will start initiatives to aim for 1.5DS level emission on scope 1 and scope 2 by 2030.

Resource dependence: Reinforce material circularity and maximize the use of vehicles as a resource through circular a economy.

Water resources/air quality: Conduct activities aligned with the water issues of each region. Ensuring compliance with air quality and expanding the scope of the activities.

\*1 Click here for more information on NGP2022. <https://www.nissan-global.com/EN/SUSTAINABILITY/ENVIRONMENT/GREENPROGRAM/>

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## NGP2022 action plan

Activities	NGP2022 objectives	NGP2022 result
<b>Climate change (Product)</b>		
Long-term vision: Realize carbon neutrality by 2050		
1	Product CO <sub>2</sub> emission reduction	40% reduction of CO <sub>2</sub> emissions from new cars (vs. FY2000; Japan, U.S., Europe and China)
2	Solid EV leadership	—
3	Support driver's behavior	Promote development to improve actual fuel consumption
4	Expansion of vehicle usage	Global expansion of V2X for energy management (Japan, U.S. and Europe)
<b>Climate change (Corporate)</b>		
Long-term vision: Realize carbon neutrality by 2050		
5	Overall reduction of CO <sub>2</sub> emissions from corporate activities	30% reduction of CO <sub>2</sub> emissions per vehicle sold (vs. FY2005; global)
6	Reduction of CO <sub>2</sub> emissions at manufacturing sites	36% reduction of CO <sub>2</sub> emissions per vehicle produced (vs. FY2005; global)
7	Reduction of CO <sub>2</sub> emissions of logistics	12% reduction of CO <sub>2</sub> emissions per production (vs. FY2005; Japan, North America, Europe and China)
8	Reduction of CO <sub>2</sub> emissions at offices (including R&D sites)	12% reduction of CO <sub>2</sub> emissions per floor area (vs. FY2010)
9	Reduction of CO <sub>2</sub> emissions at dealers	12% reduction of CO <sub>2</sub> emissions per floor area (vs. FY2010; Japan)
10	Expansion of renewable energy use	Expansion of renewable energy introduction
<b>Air quality</b>		
11	Cabin air quality improvement	Promotion of research on technical solutions
12	Reduction of VOC emissions at manufacturing sites	Promotion of VOC emission reduction per paint area (vs. FY2010)

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Activities	NGP2022 objectives	NGP2022 result	
<b>Resource dependency</b>			
Long-term vision: Reduce dependency on new materials by 70%			
13	Development of biomaterials	Promotion of research on technical solution	Promoted development of biomaterials for material types which covers more than 70% of the plastics used in vehicles.
14	Proper use of chemical substances	Implementation of the Alliance policy on chemical substance management	Maintained material list annually and number of chemical substances became doubled during NGP2022 period.
15	New resource usage minimization	More than 30% (in weight) of a new vehicle to be non-new material resources	Achieved non-new material resources usage rate over 30%.
16	Expansion of remanufactured parts	Duplation of remanufactured item coverage (vs. FY2016)	Remanufactured parts coverage was doubled compared to FY2016.
17	Expansion of battery reuse	Expansion of the EV battery reuse business	Promoted the secondary use business by expanding the production and application of refabricated batteries.
18	Adoption of die- less forming	Plan and implement technical development	Completed technical development and started application to heritage parts.
19	Waste reduction (manufacturing)	BAU 2% (Japan) and BAU 1% (overseas) reduction of waste	Achieved reduction rate of below every year Japan more than 2% vs BAU Overseas more than 1% vs BAU Japan:Significantly reduced waste generated at dry booth painting process by reusing at iron casting process. Overseas:Installed a compressor to make styrofoam salable and promoted waste reduction at a plant in U.S.A..
20	Waste to landfill reduction (manufacturing)	Landfill ratio reduction	Reduced landfill ratio by 4.2% Achieved zero landfill at all plants in Japan and oversea plants in Brazil, Mexico and India etc. A plant in India achieved zero landfill in FY2022 by effectively utilizing the sludge generated from the painting process. Other plants also promoted landfill disposal reduction by thoroughly sorting waste etc.
<b>Water scarcity</b>			
21	Water withdrawal reduction (manufacturing)	21% reduction of water withdrawal per global production (vs. FY2010)	Reduced by 8.4% Conducted various water reduction activities, including efficiency of water use improvement at manufacturing process and wastewater reuse. Although there was impacts due to production volume declining by COVID-19 and semiconductor shortages, effective use of water resources was steadily promoted.
<b>Business foundations</b>			
22	Governance enhancement	Implementation of our environmental compliance policy	Conducted global engagement of environmental compliance policy thoroughness.
23	Further application of LCA	Measure lifecycle environmental impact of vehicle and new technology	Totally 35 models were analyzed during NGP2022. 15 models are under disclosing on website.
24	Engagement with suppliers	Implementation of environment data survey to promote engagement and reduce environmental impact	Promoted supplier engagement globally through annual CDP survey and environmental activity explanation meeting.
25	THANKS activities promotion	Further promotion of Supplier THANKS activities	Promoted of supplier THANKS activities.
26	Nissan Green Purchasing Guidelines	Adoption of updated policy	Strengthened the Nissan Green Purchasing Guidelines and promoted its adoption.
27	Education program for the next generation	Global expansion of Nissan Waku-Waku Eco school program	Conducted global expansion of Nissan Waku-Waku Eco school (Brazil and Thailand). Provided Waku-eco program more than 630 schools in Japan for 6 years.
28	Collaboration with NGOs for ecosystem conservation	Enhancement of collaboration and partnerships with NGOs	Global participation in EARTH HOUR started from 2018, and now each region actively joins the campaign with their own plan.

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# Climate change

## Strategy for addressing climate change Toward a carbon-neutral society

In 2015, the UN Climate Change Conference (COP21) adopted the Paris Agreement to keep the increase in global temperature to “well below” 2° C.

COP26 in 2021 “resolved to maintain efforts to limit temperature increases to 1.5° C” with more emphasis on “limit to 1.5° C” and added “global CO<sub>2</sub> emissions to virtually zero by mid-century.” Furthermore, the Sustainable Development Goals (SDGs) adopted by the UN in 2015, like the Paris Agreement, also call for concrete measures to address climate change.

Nissan has declared its commitment to achieving carbon neutrality by the 2050 vehicle lifecycle. We are focusing on electrification of vehicles and innovation in corporate activities together with our suppliers to achieve this goal.

## Climate change scenario analysis to strengthen strategies for 2050 society

Nissan’s efforts toward the environment have achieved continuous results by consistently reaching milestones back-casted from our Long-term vision. However, compared to 2006 when we formulated the Long-term Vision based on the 2° C scenario from the Intergovernmental Panel on Climate Change (IPCC) report, the threat of extreme weather due to climate change is increasing, thus we believe it is necessary to enhance our strategy and make it more resilient amid growing uncertainties.

The scenario analysis conducted for the purpose of strategic enhancements assumes societies based on the 4° C and 2° C scenarios presented in the International Energy Agency (IEA) time horizon up to 2050 and the 1.5° C scenario in the IPCC special report. Furthermore, in consideration of factors including changes in customer and market acceptance, tightening automobile regulations and the transition toward clean energy, Nissan’s business activities, products and services were examined in terms of strategic resilience to the opportunities and risks posed by climate change in the following four steps.

### Four steps for review

- Evaluate past materiality, investigate risk factors with a decisive impact on the automotive sector due to climate change in documented studies and define main drivers in categories such as population, economy, geopolitics, climate change policy and technology.

- Categorizing main drivers into physical risks and transition risks, then considering the trade-off relationships of each, we confirmed the degree of risk in three scenarios where the average temperature on Earth increased by 1.5° C, 2° C and 4° C.
- Based on the degree to which the automobile sector was impacted and the timeline, items with a more substantial impact were screened from the main drivers.
- Changes, conditions, and effects were adjusted in each scenario to provide guidance based on qualitative evaluation of the elements necessary for enhancing strategies.

As a global automobile company, it will be more than 170 countries and markets where our production facilities operate and our products are provided, therefore we will get the impact from climate change all over the world. When taking a comprehensive perspective of this scenario analysis, even the market infrastructure, regulations and actual usage are different, Nissan’s electrification and other related advanced technologies have the potential to create opportunities for effective capabilities in scenarios other than 2° C. Nissan has come to recognize once again the importance of further accelerating efforts toward this realization as well as the fact that activities integrated with the supply chain are essential for responding to risks. In particular, the expansion of zero-emission vehicles is not only a major step towards the shift to a carbon-free society as an automobile sector, it is also a technology that contributes to the resilience of society in power management and disaster mitigation and prevention. Nissan believes this will create value for society and business.

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However, if the societal response to climate change is delayed, possible risks include transition additional policies and regulations for a decarbonized society, increases in R&D efforts and changes in market demand or corporate reputation among others. Possible physical risks, such as an increase in extreme weather and rising sea levels may lead to cost increases and declines in vehicle sales that have the potential to substantially influence on our financial situation. To avoid risks such as these to the extent possible and create future opportunities, Nissan is leveraging knowledge gained from scenario analysis for use in actual activities and reviewing strategies for expanding resilience. We believe it is important to more clearly and accurately communicate these impacts and the strategies considered to investors and other stakeholders. Nissan supports the TCFD's recommendations and will strive to disclose information in line with its recommended framework. (TCFD: The Task Force on Climate-related Financial Disclosures)

### Envisioned scenarios and associated opportunities and risks

Scenario assumption	Area of impact	Business activity opportunities and risks related to ongoing climate change
1.5°C	Policies and regulations	Respond to further tightening of vehicle fuel efficiency and exhaust gas regulations, develop electric powertrain technologies, and may influence production costs Increased burden of energy costs due to expansion of carbon taxes, expand investment in energy-saving equipment as policy
	Technological changes	Cost effects of utilizing next-generation vehicle technologies such as in-vehicle batteries and other EV-related technologies as well as expanding autonomous driving technologies
		Increased demand will affect supply chains for rare earth metals used for in-vehicle battery material and cause an increase in stabilization costs
	Market changes	Changes in consumer awareness leads to reduced new vehicle sales due to the selection of public transportation and bicycles and the transition to mobility services.
4°C	Opportunities	Expand the provision of power management opportunities with Vehicle to Everything (V2X), an EV energy charging/discharging technology, and redefine the value of EV, especially with Vehicle to Grid (V2G)
	Extreme weather	The impact on the supply chain and the operation of production bases due to extreme weather such as heavy rain and drought will increase property insurance costs and air conditioning energy costs
	Opportunities	The need for securing emergency power sources using EV batteries is increasing as a disaster prevention and mitigation measure

### Financial impact assessment of carbon tax effects

In fiscal 2021, we have started a financial impact assessment, based on the scenario analysis that we have already disclosed. Below are the results of our assessment of the impact of carbon taxes.

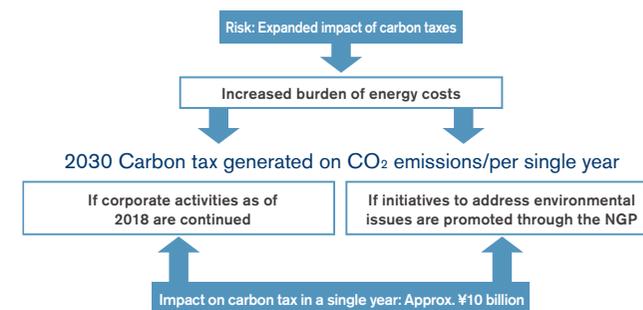
#### Background of financial impact assessment scenario selection

Pricing for CO<sub>2</sub> emissions is progressing, and an increasing

number of countries and regions are introducing carbon taxes. Although the level of taxation and the industries subject to the tax vary by country and region, this analysis will focus on the financial impact of the carbon taxes due to its significant impact on companies.

#### Evaluation of calculation methods and estimated taxes, assumptions

In our calculations, we referred to the IEA report and other reports on carbon taxes as the basis for our carbon tax projection. The carbon tax on GHG emissions in 2030 was calculated by comparing cases where:  
1) Corporate activities as of 2018 have been continued, and  
2) The Nissan Green Program promotes environmental activities and the impact of annual carbon tax could be curbed



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### Impact on business outlook

We estimated that the carbon tax impact of Scope 1 & 2 could be kept to approximately ¥10 billion if the environmental issues addressed in the Nissan Green Program were implemented, compared to the case where GHG emissions were not reduced.

### Response strategies

Nissan has been promoting the Nissan Green Program for about 20 years to address environmental issues and has achieved an average 27.7% reduction in CO<sub>2</sub> emissions from corporate activities per vehicle in fiscal 2022 compared to the fiscal 2005 level.

The EV36Zero, announced in July 2021, which creates an ecosystem for EV production, and the Nissan Intelligent Factory, announced in October that year, are concrete examples of Nissan's future roadmap. We are working toward energy reduction, making manufacturing facilities more efficient, and applying electrification technology while expanding the use of alternative energy sources such as renewable energy, bioethanol, and solid oxide fuel cells (SOFCs).

In addition, we will assess the impact of the transition to decarbonization and promote activities that consider a just transition that does not have negative impacts, thereby achieving carbon neutrality.

We will continue to improve the accuracy of our scenario analysis methods and expand the scope of clients to be analyzed to ascertain the amount of risk more accurately. We will further enhance our disclosure of information to concretize our vision for 2030 and promote our initiatives while placing importance on dialogue with our stakeholders.

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

The business structure of the automobile industry is changing greatly in the face of demands to reduce CO<sub>2</sub> emissions and dependence on fossil fuels. Nissan has been proactively engaged in environmental responsiveness and the creation of social value, such as reducing CO<sub>2</sub> emissions and realizing the practical use of electrification technologies.

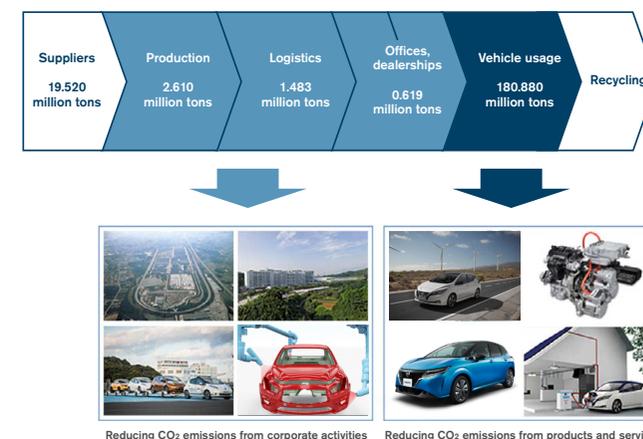
As a global automaker, Nissan considers emissions across the entire value chain it shares with its suppliers, from procurement of raw materials to transportation and operation of vehicles. We understand how important it is to balance environmental initiatives with business activities, and strive to reduce emissions through new technology developments, renewable energy use, and other measures.

### Product and corporate activity initiatives

Climate change also greatly heightens customer needs for energy-efficient mobility. We aim to those needs by clearing stringent CO<sub>2</sub> emissions regulations, as outlined in the Nissan NEXT\*<sup>1</sup> transformation plan calling for annual aggregate sales of 1 million 100% EV and e-POWER vehicles by fiscal 2023. We will further promote global activities targeting carbon neutrality in 2050, aiming for 100% electrification by the early 2030s in key markets. In our corporate activities, we will actively advance energy-saving measures, shifting to climate-efficient logistics and introducing renewable energy sources. We will realize a carbon-neutral future by promoting the electrification of automobiles and pursuing the sustainability

of our business activities in line with the expansion of renewable energy and charging infrastructure in society. In addition, Nissan has established a medium-term environmental action plan NGP2022\*<sup>2</sup> as its strategy, which runs through 2022, and has developed various future climate change scenarios to strengthen the resilience of its climate change strategy.

### CO<sub>2</sub> emissions in the value chain\*<sup>3</sup>



\*1 Click here for more information on Nissan NEXT. <https://www.nissan-global.com/EN/COMPANY/PLAN/NEXT/>

\*2 Click here for more information on the Nissan Green Program 2022 (NGP2022). <https://www.nissan-global.com/EN/SUSTAINABILITY/ENVIRONMENT/GREENPROGRAM/>

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# Product initiatives

## Policies and philosophy for product initiatives

### Our long-term vision

Based on the IPCC Fourth Assessment Report, Nissan made its own estimation, and in 2006, set a scientifically-based long-term CO<sub>2</sub> emission reduction target for new vehicles by 2050. Recognizing that this would require drastic reduction of “well-to-wheel” CO<sub>2</sub> emissions from new vehicles, we set about developing a new scenario for powertrain technologies. Additionally, under the Nissan Green Program 2022 (NGP2022), to remain on track with the 2050 target, we aimed to reduce CO<sub>2</sub> emissions from new vehicles by 40% compared to fiscal 2000 by 2022 (in Japan, the U.S., Europe and China).

As a global leader in technological advancements through the electrification of our products, we believe we can substantially contribute to global efforts to keep the temperature increase “well below” 2° C. These initiatives also reinforce the sustainability of our own business.

Although NGP2022 has achieved a certain success, the IPCC’s Special Report published in 2018 pointed out the impact of 1.5° C of global warming and related global greenhouse gas (GHG) emission pathways on the Earth as a whole. Furthermore, governments, municipalities, and customers in each market have even higher expectations for carbon neutrality.

Nissan is working toward higher goals by aiming for carbon neutrality in the vehicle life cycle and all business activities

by 2050. As a milestone toward the realization of this goal, in January 2021 we announced that Nissan has set the goal of achieving carbon neutrality across the company’s operations and the life cycle of its products by 2050. As part of this effort, by the early 2030s every all-new Nissan vehicle offering in key markets will be electrified.

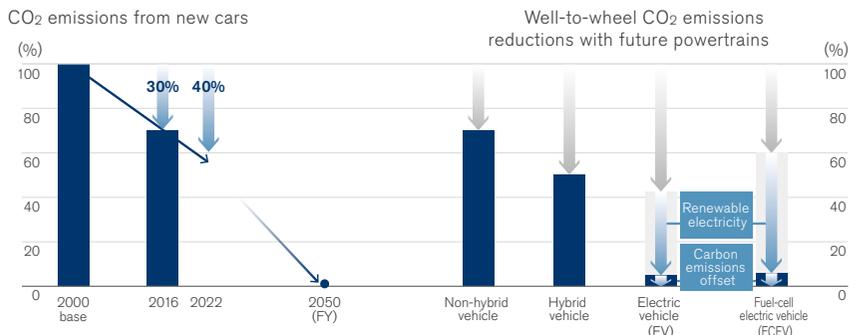
The long-term vision Nissan Ambition 2030\*1 positions electrification as the core of its long-term strategy, and we have announced an increase in the number of electrified vehicle models to be launched by 2030 to 27, including 19 EV models.

This supports our goal of achieving carbon neutrality throughout the product life cycle by 2050.

By fiscal 2030, the model mix of electrified vehicles for the Nissan and Infiniti brands combined is expected to increase to over 55% globally, up from the previous forecast of 50%. In Europe in particular, the sales ratio of electrified vehicles is expected to be 98% in fiscal 2026, further accelerating our electrification strategy.

After implementing CO<sub>2</sub> emission reduction activities to the full extent possible, we will also consider offsets and other adaptations for unavoidable CO<sub>2</sub> emissions to achieve our goals throughout the entire lifecycle.

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



### Our focus area of the Nissan Ambition 2030



#### Accelerating electrified mobility with diverse choices and experiences

1. Increase electrification sales mix



#### Increasing accessibility and innovation in mobility

1. Advanced autonomous vehicle technologies
2. Evolved all-solid-state batteries (ASSB)
3. Create new mobility services for more efficient and sustainable mobility



#### Global ecosystem for mobility and beyond

1. EV36Zero
2. Enhance infrastructure and support a circular economy in energy management
3. V2X

\*1 Nissan Ambition 2030 <https://www.nissan-global.com/EN/COMPANY/PLAN/AMBITION2030/>

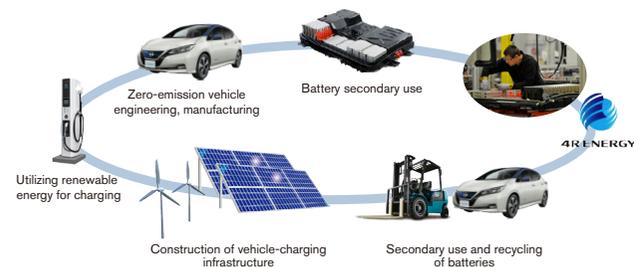
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## Establishing leadership in EVs towards zero-emissions society

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.

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



Our 2010 launch of the first Nissan LEAF made us pioneers of mass-produced EVs. Since then, we have sold more than 1,000,000\*<sup>1</sup> EVs (including joint venture sales) around the world in total, which will contribute to carbon neutrality, enable Nissan to achieve sustainable and profitable growth, and contribute to reducing the environmental impacts of company business activities. Our transformation plan, Nissan

NEXT, calls for even more Nissan EVs, designed to appeal to customers with an ever-wider range of needs.

### Launch of 100% renewable energy EV charging services at Nissan dealers and other locations

As part of our efforts to create a zero-emissions society utilizing EVs, we have announced that starting September 2023, 100% of the electricity used for quick charging at Nissan dealers will come from renewable energy sources.\*<sup>2</sup> Through these activities, Nissan is committed to working with everyone toward the realization of a zero-emissions society.



## Managing actions through products

### Key activities in NGP2022

The CO<sub>2</sub> 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 product development aimed at mitigating real-world CO<sub>2</sub> emissions that addresses vehicle, driver, and new mobility value.

#### 1. Adopt cleaner energy to reduce vehicle CO<sub>2</sub> emissions

Extend electrification across all brands under the Nissan Intelligent Mobility strategy.\*<sup>3</sup> EV lineup and deploy e-POWER technology in core Nissan products.

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

Develop e-Pedal, which regenerates energy when the driver eases up the accelerator pedal, and e-POWER electric powertrain fusing gasoline engines and electric motors. Promote adoption of route guidance technologies based on real-time information from departure point to final destination.

\*<sup>1</sup> Result as of July 25th, 2023. Click here for more information on. <https://global.nissannews.com/en/releases/nissan-global-ev-sales-surpass-1-million-unit-milestone>

\*<sup>2</sup> When quick charging using the Nissan Zero Emission Support Program 3 (ZESP3), a charging support program for owners of electric vehicles (EVs). Click here for more information on. (Japanese only) <https://global.nissannews.com/ja-JP/releases/release-33edc71f3a72a841a38960aa7304ed8b-230517-02->

\*<sup>3</sup> Click here for more information on Nissan Intelligent Mobility. <https://www.nissan-global.com/EN/INNOVATION/TECHNOLOGY/ARCHIVE/NIM/>

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### 3. Provide new mobility value

Provide new mobility services and expand the value of vehicle use. Pursue global expansion of V2X energy management solutions and engage with stakeholders to support V2X device commercialization.

#### V2X

Nissan's Vehicle-to-X (V2X) is a technology that efficiently utilizes the electrical energy stored in the batteries of electric vehicles by transferring it to the Smart Grid via bi-directional chargers.

Renewable energy sources such as solar and wind power will drive carbon neutrality. Still, they are also challenging to manage, as fluctuations in power generation can lead to surpluses or shortages.

Electric vehicles' batteries can absorb fluctuations by charging and discharging this valuable electricity to be used more stably in Smart Grid. Also, with its application in times of disaster, the value and potential of V2X are expanding.

## Product initiatives: Achievements

### Toward a 40% reduction in new vehicle CO<sub>2</sub> emissions

In fiscal 2022, CO<sub>2</sub> emissions\*<sup>1</sup> in Nissan's main markets of Japan, the U.S., Europe, and China were 41.2% lower than fiscal 2000 levels.

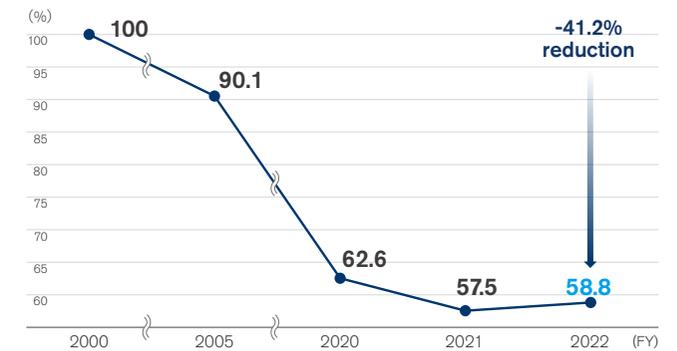
These improvements involve the development of technologies that consider cabin space, application, and price in order to adopt the most fuel-efficient technologies for each vehicle, then bring them to market.

- Improving energy efficiency of engines, transmissions and electric powertrains
- Promoting vehicle electrification and the effective capture and reuse of kinetic energy from braking
- Adoption of materials replacement, structural optimization, and development of new manufacturing processes.

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 both fuel consumption and CO<sub>2</sub> emissions without sacrificing the pleasure and ease of driving,

As a result of these initiatives, we achieved over 40% reduction in CO<sub>2</sub> emission compared to fiscal 2000 levels 1 year ahead of target.

### CO<sub>2</sub> emissions from new vehicles (Global)\*<sup>2</sup>



\*1 From new vehicles in the Japanese, U.S., European, and Chinese markets.

\*2 Reduction in CO<sub>2</sub> emissions calculated by Nissan.

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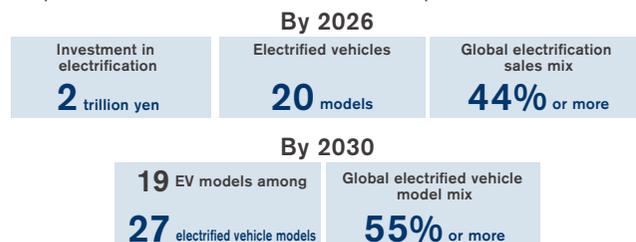
## Nissan’s electrification technologies for achieving carbon neutrality

### Accelerating the advancement and promotion of electrification technologies

By the early 2030s every all-new Nissan vehicle offering in key markets will be electrified as we pursue further innovations in electrification.

Nissan calculations show that electrified vehicles can reduce CO<sub>2</sub> emissions over their entire life cycle relative 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, electrified vehicles play an essential role beyond transportation in helping to achieve a low-carbon society. Nissan is working on advances in electrification technologies that can reduce CO<sub>2</sub> emissions, as well as the development of systems that can be installed in various vehicle models. Nissan will promote the spread of electrified vehicles based on the two pillars of EVs and e- POWER, which have the common feature of being 100% motor-driven.

### Expansion of electrification lineup



## Expanding the EV model lineup

The Nissan LEAF is a Zero-emission vehicle, emitting no CO<sub>2</sub> or other exhaust when driving. Since its launch in 2010, it also earned high praise for the smooth, strong acceleration and quiet operation of its electric motor powered by a lithium-ion battery. \*1

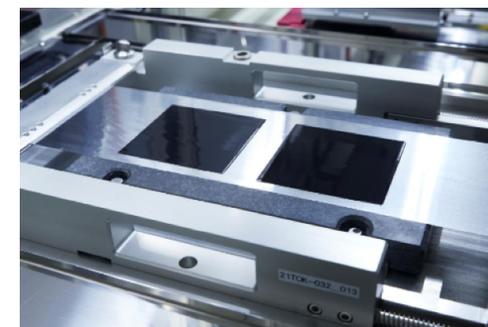
In 2022, following the Nissan LEAF and Nissan ARYA, we launched the Nissan Sakura, a completely new mass-produced minicar that runs on 100% electricity. In addition to the minicar’s unique small turn radius performance, the Nissan Sakura will offer the quiet, powerful, and smooth acceleration unique to Nissan’s EV, fully leveraging technologies cultivated in developing the Nissan LEAF.

The Nissan Sakura is equipped with the same state-of-the-art lithium-ion battery used in the Nissan LEAF. Its universal stack structure, which enhances installation efficiency, facilitates a spacious interior and a cruising range of up to 180 km (WLTC mode), which is sufficient for daily use and provides a high degree of reliability.

The Nissan Sakura also won the 2022–2023 “Japan Car of the Year,” the 2023 “RJC Car of the Year,” and the 2022–2023 “Japan Automotive Hall of Fame Car of the Year.”

## EV battery development initiatives

All-solid-state batteries are expected to be a game-changing technology for accelerating the popularity of EV. They have an energy density approximately twice that of conventional lithium-ion batteries, significantly shorter charging time due to superior charge/discharge performance, and the potential to reduce making up mostly battery costs by using less rare metals. With these benefits, Nissan expects to use all-solid-state batteries in a wide range of vehicle segments, including pickup trucks, making its EVs more competitive. Nissan has been developing this technology and aims to bring to market in 2028.



Nissan LEAF



Nissan ARIYA



Nissan Sakura

\*1 Click here for more information on Nissan life cycle assessment. >>> P063

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## Enhancing our 100% electric motor-powered e-POWER drivetrain

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 achieves both the smoothness and strength of 100% motor drive and top-level fuel efficiency. It also 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. Also, because the engine and tires are not directly connected, power can be generated at the most efficient engine settings (RPM, load), resulting in high fuel economy.

The driver can accelerate or decelerate simply by using the accelerator pedal, and the regenerative brake system also helps improve fuel economy by charging the battery.

In order to expand the adoption of e-POWER in the global market, Nissan has added e-POWER-equipped models to the Sylphy in China and the Qashqai in Europe. The Qashqai e-POWER became Nissan's first best-selling vehicle produced in the U.K. and won the Best Innovation award at the Auto Moto Grand-Prix ceremony. In Mexico, the Kicks e-POWER was classified by the Mexican government in the EV category, making it eligible for various preferential treatment as an EV.

Going forward, e-POWER will continue to evolve as a technology that can be installed in a wide range of vehicle models while balancing environmental performance and driving performance at a high level. We are developing technologies that achieve the world's highest level of 50% thermal efficiency with a next-generation engine dedicated

to power generation for e-POWER and we promote technological developments enabling further reductions in CO<sub>2</sub> emissions (fuel efficiency improvement).

- 2016: Launched Note e-POWER (compact car equipped with the e-POWER electric powertrain) in Japan
- 2018: Serena e-POWER
- 2020: e-POWER expanded to Nissan Kicks  
Launch of New Note Equipped with Second Generation e-POWER
- 2021: Note Aura was launched, won 2021–2022 "Japan Car of the Year," "31st Annual (2022) RJC Car of the Year," and "2021-2022 Japan Automotive Hall of Fame Car of the Year", while the second-generation e-POWER installed on both models won the "RJC Technology of the Year 6 Best", among many other automotive-related awards.
- 2022: X-Trail was launched, combining a power generating engine and VC-Turbo with a variable compression ratio to realize a more powerful and quiet e-POWER system.  
The 4WD models feature its new twin-motor all-wheel control technology called e-4ORCE.

## Next-generation powertrain X-in-1

In March 2023 Nissan unveiled its new approach to electrified powertrain development, which it calls "X-in-1".

Under the approach, core EV and e-POWER powertrain components will be shared and modularized, resulting in a 30% reduction, compared to 2019, in development and manufacturing costs by 2026.

At present, Nissan is developing a 3-in-1 powertrain prototype, which modularizes the motor, inverter, and reducer, which is planned for use in EVs. Also 5-in-1 prototype, which additionally modularizes the generator and increaser, is being developed for use in e-POWER vehicles.

## New HEV system equipped with a smart multimodal gearbox

The new JUKE HEV\*<sup>1</sup> unveiled in Europe operates up to 80% as an electric vehicle in urban areas, thus reducing fuel consumption by up to 40%.

The gearbox is controlled by an advanced algorithm, which controls shift points and battery regeneration. Thus, driver can enjoy responsible acceleration as well as efficient low emissions.

\*1 Click here for more information about JUKE HEV. <https://europe.nissannews.com/en-GB/releases/nissan-juke-new-hybrid-powertrain-combines-innovation-driving-fun-and-efficiency?selectedTabId=releases>

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## The growing importance of commercial vehicle electrification

It is estimated that commercial vehicle sales, which account for 25% of automobile sales, will increase to 50% in 2030, thus commercial vehicle electrification is important for carbon neutrality\*1.

### History of commercial electric vehicles at Nissan

In June 2014, Nissan sold the EV multipurpose commercial van e-NV200 in European countries and Japan. The e-NV200 has power outlets in two locations drawing up to a total of 1,500 W of electricity from the onboard engine for electrical generation, which can be used to secure power on the road during normal operation, on the go in business, for leisure activities, as well as a power source in the event of a disaster.

On construction sites, noise problems can be alleviated as there is no need to use an engine-powered generator. In Europe, Nissan is proposing a concept combining comfort and practicality to enhance outdoor activities in winter with the e-NV200 Winter Camper concept making it possible to charge the 220-volt battery using solar panels mounted on the roof.

In 2020, the Tokyo Fire Department began using a zero-emission EV ambulance based on the NV400. Nissan thinks quiet EVs with low vibration ambulances have strong merits. As this vehicle is also equipped with two lithium-ion batteries providing 33 kWh and 8 kWh, it is possible to operate electrical equipment and air conditioners for longer periods of time. It also enables these ambulances to be used as a mobile power source in the event of a power outage or disaster.

In 2022, Nissan pursued equality and functionality with the launch of the Townstar, based on the Renault-Nissan-Mitsubishi Alliance CMF-C platform. With commercial EV van and wagon configurations, Townstar can flexibly handle delivery operations in urban areas.

Going forward, Nissan will continue to expand its lineup of electric commercial vehicles and promote the manufacture of commercial vehicles with zero emissions.

## 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.



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



Zero-emission EV ambulance based on the NV400

\*1 Based on PwC Consulting LLC research

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## 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<sub>2</sub> 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 Corporation, Honda Motor Co., Ltd., and other companies to establish Japan H<sub>2</sub> 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.

In June 2016, Nissan unveiled an e-Bio Fuel-Cell system that runs on bioethanol electric power. The new system 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.

SOFCs can use a variety of fuels, enabling the use of existing fuel infrastructure, and have the advantage of presenting relatively low hurdles in terms of infrastructure adoption. Because our technology combines the efficient electricity generation of SOFC with the high energy density of liquid fuels, it can enable driving ranges on 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.

## Weight-reduction technologies supporting carbon neutrality

Along with improving the efficiency of batteries, engines, and electric powertrains, reducing the weight of vehicles is important for reducing CO<sub>2</sub> emissions.

Nissan is working on weight reduction in three points of view: Materials, Structural optimizations, and Processes.

### Materials

Nissan is rapidly expanding the use of Ultra-High-Tensile Steel realizing high strength and formability, which is used for the body frame components on a wide range of vehicle models, from “kei” minicars to the INFINITI. In 2018, we adopted 980 megapascal (MPa) Ultra-High-Tensile Strength Steel with High Formability, which features further improvements in collision energy absorption performance, for the INFINITI QX50, and in 2019, SAE International presented Nissan with the “SAE/AISI Sydney H. Melbourne Award for Excellence in the Advancement of Automotive Steel Sheet,” among other accolades. In 2020, we expanded this material to the Rogue, Qashqai, and Note, then to the Nissan ARYA in 2022.

### Structural optimizations

The e-POWER system, which integrates motors and inverters, was adopted in the 2020 Note, achieving a 6% increase in output while reducing the weight of the motor by 15% and the inverter by 30%. The same technology is used in the 2022 Nissan Sakura.

### Processes

Nissan is engaged in the practical application of a new casting method called vacuum low-pressure die casting (V-LPDC). This method was applied to the 1.5-liter 3-cylinder turbo engine cylinder head of the Rogue and Qashqai, contributing to a 4% weight reduction.

Nissan will continue proactively developing lightweight technologies to reduce CO<sub>2</sub> emissions and dependence on newly mined resources in order to achieve carbon neutrality.

## Efforts to reduce CO<sub>2</sub> emissions during parts manufacturing through the use of green steel and green aluminum

Since approximately 60% of a vehicle’s weight is made up of steel parts and around 10% of its weight is made up of aluminum parts, the use of green steel and green aluminum is a very effective way to reduce CO<sub>2</sub> emissions during parts manufacturing, which is part of the vehicle’s life cycle. In collaboration with Kobe Steel, Ltd., Nissan has decided from January 2023 to use green steel <sup>\*1</sup> and green aluminum<sup>\*2</sup> for Nissan vehicles is due not only to the significant CO<sub>2</sub> emission reductions during manufacturing, but also because they offer same level of high quality as conventional products. In addition, we will further reduce CO<sub>2</sub> emissions during manufacturing by promoting closed-loop recycling<sup>\*3</sup>, which also utilizes recycled materials generated at Nissan production sites.

\*1 Green steel: Low-CO<sub>2</sub> blast furnace steel with significantly reduced CO<sub>2</sub> emissions in the blast furnace process

\*2 Green aluminum: Aluminum that is electrolytically smelted using only electricity generated by solar power, thereby reducing CO<sub>2</sub> emissions during aluminum ingot production by approximately 50%.

\*3 Closed-loop recycling process: The reuse of waste and scrap generated during manufacturing and used products collected in-house as materials for parts of the same quality or reuse in similar products. Click here for more information on aluminum recycling. >>> P049

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## Initiatives for partnerships with society

### Nissan energy: Solutions that enrich life and society with EVs

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 are creating what we call the Nissan EV ecosystem.

### 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 May 2022, approximately 56,000 quick chargers conforming to the CHAdeMO protocol\*1 have been installed worldwide.

### Nissan Energy Share

The electricity stored in the Nissan EV's battery can do more than just power a vehicle; it can be shared with homes, buildings, and local communities through bi-directional chargers.

Using inexpensive electricity in the evening during off-peak periods and excess electricity generated by solar panels during daytime reduces electricity costs 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 charge or discharge electricity in accordance with power supply and demand balance, which contributes to the stability of a community's power supply and promotes renewable energy use. EV's high-capacity batteries have high potential for usage as social infrastructure, by storing renewable energy like solar power for which generation is difficult to control.

### Nissan EV ecosystem



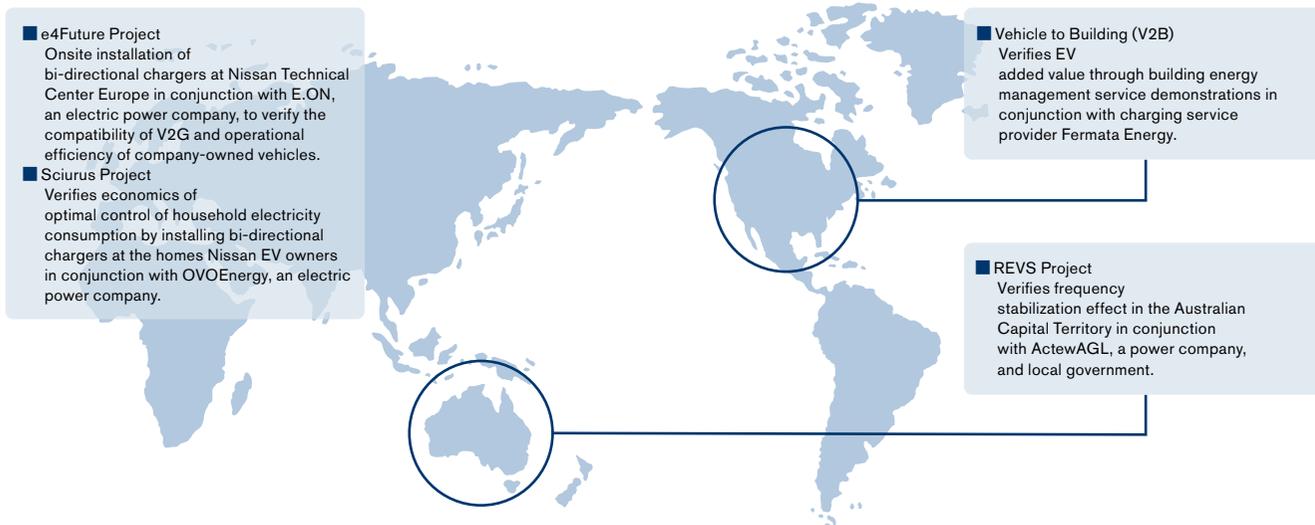
\*1 Click here for more information about CHAdeMO protocol. <https://www.chademo.com/>

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## Global spread of Nissan Energy Share

Nissan participates in collaboration with electric power companies and others in demonstration projects around the world to verify how Nissan EV charge and discharge control (V2G or Vehicle to Grid), which is connected to power systems, help stabilize the supply and demand of electricity in society and the extent of economic and environmental benefits.

Based on results obtained from projects in each region, Nissan wants to maximize the efficacy and economic benefits of EV charging and discharging operations and make Nissan Energy Share into a business as soon as possible.



## Nissan Energy Storage

Nissan EV batteries offer high performance even after being used in cars.

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 Corporation to establish 4R Energy Corporation, 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

The market for used batteries will expand with the spread of EVs and that their utilization will become an issue in the future. Based on this recognition, 4R Energy Corporation, established together with Sumitomo Corporation in 2010, has promoted the development of technologies for the reuse of used batteries at its plant in the town of Namie, Fukushima Prefecture. 4R Energy is building a business model in which used batteries collected from the market are sorted according to their condition and performance and supplied to various secondary users, passing on the value of reused batteries to customers. Expanding this model into a business and further reducing the hurdles to EV ownership for customers will lead to the further spread of electric vehicles.

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## Nissan to start verification tests of energy management system in Namie, Fukushima

### EV charging and discharging to aid achievement of carbon neutrality

In February 2022 Nissan announced, Nissan began verification tests of the energy management system it has established in Namie. The energy management system utilizes an autonomous control system that generates 100% renewable energy for charging electric vehicles by sending electricity to and from them. \*1

This verification will be conducted based on initiatives targeting the utilization of renewable energy and a low-carbon society in the "Agreement on Collaboration for Community Development Using New Mobility in the Hamadori Region of Fukushima Prefecture."

Specifically, the project will utilize RE power generation equipment and power control system (PCS) owned by Roadside Station Namie, a commercial facility located in the

town of Namie, as well as the Nissan LEAF EV, the official vehicle of Namie Town, to verify efficient energy operations and establish an energy management system to promote the local production for local consumption of clean energy by installing Nissan's charge and discharge control system in the PCS.

Renewable energy generates varying amounts of electricity depending on weather conditions, creating an imbalance between the supply and demand of electricity. Using EVs as storage batteries and combining them with a system that independently charges and discharges EVs is expected to facilitate the effective use of renewable energy and stabilize power grids.

Nissan will contribute to Namie Town's aim of realizing "local production for local consumption of energy" and the "Zero-carbon City Declaration" as well as the achievement of a carbon-neutral society through the practical application and verification of an energy management system in Namie Town.



## Demonstration test launched in U.S. and Japan aimed at expanding EV range

### California, USA: Aiming for 5 million zero-emission vehicles by 2030

Objective: Expanding from short-distance EV travel such as commuting and shopping, to inter-city travel.

Initiative: Nissan and Kanematsu Corporation in partnership with U.S. charging infrastructure service provider EV go are installing 57 fast chargers in 26 new locations along one of California's most important travel arteries.

### Japan: NEDO commissioned business

Objective: To expand the range of EV usage to inter-city travel.

Initiatives: Establish information services and other systems to guide EV users to the most appropriate quick chargers, and verify their effectiveness in expanding the range of EV usage (launched in November 2016). By September 2020, survey, analyze, and study various EV usage patterns to establish a model for the spread and expanded use of EVs.

\*1 Click here for more information about verification tests of energy management system in Namie. <https://global.nissannews.com/en/releases/release-b55e8bf1f8f64c95b00977f836063f8e-220112-01-e>

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# Corporate activity initiatives

## Policies and philosophy for corporate activity initiatives

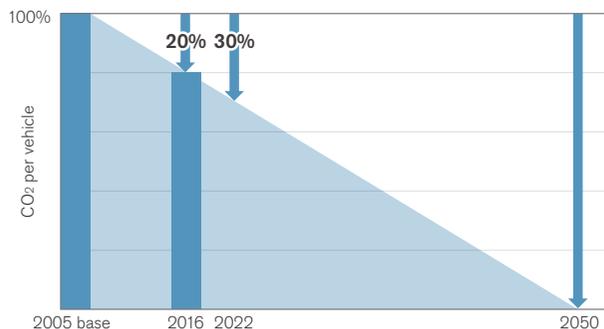
### Reducing CO<sub>2</sub> emissions from corporate activities

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<sub>2</sub> emissions by 2050. Also, as part of the Nissan Green Program 2022 (NGP2022), we set the midterm goal of a 30% reduction in overall corporate CO<sub>2</sub> emissions by 2022. Manufacturing is our largest emissions source, but we are also aiming to reduce greenhouse gas emissions from logistics, offices and dealerships, by setting targets and taking action in each area.

### NGP2022 long-term vision

As announced in January 2021, to realize carbon neutrality in the vehicle life cycle, we are also promoting efforts aimed at achieving carbon neutrality by 2050 through our corporate activities.

NGP2022 long-term vision



## 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 goal of carbon neutrality in the vehicle life cycle by 2050 are as follows:

### Overall (Manufacturing, logistics, offices, dealerships):

30% reduction in CO<sub>2</sub> emissions from global corporate activities by 2022 (vs. 2005/per vehicle sold)

#### Manufacturing

36% reduction in CO<sub>2</sub> emissions from global manufacturing sites by 2022 (vs. 2005/per vehicle manufactured)

#### Logistics

12% reduction in CO<sub>2</sub> emissions from logistics in Japan, North America, Europe, and China by 2022 (vs. 2005/per vehicle manufactured)

#### Offices

12% reduction in CO<sub>2</sub> emissions from global offices by 2022 (vs. 2010/per floor area)

#### Dealerships

12% reduction in CO<sub>2</sub> emissions from dealerships in Japan by 2022 (vs. 2010/per floor area)

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## Corporate activity initiatives: Achievements

### 27.7% reduction in CO<sub>2</sub> emissions from corporate activities

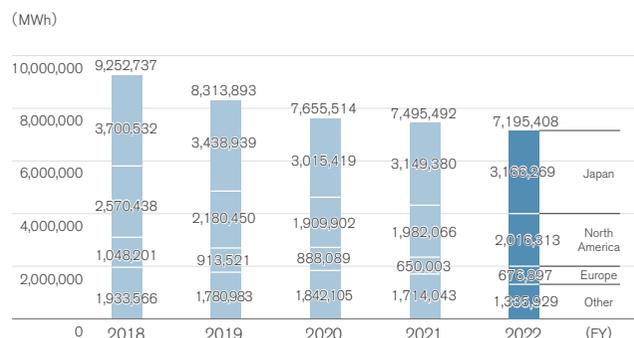
The scope of management regarding climate change through corporate activities includes all vehicle and parts production sites, logistics activities, office locations, and sales companies within the consolidation scope, including subsidiaries and affiliates.

This represents that Nissan has significantly expanded the scope of its CO<sub>2</sub> emission reduction activities, which previously covered only production sites, and has broadened the scope of initiatives that have been conducted individually, such as the introduction of highly efficient equipment, energy conservation activities, and renewable energy from fiscal 2011. The objective is to strengthen the management level of the entire company's activities.

In addition to overall corporate activities, we have set KPIs and targets for each domain that enable us to identify the progress of each. For overall corporate activities, we have established a target of reducing CO<sub>2</sub> emissions from corporate activities by 30% per unit of global sales compared to fiscal 2005 by fiscal 2022\*. In fiscal 2022, we reduced CO<sub>2</sub> emissions (t-CO<sub>2</sub>/unit) by 27.7% compared to fiscal 2005. \*1

## Trend in energy consumption

The total energy consumption of our global corporate activities during fiscal 2022 was 7,195 thousand MWh, a 4% decrease from 7,495 thousand MWh in fiscal 2021.\*2 The total energy consumption from manufacturing processes during fiscal 2022 was 6,462 thousand MWh★, a decrease from 6,875 thousand MWh in fiscal 2021.



## Energy consumption

	Unit	2021	2022
Total	MWh	7,495,492	7,195,408
By region			
Japan	MWh	3,149,380	3,166,269
North America	MWh	1,982,066	2,016,313
Europe	MWh	650,003	676,897
Other	MWh	1,714,043	1,335,929
By energy source			
Primary			
Natural gas	MWh	2,907,420	2,828,289
LPG	MWh	145,717	130,508
Coke	MWh	112,154	119,767
Heating oil	MWh	69,868	58,579
Gasoline	MWh	177,147	120,565
Diesel	MWh	23,800	26,016
Heavy oil	MWh	22,383	9,767

	Unit	2021	2022
External			
Electricity(purchased)	MWh	3,859,586*5	3,737,002
Renewable energy*3	MWh	229,754	275,807
Chilled water	MWh	3,598	3,929
Steam	MWh	114,506	125,761
Internal			
Electricity(in-house generation)	MWh	59,313	35,226
Renewable energy*4	MWh	59,313	35,226
Total renewable energy	MWh	289,067	311,033

\*1 Global CO<sub>2</sub> emissions per vehicle sold by dividing the total volume of CO<sub>2</sub> emissions produced through Nissan's corporate activities globally by the number of Nissan vehicles sold globally.

\*2 Please refer to the data book for the past 5-year historical trends. >>> P147

\*3 Volume of renewable energy in electricity purchased by Nissan.

\*4 Volume of renewable energy generated by Nissan at its facilities and consumed for its own purposes. \*Please refer to the data book for the past 5-year historical trends.

\*5 Due to an error in the disclosure of last fiscal year's figures, the figures for fiscal 2021 were revised.

★ This figure is subject to assurance by KPMG AZSA Sustainability Co., Ltd. For details, please see here. >>> P058

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## Carbon footprint of corporate activities

In fiscal 2022, the total of Scope 1 and 2 emissions of our global corporate activities was 2,096 thousand tons, a 6% decrease from 2,231 thousand tons in fiscal 2021.\*1

Total CO<sub>2</sub> emissions from manufacturing processes were 1,798 thousand tons ★ (Scope 1 emissions: 579 thousand tons ★; Scope 2 emissions: 1,219 thousand tons ★), a decrease from 1,944 thousand tons in fiscal 2021.

## Carbon footprint aligned with financial statements

Nissan has recognized the importance of disclosing carbon footprint in alignment with financial statement and have recalculated the scope.

- Previous scope: Nissan Motor Co., Ltd., consolidated subsidiaries, and part of its affiliates accounted for by the equity method
- New scope: Nissan Motor Co., Ltd. and consolidated subsidiaries

	Unit	2021	2022
Scope 1+2	kt-CO <sub>2</sub>	1,844	1,794

Reference: Data based on the conventional scope

	Unit	2021	2022
Scope 1	t-CO <sub>2</sub>	690,155*2	661,241
Scope 2	t-CO <sub>2</sub>	1,541,276	1,435,081
Scope 1 + 2	t-CO <sub>2</sub>	2,231,430*2	2,096,322
Japan	t-CO <sub>2</sub>	982,671*2	978,051
North America	t-CO <sub>2</sub>	507,584	526,414
Europe	t-CO <sub>2</sub>	112,157	105,974
Other	t-CO <sub>2</sub>	629,019	485,882
Scope 3	t-CO <sub>2</sub>	127,546,646*3	118,828,370

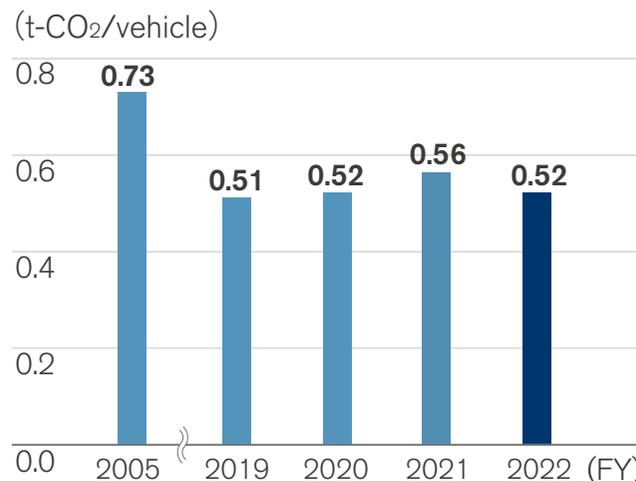
## Greenhouse gas (GHG) emissions other than energy-derived CO<sub>2</sub>\*4

By type	Unit	2021	2022
CH <sub>4</sub> (methane)	t-CO <sub>2</sub> e	5,088	5,054
N <sub>2</sub> O (nitrous oxide)	t-CO <sub>2</sub> e	1,244	1,071
HFCs (hydrofluorocarbons)	t-CO <sub>2</sub> e	1,320	1,878
PFCs (perfluorocarbons)	t-CO <sub>2</sub> e	0	0
SF <sub>6</sub> (sulfur hexafluoride)	t-CO <sub>2</sub> e	43	43
NF <sub>3</sub> (nitrogen trifluoride)	t-CO <sub>2</sub> e	1	0

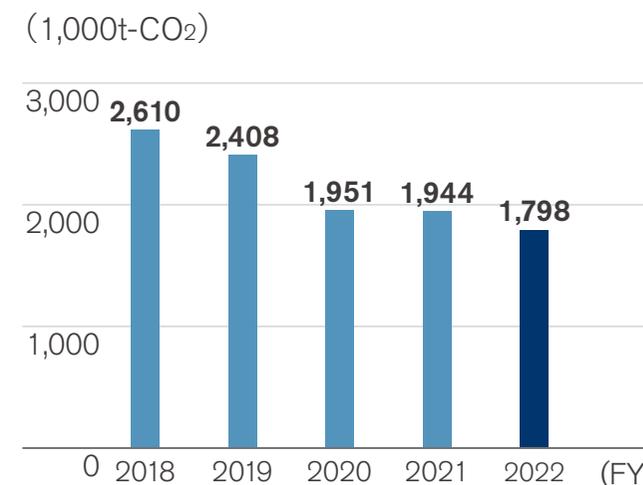
## Manufacturing activities

### Manufacturing CO<sub>2</sub> per vehicle produced

In fiscal 2022, our manufacturing CO<sub>2</sub> emissions per vehicle produced were 0.52 tons, 28.8% less than fiscal 2005.



## Carbon footprint of manufacturing activities



\*1 Please check the data book for the past 5-year historical trends. >>> P148

\*2 The values for fiscal 2021 have changed due to the disclosure of greenhouse gases other than CO<sub>2</sub> emissions from energy use as a separate item.

\*3 Among Scope 3 emissions, the values for fiscal 2021 have changed due to a modification in the calculation method for Category 1 and the determination of fuel efficiency values published by the government for Category 11.

\*4 GHG emissions from Nissan Motor Co., Ltd. domestic sites calculated based on the Act on Promotion of Global Warming Countermeasures.

★ This figure is subject to assurance by KPMG AZSA Sustainability Co., Ltd. For details, please see here. >>> P058

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## Carbon neutrality roadmap at production plants

Nissan is promoting activities aimed at achieving carbon neutrality at its plants, with the goal of achieving this by the 2050 life cycle. In October 2021, we announced a roadmap to achieve carbon neutrality in 2050 at our plants to steadily promote initiatives to achieve this goal.\*1

By 2030: We will first promote the introduction of innovative production technologies and electrification while reducing energy consumption in plants. We will then introduce renewable energy and expand the application of alternative energy sources.

2030-2050: Toward 2050, we will fully electrify plant equipment that operate under various forms of power, including gas and steam.

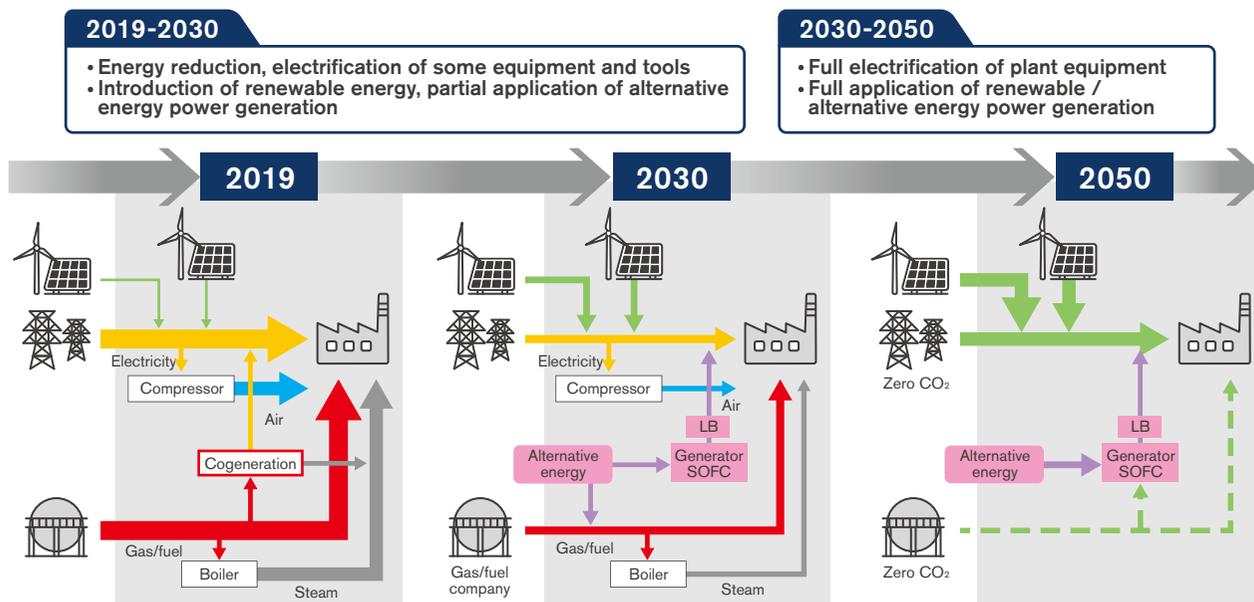
At the same time, we will achieve carbon neutrality at our plants by fully applying electricity generated in-house by fuel cells that use renewable energy and alternative fuels.

## Aiming to achieve carbon neutrality by 2050 through innovation in production technology

### Nissan Intelligent Factory, a next-generation vehicle manufacturing concept\*2

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.

Zero-emission production system, a pillar of the Nissan Intelligent Factory: We will promote activities based on the carbon neutrality roadmap at our production plants as we work to achieve carbon neutrality.



\*1 Click here for more information on our roadmap for carbon neutrality at production plants. <https://global.nissannews.com/en/releases/release-c252360e116720126985295f9d7480af-new-nissan-intelligent-factory-opens-in-tochigi>

\*2 Click here for more information on the Nissan Intelligent Factory. <https://www.nissan-global.com/EN/INNOVATION/TECHNOLOGY/ARCHIVE/NIF/>  
Click here for more information on a next-generation vehicle manufacturing concept. (Japanese only) <https://global.nissannews.com/ja-JP/releases/191128-02-j>

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## Key initiatives toward carbon neutrality by 2050 at production plants

### 1. Global energy-saving activities (adoption of new technologies, improved processes)

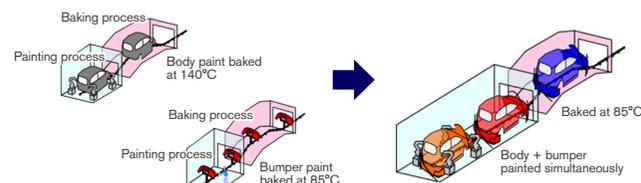
Most CO<sub>2</sub> emissions in the manufacturing process come from the consumption of energy generated by fossil fuels. We engage in a variety of energy-saving activities in the manufacturing process in pursuit of the lowest energy consumption and CO<sub>2</sub> emissions of any automaker.

#### Initiatives in automotive production technology

In the realm of automotive production technology, we are introducing highly efficient equipment and improving manufacturing techniques. Other key approaches are the three-wet paint process and low-temperature baking technology used for vehicle painting, which enables the body and bumpers to be painted at the same time. Approximately 30% of CO<sub>2</sub> emitted from manufacturing plants comes from the painting process, thus shortening or eliminating processes and lowering temperatures during the process will lead to a reduction in CO<sub>2</sub> emissions. The low-temperature three-wet painting technology introduced by Nissan enables the body and bumpers, which were previously painted separately, to be painted at the same time, reducing CO<sub>2</sub> emissions from the painting process by 25% or more.\*<sup>1</sup> Nissan has implemented this technology in the new production line at the Tochigi Plant in the Nissan Intelligent Factory (launched in 2021) and will gradually expand its

roll out as painting facilities become more sophisticated in the future. Also, 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. This technology was adopted for the dry paint booths at our Sunderland Plant in the U.K. (operating since September 2018).

#### Three-wet paint process (Combined primer and topcoat application)



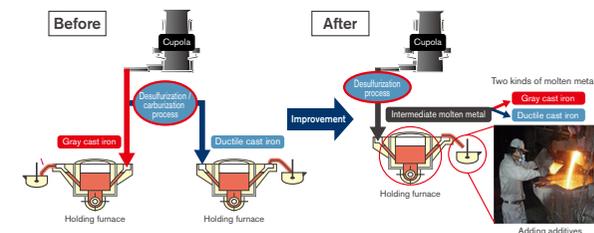
Simultaneous Painting of Body and Bumpers  
CO<sub>2</sub> emissions have been reduced by simultaneously painting the body and bumpers using a new technology and consolidating them into one process (right) and drying at a low temperature (85°C) instead of the conventional two-step process (left).



#### Initiatives in the field of powertrain production technology

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. Conventionally 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<sub>2</sub> 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 on site 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



\*1 Source: Nissan

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### Energy-saving activities at Nissan Energy Saving Collaboration (NESCO)

To reach our defined objectives for CO<sub>2</sub> emissions and energy use, we solicit facility proposals from each global site, preferentially allocating investment based on the potential CO<sub>2</sub> emission reduction compared to project costs.

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 consumption and low-energy-loss operations. We promote CO<sub>2</sub> 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)\*<sup>1</sup> 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<sub>2</sub> emissions of some 40,115 ton\*<sup>2</sup> in fiscal 2022, according to our calculations.

When sourcing energy, we consider the balance of CO<sub>2</sub> emissions for the entire company alongside renewable energy usage rate and cost, choosing suppliers best suited for achieving each goal.

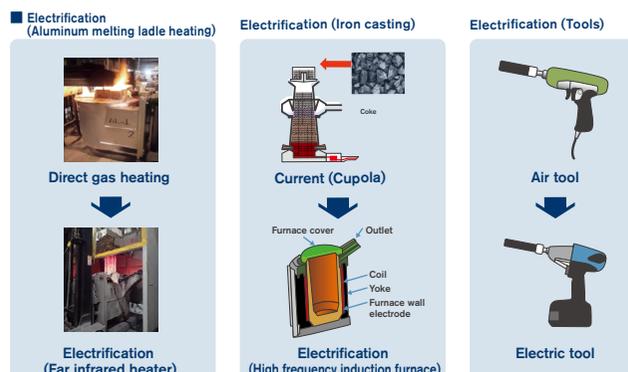
As a result of these activities, CO<sub>2</sub> emissions at production plants in fiscal 2022 amounted to 0.52 tons per vehicle, a reduction of 28.8% from the fiscal 20205 level.

### 2. Expanded electrification of production facilities

Electrification of fossil fuel facilities is indispensable to achieving carbon neutrality. We have therefore begun electrifying aluminum melting furnaces and gas heating equipment used for casting, while are also planning to convert various heat treatment furnaces and cupolas that use coke as fuel into electric furnaces.

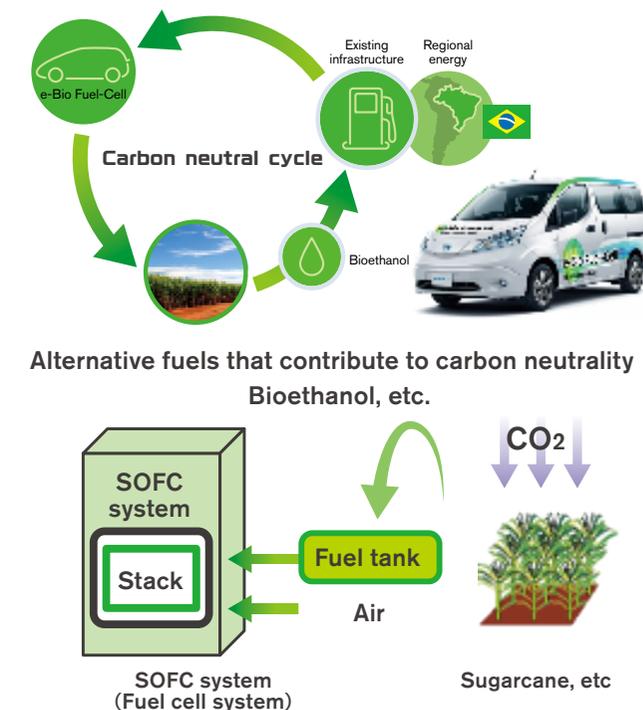
Electrification of compressed air, which has low energy efficiency, is also effective in reducing CO<sub>2</sub> emissions. For this reason, we are reducing our compressed air usage by converting air tools in the assembly process to electric tools and migrating from water removal by air blowing to vacuum drying in the machining process.

We will continue to expand production facility electrification in these and other ways.



### 3. In-house power generation using alternative fuels

We are developing SOFC\*<sup>1</sup> fuel cell systems, which are being developed as vehicle fuel cell systems, for energy storage system applications while also developing applications for the generated electricity at factories. The use of carbon neutral alternative fuels such as bioethanol in SOFCs is expected to contribute significantly to the carbon neutrality of plants.



\*1 Established in Japan in 2003, then in Europe, Mexico, and China in 2013

\*2 Source: Nissan

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#### 4. 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) promote the introduction of renewable energy through contracts with PPA\*1 providers. As an example of the first approach, our Sunderland Plant in the U.K. introduced 10 wind turbines supplying 6.6 MW of power. In fiscal 2022, an additional 20 MW of solar power generation capacity was installed, bringing the total amount of power generated by solar power generation to 25 MW. 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. Additional solar power capacity of 18MW was introduced at the Huadu Plant and of 3MW at the Changzhou Plant in 2022.

Regarding the second approach, Renault Nissan Automotive India Private Limited in India actively uses energy generated from wind power and biomass, achieving a renewable energy usage rate of 72% in 2022.

Under contract with a PPA operator, we installed and commenced operation of a solar power generation system on the roof of a parking lot at our India plant in October 2020, and 5.5 MW system at our Thailand plant in January 2022. Through these efforts, we are enhancing the renewable

energy usage rate at our production plants, which reached 11.9% in fiscal 2022.



5.5 MW of solar power generation at the Thailand Plant

\*1 Power Purchase Agreement

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**EV36Zero, an electric vehicle (EV) hub to achieve carbon neutrality**

Nissan is a pioneer in not only the development and production of EVs, but also in comprehensive efforts to utilize the onboard battery as a storage battery and for secondary use, with the aim of achieving carbon neutrality throughout the entire life cycle of a vehicle. In July 2021, we unveiled EV36Zero as the world's first hub to create an ecosystem for electric vehicle (EV) manufacturing in order to advance the next phase of the automotive industry together with our partners and achieve carbon neutrality in Europe.

- New-generation Nissan electric crossover to be manufactured at the Nissan Sunderland, U.K. Plant
- Envision AESC will build a new giga-factory with an annual production capacity of 9GWh adjacent to the Nissan Sunderland Plant
- Renewable energy 'Microgrid' to deliver 100% clean electricity for the Sunderland Plant
- 2nd life EV batteries used as energy storage for ultimate sustainability
- This comprehensive project represents 6,200 jobs at Nissan and at its U.K. suppliers

Centered around the plant in Sunderland, U.K., Nissan EV36Zero will supercharge the company's drive to carbon neutrality and establish a new 360-degree solution for zero-emission motoring. The transformational project has been launched with an initial £1 billion investment by Nissan and its partners Envision AESC and the Sunderland City Council. Comprised of three interconnected initiatives, Nissan EV36Zero brings together EVs, renewable energy and battery production, setting a blueprint for the future

of the automotive industry. The experience and know-how gained through the project will be shared globally, enhancing Nissan's global competitiveness. Nissan will continue to leverage its strengths in electrification to become a company that continues to provide value to its customers and society.



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### Initiatives in the logistics field

Nissan is optimizing the frequency of deliveries and transport routes, improving packaging specifications (load shapes), and engaging in cooperative transport with other companies to promote better loading ratios and realize efficient transportation requiring fewer trucks. From the new vehicle development stage, we make efforts to source components as close to our plants as possible to reduce transportation distances. In addition, we incorporate parts shapes that take transportation efficiency into consideration during parts design, thereby reducing the number of parts procured per vehicle, which in turn reduces transportation volume.

In response to social trends in workstyles, such as driver shortages and shorter working hours, we are constantly reviewing our logistics methods and proactively promoting a modal shift to rail and marine transport. In Japan, parts shipments between the Kanto and Kyushu areas are conducted by rail and ship to the maximum extent possible.

In the future, we will collaborate with carriers that are working on environmental measures and introduce ships powered by LNG to establish logistics with a lower environmental impact.

We are targeting a 12% reduction in CO<sub>2</sub> emissions by fiscal 2022 compared to fiscal 2005 levels, as measured by the index of CO<sub>2</sub> emissions per vehicle.\*<sup>1</sup> In fiscal 2022, CO<sub>2</sub> emissions per global vehicle were 0.25 tons, a reduction of 40.9%.

### CO<sub>2</sub> Emissions from Logistics

(FY)

	Unit	2021	2022
Total	t-CO <sub>2</sub>	874,936	771,102
Inbound* <sup>2</sup>	t-CO <sub>2</sub>	366,190	316,541
Outbound* <sup>3</sup>	t-CO <sub>2</sub>	508,746	454,561

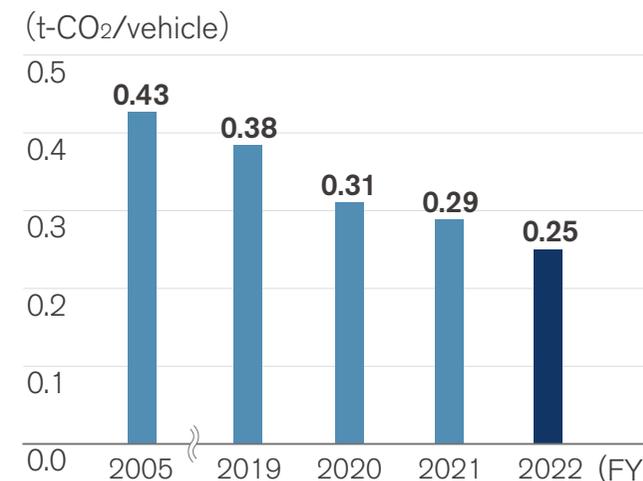
  

Sea	%	20.8	27.7
Road	%	65.6	57.8
Rail	%	7.1	7.1
Air	%	6.5	7.1

In fiscal 2022, CO<sub>2</sub> emissions from logistics were 771 k-tons, down approximately 12% from the previous fiscal year.

### CO<sub>2</sub> emissions per vehicle transported

In fiscal 2022, CO<sub>2</sub> emissions per vehicle transported were 0.25 tons.



\*1 Total CO<sub>2</sub> emissions from transportation of parts to our manufacturing bases in Japan, United States, Mexico, Europe, China, Thailand, and India, and transportation of vehicles from our manufacturing bases to dealerships, divided by the number of vehicles produced.

\*2 "Inbound" includes parts procurement from suppliers and transportation of knockdown parts.

\*3 "Outbound" includes transportation of complete vehicles and service parts. \* Please check the data book for the past 5-year historical trends. >>> [P150](#)

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## Office initiatives

Nissan promotes efforts to reduce CO<sub>2</sub> 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<sub>2</sub> emissions and costs have been taken into account through Japan's PPS system.

Nissan Energy Saving Collaboration (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 for environment go beyond just CO<sub>2</sub> management. Employees are encouraged to use online meeting tools as much as possible to reduce the number of business trips required worldwide, which also improves workplace efficiency and reduces the costs.

## Renewable energy introduction initiatives at Nissan global headquarters

At our Global Headquarters, we are promoting energy conservation activities through daily improvements that include turning off lights and installing LEDs, as well as reducing CO<sub>2</sub> emissions through the introduction of renewable energy.

In 2011, we installed a solar power generation system providing approximately 40kW and Nissan LEAF lithium-ion batteries. The electricity generated is stored in batteries housed in the Global Headquarters building, then used for electric vehicle charging systems installed onsite. Surplus power generated is effectively used as electricity for the building.

Using a FIT Non-Fossil Certificate with Tracking, approximately 7,000 MWh of electricity used annually at the Global Headquarters will be converted to 100% renewable energy, which is expected to reduce annual CO<sub>2</sub> emissions by approximately 40 tons.

## 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<sub>2</sub> 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).<sup>\*1</sup>

Among our current business facilities, our Global Headquarters in the city of Yokohama, Kanagawa Prefecture, 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, which is located in the same prefecture.

Our 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<sub>2</sub> emissions were evaluated highly, as were its methods of water recycling and its significant reduction in waste produced.

## Dealership initiatives

Nissan promotes efforts to reduce CO<sub>2</sub> emissions at dealerships. 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 April 2000, we introduced the "Nissan Green Shop" certification system, a proprietary environmental management system based on ISO 14001 certification, to promote energy conservation and other CO<sub>2</sub> reduction activities as one of our environmental initiatives. A set of standards has been established enabling CO<sub>2</sub> reduction activities to be conducted in accordance with a unified concept based on the Nissan Green Program (NGP), and specific measures such as reducing electricity consumption and switching to LED lighting have been incorporated into the activity plans of each company.

<sup>\*1</sup> Comprehensive Assessment System for Built Environment Efficiency.

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# Air quality

## Air quality policies and philosophy

Nissan approaches air quality by focusing on two points: greener exhaust emissions and providing a pleasant in-cabin environment to customers.

In this way, we will strive to consider ecosystems while pursuing mobility that provides more comfort and security to customers. According to the State of Global Air 2018 report issued by the U.S.-based Health Effects Institute (HEI), 95% of the world’s population currently live in regions where particulate matter smaller than 2.5 μm (PM2.5) exceeds the 10 μg/m3 basic level specified by World Health Organization (WHO) Air Quality Guidelines. Furthermore, the Organisation for Economic Co-operation and Development (OECD) predicts that the global population will exceed nine billion by 2050, with around 70% of people concentrated in cities, making air pollution in urban areas an even more pressing issue.

For an automaker, air pollution stands alongside climate change and congestion as an issue for cities in particular that must be remedied. Nissan is advancing its efforts to improve air quality with two approaches:

### 1. Promoting zero-emission vehicles

EVs such as the Nissan LEAF, which has cumulative global sales of 640,000 units (as of the end of March 2023), are an effective tool for reducing air pollution in urban areas. As a leader in this field, we are promoting zero-emission mobility and infrastructure construction in partnership with national and local governments, electric power companies, and other industries.

### 2. Enhancing internal combustion engines

We have proactively set voluntary standards and emission-reduction targets for internal combustion engines. With the ultimate goal of making automotive emissions as clean as the atmosphere itself, we have developed a wide range of technologies and achieved the results listed below through cleaner combustion technologies, catalysts for purifying emissions, and countermeasures against gas vapors from gasoline tanks.

- Sentra CA (released in the U.S. in January 2000): The world’s first gasoline-powered vehicle that satisfied all the exhaust gas requirements set by the California Air Resources Board to receive Partial Zero Emissions Vehicle (PZEV)\*1 certification.
- Bluebird Sylphy (released in Japan in August 2000): The first passenger vehicle made in Japan to achieve Ultra-Low Emission Vehicle (U-LEV)\*2 certification.

We will continue our efforts to ensure cleaner exhaust emissions from internal combustion engines, which remain the most commonly used in the automotive market.

## Improving in-cabin air quality

With circumstance of spreading advanced driver assistance systems and developing fully autonomous driving technologies, drivers are expected to spend more time in their vehicles, making it even more important for that space to be pleasant and safe.

Under NGP2022, we conducted research and development aimed at cleaner vehicle emissions, as well efforts to improve the cabin environment, including better air quality, to enhance comfort. As part of these efforts, starting with specification enhancements in April 2021 for the Nissan LEAF, several vehicle model interiors are equipped with materials providing verified\*3 antibacterial properties.

As part of our continued efforts concerning volatile organic compounds (VOCs)\*4 such as formaldehyde and toluene, Nissan is further reviewing and reducing materials for seats, door trim, floor carpet, and other parts as well as adhesives. We voluntarily set more stringent standards than those of the Japanese government and automotive industry body regulations, and have applied them to all new vehicles introduced to the market from July 2007 onward.

\*1 PZEV: Certification set by the California Air Resources Board

\*2 U-LEV: Vehicle that produces 75% less nitrogen oxide (NOx) and nonmethane hydrocarbon (NMHC) than the 2000 emission standards level in Japan.

\*3 Results were verified using specific bacteria and usage environments, and are not guaranteed to be effective against all bacteria.

\*4 VOCs: Organic chemicals that readily evaporate and become gaseous at normal temperature and pressure conditions.

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## Reduced emissions from production activities

Nitrogen oxide (NOx), sulfur oxide (SOx), and VOCs are recognized as common forms of emissions created by vehicle manufacturing facilities. We are taking firm measures to ensure that management standards and systems for atmospheric emissions are thoroughly followed; and working to reduce both VOC exhaust volumes and the use of VOC-emitting substances to levels lower than required by national regulations.

### Air quality: Achievements

#### Compliance with Air quality emissions regulations (Passenger cars only)

Nissan not only works to develop and promote zero-emission EVs but continues to promote cleaner exhaust emissions from all of our engines. For example, the Qashqai released in Europe in October 2018 has a new fuel-efficient 1.3-liter turbo gasoline engine fitted with a particulate filter that meets the Euro 6d-Temp\*1 emissions standard. In Japan, our product with electrification technology, e-POWER has achieved 75% reductions in exhaust emissions from 2018 standards and improved fuel economy at the same. As part of these efforts, our compliance with air quality emissions regulations goes far beyond current legal requirements to meet more stringent specifications. The following table shows the percentage of Nissan vehicles in each location produced to the strictest local standards.

#### Compliance with Exhaust emissions regulations (By region) \*2

Country	Standard	unit	2022 (FY)
Japan	50% lower than 2018 standard	%	90.2
Europe	Euro 6d	%	100
U.S.	U-LEV / SULEV / ZEV	%	100
China	National 6	%	100

#### Plant emission management

We thoroughly implement systems and control standards at our production plants to reduce the amount of air pollutants emitted during operation. Our air pollution control targets are more stringent than those mandated by the countries in which we operate.

In Japan, we have promoted strict countermeasures for emissions of NOx and SOx as air pollutants. We have lowered NOx and SOx emissions by introducing low-NOx burners in the ovens and boilers that provide heat for painting lines, and by switching the fuel used by those burners from heavy oil and kerosene to alternatives with low SOx emissions.

From a carbon-neutral perspective, facilities that use fuel will be increasingly electrified. As a result, emissions from production plants are expected to be further reduced. We will continue to implement appropriate management on an ongoing basis.

## Reduced VOC from production processes

Volatile organic compounds (VOCs)\*3, which readily evaporate to become gaseous in the atmosphere, account for approximately 90% of the chemicals generated as the result of our vehicle production processes. Lowering VOC emissions is a challenge that we are working to address. We strive to increase our recovery of cleaning solvents and other chemicals in order to limit the amounts of these substances emitted from our plants ahead of implementation of new regulations in each country where we operate, while also advancing planned measures to increase the recycling rate for waste solvents. We are also introducing water-based paint lines that limit VOC emissions to less than 20 grams per square meter of painted surface. We have adopted these lines in the Nissan Motor Kyushu Plant as well as at two plants in Aguascalientes in Mexico, the Resende Plant in Brazil, the Smyrna Plant in the U.S., the Huadu Plant in China, and the Sunderland Plant in the U.K. We achieved a reduction of 35.8% in fiscal 2022 in VOC emissions per painted surface area compared with fiscal 2010 levels.

\*1 Euro 6d-Temp: All Euro 6 standards and the initial Real-Driving Emissions (RDE) limit for new car models.

\*2 Passenger cars only.

\*3 VOCs: Organic chemicals that readily evaporate and become gaseous at normal temperature and pressure conditions. Click here for more information on air quality. [>>> P152](#)

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# Resource dependency

## Resource dependency policies and philosophy

With the aim of maximizing the value of resources, Nissan has been targeting green growth while raising the efficiency of resource use to the ultimate level and using more renewable resources and recycled materials.

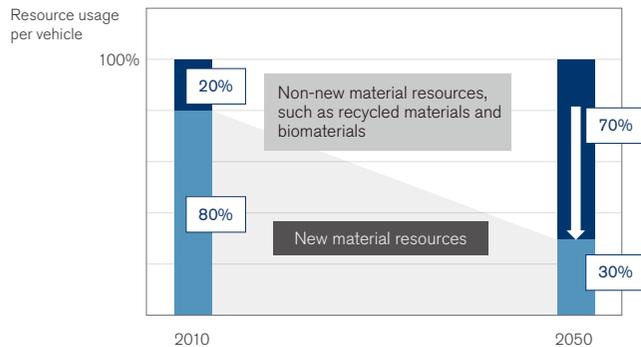
In working toward the long-term vision of using materials that do not rely on newly mined resources for 70% of the materials used in each vehicle in 2050, we will strive to minimize the use of natural resources and maintain new resource usage at 2010 levels.

## Resource dependency management

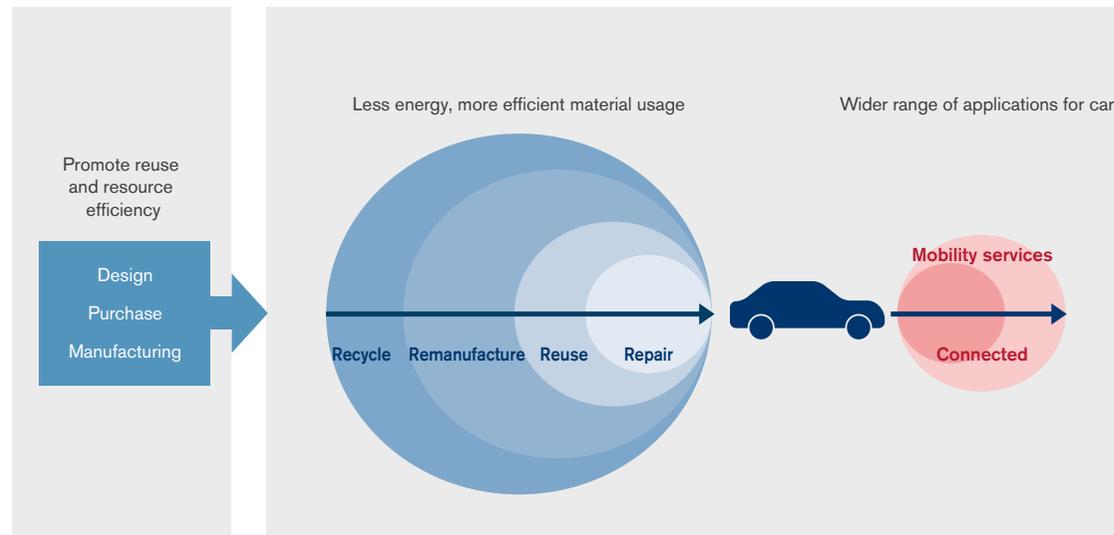
In order to use the earth's precious and limited resources efficiently, we have focused our efforts on the closed-loop recycling of steel, aluminum, and plastic —three kinds of material which account for a large proportion of vehicle content yet also have a major impact on the environment. As part of the Nissan Green Program 2022 (NGP2022), Nissan is developing systems for using resources efficiently and sustainably across their entire life cycle and has adopted the concept of the "Circular Economy" to maximize the value it provides to customers and society. In an attempt to use resources efficiently with less energy, we will promote the use of recycled materials and recycling end-of-life vehicles, while striving to incorporate reusable resources in our

activities at the design, purchasing, and manufacturing stages. We are using fewer resources overall, both through appropriate use of chemical substances and by making vehicles lighter. We will continue to promote the efficient use of resources with further reduced energy requirements and the expanded use of repaired and rebuilt parts for customers' repairs as well as the secondary use of EV batteries in the vehicle use stage, and foster the development of biomaterials and dieless forming technology for practical use. Another focus is to increase the value cars manufactured in this way provide to society and ensure that cars can be put to best use by promoting electrification and autonomous drive in our products, pursuing connectivity and providing mobility services such as ride sharing.

## Long-term vision for reducing resource dependency



## Nissan's circular economy concept



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## Resource dependency: Achievements

### Reducing dependence on newly extracted resources to 70% by 2022

Nissan has implemented a policy of minimizing the use of newly extracted natural resources and maximizing the use of recyclable materials from the early development stage while also making structural improvements to facilitate recycling. We are also reducing the use of resources in the manufacturing process and making more efficient use of resources.

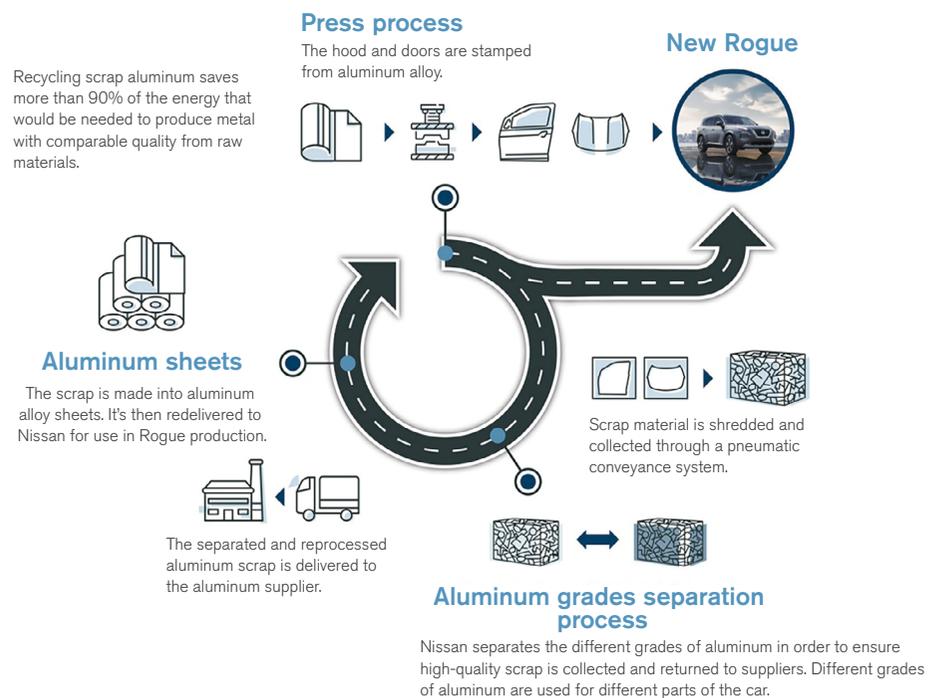
In NGP2022, our goal was to cut the use of newly extracted resources to 70% per vehicle in fiscal 2022. We intended to increase the use of recycled materials in our vehicles on a global scale, including Japan, Europe, and North America, in cooperation with our suppliers.

### Initiatives to expand use of recycled materials (Ferrous and nonferrous metals)

In fiscal 2022, ferrous metals accounted for 61% of the materials used in our automobiles by weight. Nonferrous metals made up another 15% and resins 13%, with miscellaneous materials making up the final 11%. To further reduce our use of natural resources, we are advancing initiatives to expand the use of recycled materials in each of these categories.

We are taking steps to reduce the steel and aluminum scrap left over in the manufacturing process, and working globally with business partners to collect and reuse this scrap as material for new vehicles through closed-loop recycling initiatives.

Currently, at Nissan Motor Kyushu and plants in North America and Europe, where X-Trail, Rogue and Qashqai are manufactured, we are collaborating with aluminum manufacturers to adopt a closed-loop recycling process that recycles aluminum scraps generated during manufacturing into aluminum alloy sheets for automobiles. The sorting and collecting of scrap in this process control impurities, realizing horizontal recycling without quality deterioration, which contributes to reductions in the amount of newly mined resources (aluminum ingots) used.



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## Initiatives to expand use of recycled materials (Resins)

In addition to our initiatives to expand the use of recycled steel and aluminum, Nissan also strives to use more recycled resins.

As a closed-loop recycling initiative, we are collecting finished bumper scrap generated at our plants and sending it to our Oppama Plant, where we process it by removing the paint film and recycling it. These recycled resins have been given new life as bumpers in the Nissan LEAF and many other new vehicles. This initiative was expanded to Dongfeng Motor Co. (DFL), our joint venture in China, where they have been used to produce replacement bumpers since 2014. Additionally, exchanged bumpers collected from dealerships are being recycled as materials used in under covers and for other components.

We collected and recycled approximately 87,000 bumpers in fiscal 2022, representing 57% of bumpers removed at Japanese dealerships. Furthermore, 30% of the automotive shredder residue (ASR) processed at dedicated processing plants is made from resins. In order to use these resins in automobiles, we are running a number of R&D projects on topics such as optimizing the recycling process for resins recovered from ASR, and conversion of auto waste plastic into oil. \*1

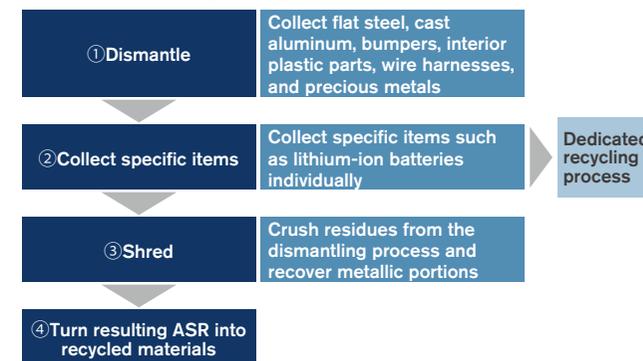


Research on optimization of ASR recovered resin recycling process. Left photo is ASR and right photo is resin recovered from ASR.

## End-of-life vehicle recycling

Nissan considers the three Rs —reduce, reuse, and recycle—from the design stage for new vehicles. Since fiscal 2005, all new models launched in the Japanese and European markets have achieved a 95% or greater recyclability rate.\*2 We have also joined forces with other automotive companies to promote the recycling of end-of-life vehicles (ELVs) through dismantling and shredding. Based on Japan’s End-of-Life Vehicle Recycling Law, Nissan has achieved at least 95% effective recycling rate of ELVs in Japan since fiscal 2005. In fiscal 2022, we achieved a final recovery ratio for ELVs of 99.5%\*3 in Japan, greatly exceeding the target effective recycling rate of 95% set by the Japanese government.

## ELV processing flow



Since 2004, Nissan and 12 other Japanese auto manufacturers have supported ASR recycling facilities, as called for in Japan’s End-of-Life Vehicle Recycling Law, as an integral part of a system to recycle ASR effectively, smoothly, and efficiently. Nissan is taking an important role in this joint undertaking.

We have also established a take-back system for ELVs in Europe. This network of Authorized Treatment Facilities was developed for individual countries in collaboration with contracted dismantlers, contracted service providers, and governments in alignment with a European ELV directive. Additionally, Japan Automobile Manufacturers Association, Inc. (JAMA) established a common scheme for recovering used lithium-ion batteries along with a system for processing these batteries appropriately, and put both into operation in fiscal 2018.

\*1 These R&D projects are undertaken as part of our recycling optimization support business using surplus money from recycling fees deposited for three specified components (refrigerant, airbags, ASR) based on Japan’s End-of-Life Vehicle Recycling Law. Click here for more information on the implementation of Nissan’s project to advance recycling (Japanese only). [https://www.nissan-global.com/JP/SUSTAINABILITY/ENVIRONMENT/A\\_RECYCLE/R\\_FEE/SAISHIGEN](https://www.nissan-global.com/JP/SUSTAINABILITY/ENVIRONMENT/A_RECYCLE/R_FEE/SAISHIGEN)

\*2 Calculated based on 1998 JAMA definition and calculation guidelines (in Japan) and ISO 22628 (in Europe).

\*3 Based on Nissan research

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### Developing biomaterials

Nissan is promoting technical research to replace plastics and other resin materials used in automobiles with biomaterials derived from plants. NGP2022 contained concrete goals for biomaterials development, and these materials are already being used in cars. For example, the coverings on the seats in the Nissan LEAF are made using biomaterials.

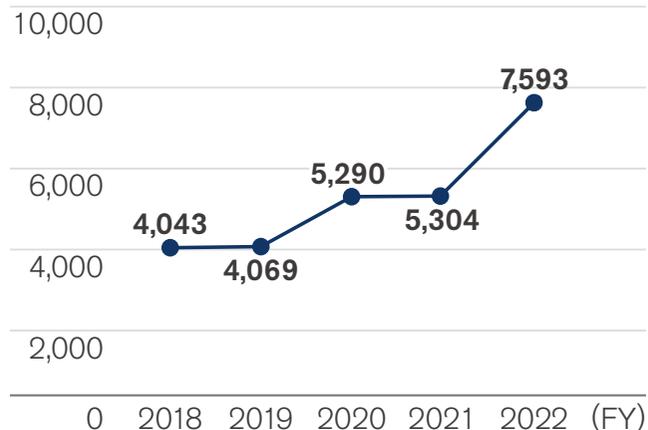


Seat coverings made from biomaterials in Nissan LEAF

### Proper use of regulated chemical substances

Nissan revised its standard for the assessment of hazards and risks in the Renault-Nissan Alliance, actively applying restrictions to substances not yet covered by regulations but increasingly subject to consideration around the world. As a result, the number of defined chemical substances covered in fiscal 2022 rose to 7,593. These steps are thought to be necessary for future efforts in the repair, reuse, remanufacture, and recycle loop for resources. \*1

#### Defined Chemical Substances (Substances)



### Expansion of remanufactured parts

Parts with the potential for recycling include those reclaimed from ELVs, as well as those replaced during repairs. In Japan, we collect and thoroughly check the quality of these secondhand parts. These parts are sold as Nissan Green Parts in two categories: remanufactured (recycled) parts, which are disassembled and have components replaced as needed, and reusable (used) parts \*2, which are cleaned and tested for quality.

In NGP2022, we enhanced the deployment of Nissan Green Parts in Japan, Europe and North America, aiming for twice the parts coverage in 2022 compared to 2016. This initiative provides customers who seek to use cars for a long period of time with the new option of using remanufactured parts.

#### Example of Nissan Green Parts in Japan



Alternator



Air conditioning compressor



Starter motor

\*1 Click here for more information on chemical substances governance. >>> P060

\*2 Not available at some retail outlets.

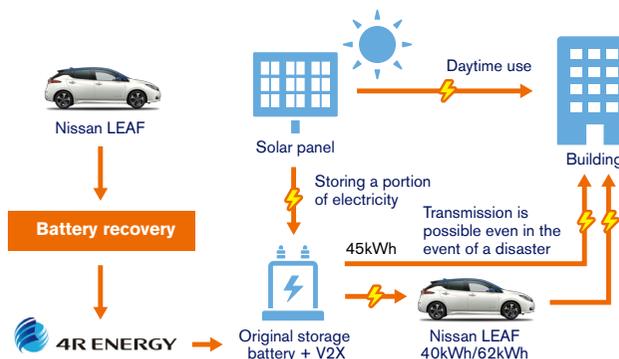
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## Promotion of 4R for second-life use for lithium batteries

Lithium-ion batteries used in Nissan’s EVs retain capacity well beyond the useful life of the vehicles themselves. The “4R” business models —which reuses, refabricates, resells, and recycles lithium-ion batteries —allows for their effective use as energy storage solutions in a range of applications, thus creating a much more efficient energy cycle of battery use.

4R Energy\*1 is actively engaged in the development and production of various battery storage systems built with used Nissan LEAF batteries at the Namie facility. One example of these efforts is the development of stationary power storage systems that reuse batteries used in the Nissan LEAF for the purpose of enhancing resiliency. Since September 2019, this reuse stationary power storage system (40 kWh) has been used in trials for procuring electricity using renewable energy at ten 7-Eleven convenience stores in Kanagawa Prefecture. Additionally, in conjunction with IKS Japan Co., Ltd., we are developing new models with Vehicle to Everything (V2X) functions that can also utilize electric power from EVs, sales of which launched in fiscal 2020 and are proceeding apace.

### Overview of proof of concept for procuring electricity through renewable energy

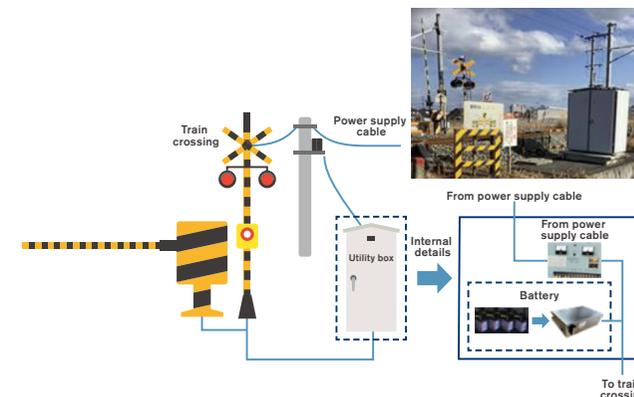


In addition, recycled lithium-ion storage batteries “EneHand Green (the trading name of 4R Energy)” were developed for East Japan Railway Company (JR East) as a power source for railroad crossing security equipment by reusing modules from the used 24kWh batteries recovered from the Nissan LEAF. The system features longer service life and lower operating costs compared to conventional lead-acid battery power supplies.

Field trials began in January 2021 on the Joban Line, followed by trial installations (5 units) at train crossings on the Joban and Mito Lines, and advanced installations (10 units) of the production version.

In fiscal 2022, the system was introduced at approximately 160 train crossings with high battery use and therefore high impact. The system will be used at more train crossings over time.

### Reused Nissan LEAF batteries be utilized at JR East train crossings



At the same time, 4R Energy acquired the world’s first UL1974\*2 certification in June 2019, which is an international evaluation standard for evaluating repurposing batteries and has been certified by a third-party organization for reuse and refabricating processes and product manufacturing with an emphasis on safety. Furthermore, in recognition of these activities, in October 2019 4R Energy was presented with the Frost & Sullivan\*3 “2019 Strategy Innovation and Leadership Award,” and in March 2020, in conjunction with Nissan, 4R Energy and Nissan won the “Sixth Annual Japan Resilience Award 2020,” sponsored by the Association for Resilience Japan.\*4

Further, in recognition of efforts to reduce CO<sub>2</sub> emissions, Nissan and 4R Energy received the “Minister

\*1 4R Energy Corporation was launched in 2010 as a joint venture between Nissan and Sumitomo Corporation in anticipation of the increasing need to utilize reusable lithium-ion batteries more effectively as the EV market expands. Given Nissan’s engagement in establishing EV battery reuse and refabrication technologies and the increasing number of used batteries collected, in March 2018, operations commenced at Japan’s first base and plant for the reuse and refabrication of used lithium-ion batteries, located in the town of Namie, Fukushima Prefecture.

\*2 The UL1974 Standard for Evaluation for Repurposing Batteries defines the process for determining and classifying the suitability of usage when battery packs, modules, or cells used to drive EVs have finished their intended period of use. Evaluating reused batteries in accordance with this process enables the provision of reused batteries that are safe and give a clear understanding of remaining capacity to meet a variety of demands.

\*3 Frost & Sullivan provides research and consulting services in 80 countries and over 300 major markets through a global network of more than 40 locations.

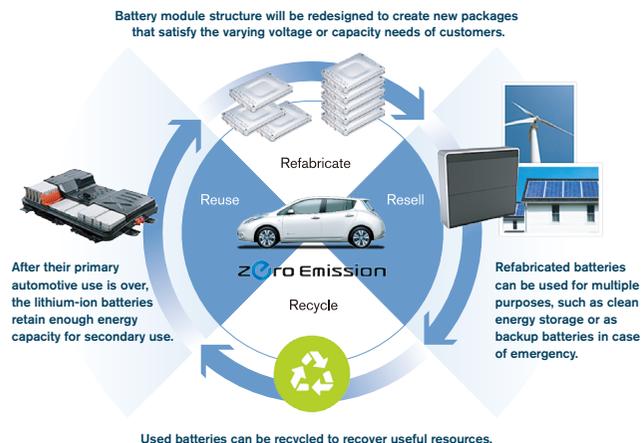
\*4 In light of the results of the National Resilience Minister’s Private Advisory Committee National Resilience Roundtable, to ensure the Fundamental Plan for National Resilience is executed smoothly, the council aims to build a resilient nation with cooperation among industry, academia, government, and the private sector.

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of the Environment Award in the Development and Commercialization Category, Mitigation and Adaptation Division” for “CO<sub>2</sub> reductions through the spread of electric vehicles and Japan electrification action ‘Blue Switch’ activities.”

We are extensively involved with 4R business model activities globally as well.

### Recycled resource circulation facilitated by the Nissan LEAF



### Reducing use of scarce resources

Permanent magnet motors for EVs, HEVs, and e-POWER use scarce resources called rare earth elements. Reducing their usage is important because rare earth elements are unevenly distributed around the globe, and the shifting balance of supply and demand leads to price fluctuations.

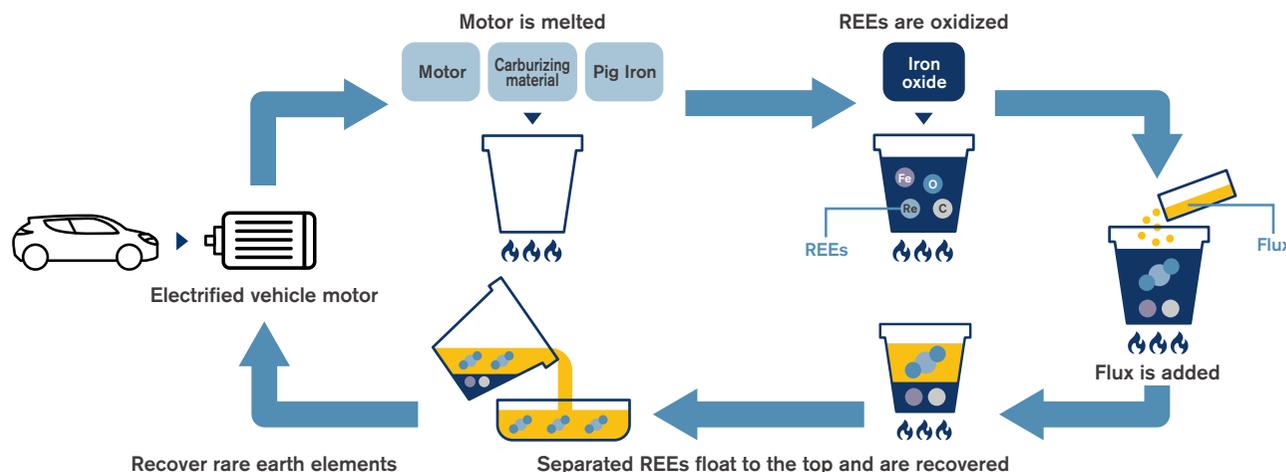
Nissan has continuously reduced the use of heavy rare earth elements, and in 2020, the Note e-POWER adopted magnets with 85% less heavy rare earth elements compared to 2010. Furthermore, the 2022 Nissan ARIYA uses an electrically excited synchronous motor without permanent magnets.

As a new initiative, Nissan is also promoting the development of rare earth metal recovery technologies from drive motor magnets. Up to now, in order to recycle magnets used in

motors, multiple processes including manual disassembly and removal of the magnets have been required, making economic efficiency an issue. Nissan and Waseda University collaborated to establish technologies for recovering rare earth metals in highly pure states through direct dissolution using borate as a flux, eliminating the need to dismantle the motor rotors. Currently, we are conducting trial testing using motors that did not meet our shipping standards in order to put them to practical use.

In these ways, with respect to motors, which are a key technology, Nissan is engaged in developments corresponding to the circular economy concept, from reducing the amount of rare earth metals used to reuse that utilizes resources efficiently and sustainably.

### Recycling process for rare-earth elements (REEs) used in electrified vehicle motors



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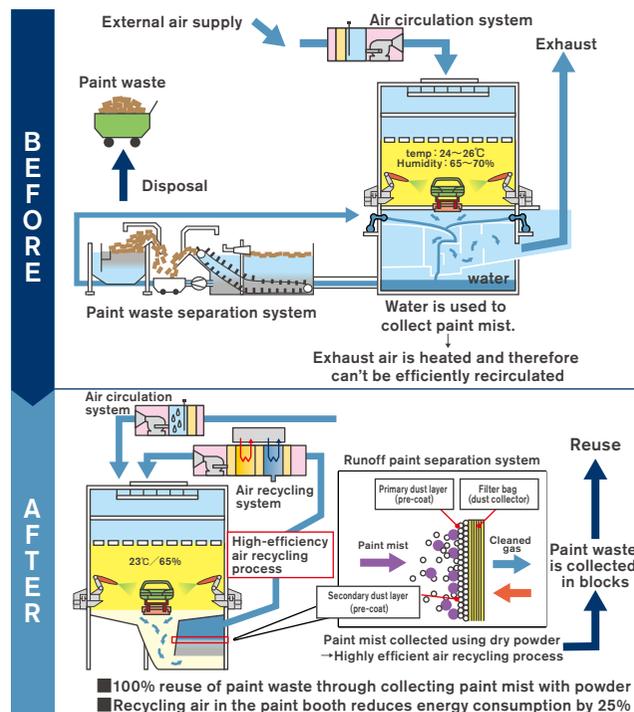
## Resource dependency: Achievements in waste reduction

### Thorough measures for waste materials

Nissan actively promotes measures based on the 3R (Reduce, Reuse, Recycle) approach in its production processes whenever possible, striving to minimize the waste generated and maximize recycling efficiency by thorough waste sorting. At the end of fiscal 2010, we achieved a 100% Recycling rate at all of our production sites in Japan, including five manufacturing plants, two operation centers, and five affiliates. Overseas, we have reached 100% Recycling rates at plants in Mexico, Brazil, and elsewhere. Under NGP2022, we undertook initiatives to reduce waste from our production factories by 2% annually in Japan and 1% annually worldwide as compared to business as usual (BAU\*1). As part of such efforts, we are reducing packaging materials used in import and export parts shipping, working with Renault to repeatedly use plastic and returnable containers\*2 for the distribution of parts between overseas bases. Furthermore, we have optimized parts shape at parts design stage which is called logistics simultaneous activities to reduce the volume of packaging materials used. We also contribute to waste reduction by selecting recyclable materials at the packaging material selection stage and are actively engaged in the development of recycling technologies for carbon fiber reinforced plastics (CFRP).

## Promoting recycling with dry paint booths

Recycling is also being promoted at the Nissan Intelligent Factory, which began operations in 2021. Conventionally, residual paint in the air during the painting process has been mixed with water and disposed of as waste. By employing dry booths that do not use any water, 100% of the paint mist is collected in the plant and recycled as a substitute for the auxiliary agent used to remove impurities in the iron casting process.



## Waste

Waste generated globally in fiscal 2022 amounted to 157,982 tons, same level as 158,199 tons in fiscal 2021. Waste generated globally from production sites in fiscal 2022 was 149,999 tons\*, same level as 150,945 tons in fiscal 2021.\*3

	Unit	2021	2022
Total	ton	158,199	157,982

By region			
Japan	ton	52,386	51,069
North America	ton	51,062	52,007
Europe	ton	33,895	36,577
Other	ton	20,857	18,329

By treatment method			
Waste for disposal	ton	7,208	8,688
Recycled	ton	150,991	149,293

\*1 Business As Usual

\*2 Returnable containers: Containers for packing parts that can be returned to the sender after parts delivery and used repeatedly. Nissan has adopted a folding structure in consideration of transportation efficiency at the time of return.

\*3 Click here for more information on Resource dependency (Facility waste). >>> P154

\* This figure is subject to assurance by KPMG AZSA Sustainability Co., Ltd. For details, please see here. >>> P058

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# Water scarcity

## Policies and philosophy for water resource management

Demand for water is expected to continue to increase globally, driven by rising populations and economic development. With rain patterns also changing due to extreme weather events, the stability of water supplies is likely to become a more pressing social concern with every passing year.

“Clean Water and Sanitation” is also one of the Sustainable Development Goals (SDGs) adopted by the United Nations in 2015. The 1.5°C Special Report\*<sup>1</sup> released by the Intergovernmental Panel on Climate Change (IPCC) in 2018 reported that risks and effects from extreme weather events, such as heavy rain and drought, would increase if temperatures rose by 1.5°C, and that such risks and effects would be even more severe and become widespread if temperatures rose by 2°C. Water resource management to mitigate water shortages, flooding, and many other challenges is a key factor in promoting sustainable development.

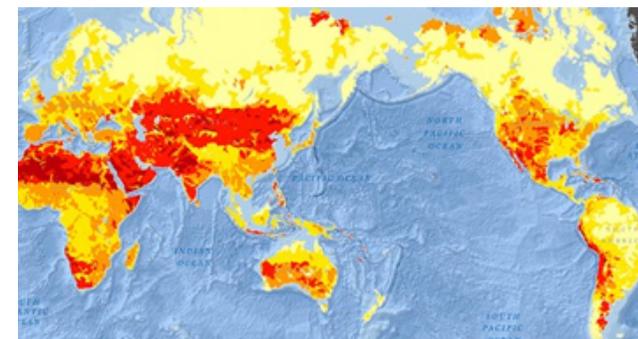
We believe that reducing dependence on water resources is important to being a sustainable company and are taking steps to improve water quality management and reduce water usage across our production sites.

## Water resource management

Nissan manages wastewater quality to even stricter standards than required by local regulations at its main production sites. At sites in Japan, we have further strengthened measures against water pollution by attaching water quality sensors to the discharge points of our wastewater treatment facilities to automatically suspend water discharge if water quality problems are detected. Processing recycled water using reverse osmosis (RO) membranes\*<sup>2</sup> has allowed some sites to achieve zero wastewater discharge.

Under the Nissan Green Program 2022 (NGP2022), by 2022 we aimed to reduce water usage per vehicle produced at global production sites by 21% compared to 2010. In order to achieve this, we took steps to reduce water usage, such as sharing best practices among plants, investing in equipment, and expanding the Nissan Energy Saving Collaboration (NESCO) team into “r NESCO” (r[esource] NESCO). Additionally, since the water resource situation varies considerably from region to region, we assess water risk using our own methods for each of our production sites throughout the world. At sites where a high level of risk is found, we effectively use rainwater and improve wastewater recycling rates in addition to prioritizing initiatives to reduce external water intake.

## Global water risks



Created based on the World Resources Institute's Aqueduct Water Risk Atlas (aqueduct.wri.org).

\*1 Full title: An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty.

\*2 Reverse osmosis (RO) membrane: A type of filtration membrane that filters impurities such as ions and salts from water.

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## Water resource achievements

### Reducing water used in corporate activities

Nissan strives to manage and reduce water usage at every plant. Water used per vehicle produced in fiscal 2022 was reduced by 8% from the 2010 level. We will continue our efforts to reduce water usage.

To reduce water usage, we built reservoirs to collect rainwater at the Chennai Plant in India and the second Aguascalientes Plant in Mexico, and installed wastewater recycling equipment at the Chennai Plant, the Huadu Plant in China, and the Oppama Plant in Japan. Our efforts at the Chennai Plant, in particular, were recognized as an excellent example of water resource management by the Confederation of Indian Industry (CII). At Nissan North America (NNA), plants are competing among themselves to

find new ideas for reducing water usage, such as by filtering wastewater from pre-painting processes and thus improving water quality.

We are also working to reduce water usage at Nissan's Global Headquarters in Yokohama, Japan, by processing rainwater and wastewater from kitchens and other internal sources to be reused for flushing toilets and watering some plants.



Chennai plant, honored by the CII.

### Examples of efforts to reduce water usage at manufacturing plants and offices in India

In India, where the handling of water resources has a significant impact on people's lives, our manufacturing plant has installed water treatment facilities using an RO membrane to reduce water consumption. After treating domestic wastewater, it is reused as cooling for the manufacturing process and cooling towers. As a result, we are able to reduce approximately 78,000 kiloliters of water consumption per year, which is equivalent to the amount of water used by about 320,000 households a day.

In addition, India is working to revitalize lakes and ponds around its plants with consideration of the use of water in the local community to be important. India completed revitalisation of Sitheri Lake in 2020 and committed to revitalise ten lakes and ponds, including Oragadam lake which is the primary source of water for six villages, in 2023. Dredging and increasing the capacity of lakes and ponds contributes to securing drinking water and sustains biodiversity.

Moreover, Nissan Motor India's service centers provide customers with car wash services using the latest foam car wash technology. This reduces the amount of water used by 45%, from approximately 160 liters to approximately 90 liters per car washed. As well as saving water, the foam car wash service reduces wash time as it does not use strong chemical detergents and improves a car's gloss by approximately 40%.



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## Water input for corporate activities

In fiscal 2022, water input for our global corporate activities was 20,208 thousand m<sup>3</sup>, same level as 20,090 thousand m<sup>3</sup> in fiscal 2021.

In fiscal 2022, water input from global production sites was 19,065 thousand m<sup>3</sup>★, the same level as 19,495 thousand m<sup>3</sup> in fiscal 2021.

(FY)

	Unit	2021	2022
Total	thousand m <sup>3</sup>	20,090	20,208

Japan	thousand m <sup>3</sup>	10,317	10,472
North America	thousand m <sup>3</sup>	4,047	4,235
Europe	thousand m <sup>3</sup>	1,404	1,270
Other	thousand m <sup>3</sup>	4,322	4,231

## Water discharge from corporate activities

Nissan thoroughly processes wastewater at its various plants. Wastewater from two Nissan plants in Aguascalientes, Mexico, is used to maintain landscaping on the sites, with no off-site discharge.

We also are strengthening water pollution prevention measures in our Japanese plants. In preparation for unexpected occurrences, such as the discharge of oil, we have attached water quality sensors to the discharge points of wastewater treatment facilities. Discharge of water outside the sites is automatically suspended if water quality problems are detected. In addition, we installed water quality sensors on rainwater drainage outlets which automatically close floodgates even for heavy rains. \*1

(FY)

	Unit	2021	2022
Total	thousand m <sup>3</sup>	13,620*1	13,219

Japan	thousand m <sup>3</sup>	8,771	8,902
North America	thousand m <sup>3</sup>	2,565	2,610
Europe	thousand m <sup>3</sup>	707*1	596
Other	thousand m <sup>3</sup>	1,577	1,110

Quality

Chemical oxygen demand (COD) Japan only	kg	19,941	24,884
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## Water consumption in corporate activities

The total amount of water consumed in global corporate activities in fiscal 2022 was 6,989 thousand m<sup>3</sup> \*2, an increase from 6,470 thousand m<sup>3</sup> \*1 in fiscal 2021.

(FY)

	Unit	2021	2022
Total	thousand m <sup>3</sup>	6,470*1	6,989

Japan	thousand m <sup>3</sup>	1,546	1,570
North America	thousand m <sup>3</sup>	1,481	1,625
Europe	thousand m <sup>3</sup>	697*1	674
Other	thousand m <sup>3</sup>	2,745	3,121

\*1 Due to an error in the calculation of last fiscal year's figures, the figures for fiscal 2021 were revised. ★ This figure is subject to assurance by KPMG AZSA Sustainability Co., Ltd. For details, please see here. >>> P058

\*2 Based on GRI 303, total water consumption is total water withdrawn minus total water discharged as calculated by Nissan.

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## Third-party assurance

### Independent Assurance Report

To the Representative Executive Officer, President and CEO of Nissan Motor Co., Ltd.

We were engaged by Nissan Motor Co., Ltd. (the "Company") to undertake a limited assurance engagement of the environmental performance indicators marked with a star ★ (the "Indicators") for the period from April 1, 2022 to March 31, 2023 included in its ESG data book 2023 (the "ESG data book") for the fiscal year ended March 31, 2023.

#### The Company's Responsibility

The Company is responsible for the preparation of the Indicators in accordance with its own reporting criteria (the "Company's reporting criteria"), as described in the ESG data book.

#### Our Responsibility

Our responsibility is to express a limited assurance conclusion on the Indicators based on the procedures we have performed. We conducted our engagement in accordance with the 'International Standard on Assurance Engagements (ISAE) 3000, Assurance Engagements other than Audits or Reviews of Historical Financial Information' and the 'ISAE 3410, Assurance Engagements on Greenhouse Gas Statements' issued by the International Auditing and Assurance Standards Board. The limited assurance engagement consisted of making inquiries, primarily of persons responsible for the preparation of information presented in the ESG data book, and applying analytical and other procedures, and the procedures performed vary in nature from, and are less in extent than for, a reasonable assurance engagement. The level of assurance provided is thus not as high as that provided by a reasonable assurance engagement. Our assurance procedures included:

- Interviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the ESG data book and reviewing the Company's reporting criteria.
- Inquiring about the design of the systems and methods used to collect and process the Indicators.
- Performing analytical procedures on the Indicators.
- Examining, on a test basis, evidence supporting the generation, aggregation and reporting of the Indicators in conformity with the Company's reporting criteria, and recalculating the Indicators.

- Visiting the Fuji Area of JATCO Ltd selected on the basis of a risk analysis.
- Evaluating the overall presentation of the Indicators.

#### Conclusion

Based on the procedures performed, as described above, nothing has come to our attention that causes us to believe that the Indicators in the ESG data book are not prepared, in all material respects, in accordance with the Company's reporting criteria as described in the ESG data book.

#### Our Independence and Quality Management

We have complied with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. In accordance with International Standard on Quality Management 1, we design, implement and operate a system of quality management including policies or procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

/s/ Kazuhiko Saito  
Kazuhiko Saito, Partner, Representative Director  
KPMG AZSA Sustainability Co., Ltd.  
Tokyo, Japan  
July 18, 2023

Notes to the Reader of Independent Assurance Report:

This is a copy of the Independent Assurance Report and the original copies are kept separately by the Company and KPMG AZSA Sustainability Co., Ltd.

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[Remarks] Basis of calculation for CO<sub>2</sub> emissions, waste generated and water input subject to third-party assurance

- CO<sub>2</sub> emissions from production sites: Calculated based on Nissan internal standards. The energy use data of each site is based on invoices from suppliers, which are multiplied by a CO<sub>2</sub> emissions coefficient publicly available for each production site.
- CO<sub>2</sub> emissions from purchased goods & services: Calculated by multiplying the amount of CO<sub>2</sub> emissions per vehicle by the annual global production volume in fiscal 2022, covering raw materials purchased in conjunction with automobile production.  
CO<sub>2</sub> emissions per vehicle are calculated by applying the Database on GHG Emission Factors (ver.3.0) for Carbon Footprint of Products Pilot Project to the amount of raw material input per typical vehicle as of 2010.
- CO<sub>2</sub> emissions from the use of sold products: Calculated using the average regional CO<sub>2</sub> emissions per vehicle multiplied by the regional estimated average lifecycle mileage and multiplied by fiscal 2022 sales volumes. The average CO<sub>2</sub> emissions for the use phase (including direct emissions only) per unit are calculated for each of our main regions (Japan, U.S., EU and China) and extrapolated from average emissions of these markets for other markets. Estimated average lifetime mileages are set based on published country-by-country market average lifetime mileage data.
- Scope 3 emissions figures are estimates subject to varying inherent uncertainties.
- Waste generated from production sites: Calculated based on Nissan internal standards. The discharged waste within production sites is based on data from truck scales at the sites or data reported by disposal contractors. However, materials recycled in-house, used in reproduction (reused by Nissan) or recycled (as salable, valuable materials) are not categorized as generated waste. In addition, non-steady and irregular generated waste, waste generated in canteens, waste from permanently stationed companies at the sites, waste generated by external vendors and waste from construction are excluded.
- Water input from production sites: Calculated based on Nissan internal standards. Water input is the water withdrawal amount according to billing meters or company meters installed on site. The water withdrawal amount includes drinking water (tap water), industrial-use water, underground water (spring/well water) and rainwater or the like.

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# Strengthening our business foundations to address environmental issues

## Environmental governance

### Enhancing environmental management based on ISO 14001

As of January 2011, the Nissan global headquarters and all other main Nissan facilities in Japan have acquired ISO 14001 certification for environmental management systems.

We have appointed an environmental management officer to oversee our environmental activities. The coordinated goals set by the environmental management officer for the Companywide management system are cascaded down to the employees working in all facilities in Japan through local offices.

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

To confirm that management is functioning properly with respect to environmental management, we periodically retain third-party organizations to conduct audits. Additionally, to strengthen compliance, we conduct internal audits with

respect to areas covered by third-party audits as well as all other environmental activities, prioritizing adherence to government reporting requirements and identifying risks. Nissan’s overseas production plants have also acquired ISO 14001 certification. Nissan’s policy is to establish environmental management systems in all regions where we operate in accordance with the same standards. \*1

### Nissan’s voluntary operational 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, Authorisation and Restriction of Chemicals (REACH) Regulation, which went into effect in June 2007, and Japan’s Act on the Evaluation of chemical substances and regulation of their manufacture. The Japan Automobile Manufacturers Association (JAMA) has launched a voluntary program to help minimize the potential release of formaldehyde, toluene, and other volatile organic compounds (VOCs)\*2 in vehicle cabins. This program utilizes the VOC guidance value established by the Ministry of Health, Labor and Welfare for specific substances in January 2002 to be met for all new models manufactured or sold by Nissan in Japan after April 2007. In accordance with the Ministry’s guidance value revision in January 2019, new guideline values have been met from new models released in 2022 or later.

Nissan is strengthening its management of environment-impacting substances, adhering to a planned schedule

for their reduction and advancing the use of alternative substances. In 2005, we 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, which restrict environment-impacting substances even more than the domestic laws of the countries where we operate, were rolled out globally.

Based on the above-referenced policies, Nissan developed a specific Nissan Engineering Standard (NES) for the Restricted Use of Substances, which identifies the chemical substances whose use is either prohibited or controlled. The NES is applied in material selection and also in the components and parts used in our 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 models\*3 (excluding OEM vehicles) launched globally since July 2007. To control VOC use in car interiors, Nissan adopted the voluntary targets of JAMA as our own standards for global operations, and we are reviewing and reducing the use of prohibited and controlled chemical substances in materials and adhesives for seats, door trim, floor carpet and other parts.

Every year, we revise the Restricted Use of Substances standards to reflect changes in international laws and regulations and to add new substances covered by our voluntary internal standards. For the 2017 revision, the

\*1 Click here for more information on our Environmental governance. >>> P018

\*2 VOC :Organic chemicals that readily evaporate and become gaseous at normal temperature and pressure conditions.

\*3 Excluding non-consolidated OEM plants

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members of the Renault-Nissan Alliance implemented shared standards based on a reassessment of select criteria for hazards and risks that enhance the level of compliance, strengthening alliance activities by anticipating regulations. We build and maintain communication and management systems throughout the supply chain. For example, we disclose information to users and submit REACH reports to the relevant authorities about the vehicles and parts produced in or exported to Europe from Japan and other countries (including some from the U.S.). We also comply with Classification, Labeling and Packaging of Substances and Mixtures regulations.

### Sanctions and government guidance at Nissan production facilities

During fiscal 2022, in relation to the environmental management system, none of Nissan’s production facilities received notifications or sanctions from the government regarding significant violations of environmental laws or regulations. However, there was one environmental incident (total nitrogen level in factory effluent exceeding the standard value) at a manufacturing site in Japan for which government guidance was received. The root cause was poor condition of the septic tanks, and we will prevent recurrence by reviewing septic tank maintenance and management methods and strengthening the monitoring system.

### Raising employee awareness

Nissan’s environmental activities are enabled by the knowledge, awareness, and competency of its employees. Based on ISO 14001 standards, we have conducted employee education rooted in the Nissan Green Program 2022 (NGP2022) regarding CO<sub>2</sub> emission reductions, energy, water consumption, and waste. In addition, education regarding environmental accident prevention and the

management of hazardous materials is provided every year to employees, including those from affiliated companies working in our production facilities. Training programs with quantitative evaluation are deployed to improve the skills and knowledge of each employee on how to reduce environmental impact in their activities. The content of these training programs is updated every year. In Japan, we have original educational curriculums to deepen their understanding of NGP2022 and environmental issues surrounding the auto industry through an orientation for new employees, seminars for middle managers and town hall meetings between managements and employees. Employees can stay up to date on our latest environmental attempts through features in the intranet, internal newsletters, and in-house video broadcasts. Overseas, we provide information and education to employees through the intranet, videos, events, and various other communication approaches suited to each region.

### Employee-initiated activities and evaluation system

In fiscal 2008, we added “environment” to the range of kaizen issues addressed by quality control (QC) circles. This offers opportunities for employees to think proactively and propose ideas to improve environmental aspects of our business. Managers encourage the active participation of employees by communicating how these activities of QC circles are linked to the achievement of our midterm business plan. The ideas proposed by employees are evaluated by managers and QC circle secretariats for their potential contribution to environmental improvement, among other factors, after which we may implement those with the highest potential. The knowledge and skills of the frontline employees on CO<sub>2</sub> emission reduction, energy management, water conservation, and waste and landfill reduction have been compiled in a best-practices manual and shared among

global facilities. We hold contests in some facilities during officially designated months in Japan to keep employees motivated about participating in environmental activities. These include the Energy Use Reduction Idea Contest in February (energy-efficiency month), the Water Usage Reduction Idea Contest in June (environment month), and the Waste Reduction Idea Contest in October (3R promotion month). We also use various methods to reward employees for their contributions to environmental improvement activities. These activities are included in the annual performance goals used at some Japanese and overseas locations. This system assesses employees’ achievement of goals, reflecting this in performance-related elements of employee 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” recognition from managers for excellent work or achievements.

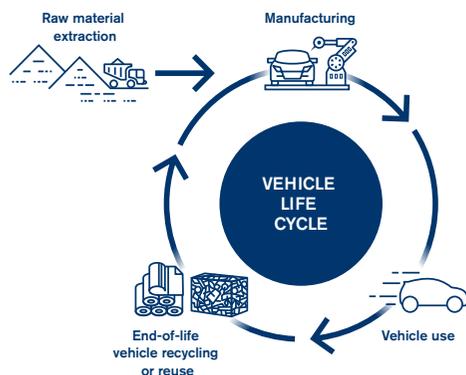
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## Lifecycle assessment to reduce environmental impact

Nissan conducts environmental risk management based on solid environmental policy by assignment personnel in each facility, validation by supervisors, and regular inspections. We also identify potential risks by conducting life cycle assessments (LCAs). The LCA method is used to quantitatively evaluate and comprehensively assess environmental impact, not just when vehicles are in use, but at all stages of their life cycle, from resource extraction, manufacturing, and transport to disposal.

Our LCA methods have been certified by the Japan Environmental Management Association for Industry since 2010 and since 2013 by third party TÜV Rheinland in Germany (renewed in November 2021). The latter certification is based on ISO 14040 / 14044 standards and validates the environmental impact calculations in our product LCAs.

In NGP2022, LCA was conducted for new vehicles and technologies based on this calculation procedure to further reduce the environmental impact over the vehicle life cycle by improving efficiency during both manufacture and operation of vehicles.

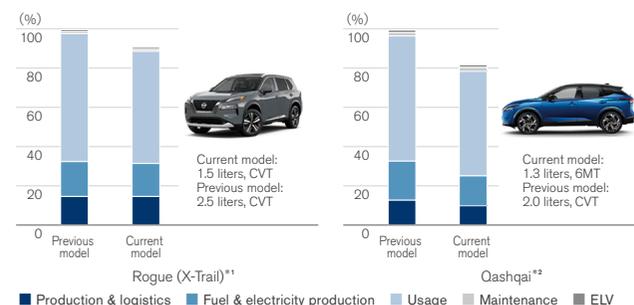


## Global top-selling model's LCA improvements

We have been expanding the application of the LCA method and enhancing the understanding of the environmental impact of our products in quantitative terms, especially our best-selling models worldwide. Coverage on a unit basis has reached approximately 80% of models globally and approximately 90% in Europe.

With the Rogue (X-trail) and Qashqai, for example, improvements in internal combustion engine efficiency and vehicle weight reduction have led to both enhanced safety features and lower CO<sub>2</sub> emissions.

### Lifecycle CO<sub>2</sub> equivalent emissions (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, etc.)



\*1 Production in the U.S., 120,000 miles driven in the U.S. (basis for comparison).  
 \*2 Production in EU, 150,000 km driven in EU (basis for comparison).

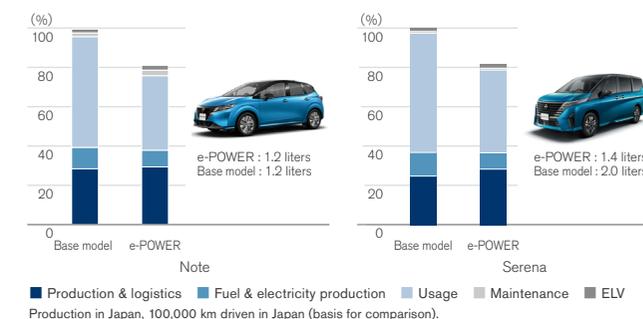
## LCA comparison for e-POWER models

Nissan introduced its new e-POWER powertrain in 2016, marking another significant milestone in the electrification strategy with life cycle emission improvements. For example, the Note e-POWER, Nissan Kicks e-POWER, X-Trail e-POWER, and Serena e-POWER have achieved 18% to 27% reductions in CO<sub>2</sub> emissions compared to their gasoline-powered counterpart models.

Electrified e-POWER vehicles use a system in which a gasoline engine operates only under certain circumstances and is used to generate electricity. As a result, e-POWER vehicles achieve lower exhaust emissions and better fuel efficiency for driving than conventional gasoline engines. Also, since an e-POWER vehicle only requires a small battery (unlike one that is 100% electric), emissions from the manufacture of dedicated EV parts such as batteries can be kept at a level only slightly above that for parts for conventional vehicles.

There is future potential for further reductions in CO<sub>2</sub> emissions through additional weight reductions and the optimization of "running energy management by e-POWER".

### Lifecycle CO<sub>2</sub> equivalent emissions (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, etc.)



Production in Japan, 100,000 km driven in Japan (basis for comparison).

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## LCA comparison of EV models

The Nissan LEAF reduces its lifecycle CO<sub>2</sub> emissions by approximately 32% compared to conventional vehicles of the same class in Japan. The Nissan ARIYA and Nissan Sakura launched in 2022, further improve EV product appeal

and reduce environmental impacts. Compared to Japanese gasoline-powered vehicles in the same class, the Nissan ARIYA and Nissan Sakura reduce lifecycle CO<sub>2</sub> emissions by 17-18%.

### Initiatives to reduce CO<sub>2</sub> emissions at each stage of the lifecycle

In Nissan ARIYA production at the Tochigi Plant, we have strengthened efforts to reduce CO<sub>2</sub> emissions at each stage of the lifecycle.

In the production stage, we contributed to the reduction of CO<sub>2</sub> equivalent emissions through ongoing efforts that include increasing the yield of materials and utilizing recycled raw materials. Through the Nissan Intelligent Factory method introduced at the Tochigi Plant in 2021, we are engaged in efforts to ensure all production plants are carbon neutral by promoting innovations that improve production efficiency during vehicle assembly, increasing the efficiency of energy and materials used in plants, electrifying plant equipment, and utilizing renewable energy sources.

To reduce environmental load in vehicle use, Nissan is continually reducing CO<sub>2</sub> emissions by improving efficiency of electric powertrains including battery, power savings on accessories and increasing renewable energy usage.

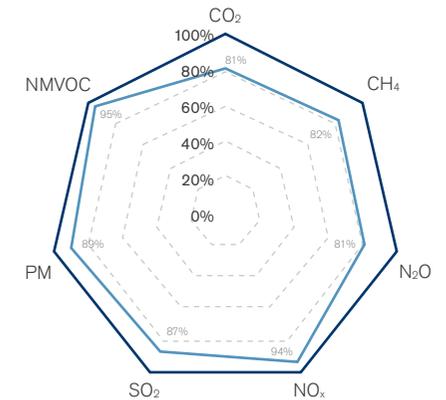
Nissan is also promoting vehicle battery reuse to help realize the decarbonization of society as a stationary battery for distributed power supply to store various renewable energies.

Nissan will keep reducing the environmental impact from the entire life cycle of electric vehicles.

## Lifecycle improvements beyond climate change

Nissan is expanding the scope of LCAs to include not just greenhouse gases but also a variety of chemicals. Our calculations show that, compared to conventional gasoline engines, the new Qashqai achieves reductions in emission 5-19% for all targeted chemical substances, and reduces environmental impacts throughout its life cycle.

Emissions improvement in the New Qashqai over its lifecycle



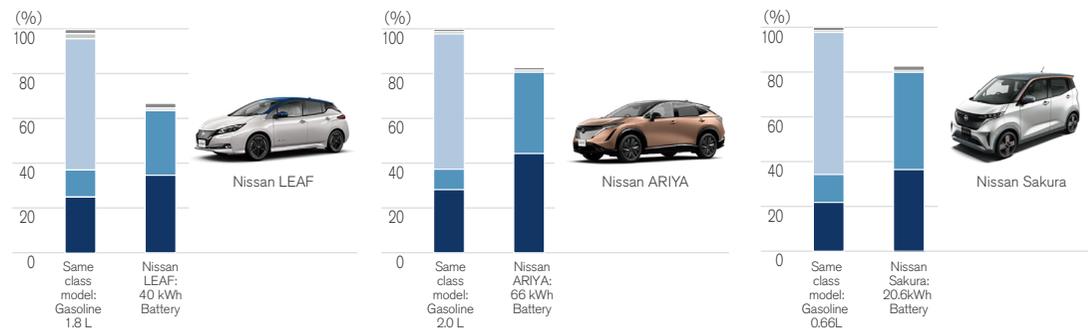
● Conventional  
● Mild Hybrid

Production in EU, 150,000 km driven in EU.

## Lifecycle CO<sub>2</sub> equivalent emissions (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, etc.)

■ Production & logistics  
■ Fuel & electricity production  
■ Usage  
■ Maintenance  
■ ELV

Production in Japan, 100,000 km driven in Japan (basis for comparison).



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## Stakeholder engagement

### Working with suppliers

As part of NGP2022, we are working to improve suppliers' environmental performance via the following initiatives.

#### Suppliers' environmental performance improvement initiatives

Nissan Green Purchasing Guidelines	
2008	Newly published Nissan Green Purchasing Guideline as globalized edition.
2010	Document edited according to the revised EU regulations for environment impacting substances (EU REACH regulation, MSDS report requests) Document edited according to the publication of the Renault-Nissan CSR Guidelines for Suppliers.
2011	Document edited according to the announcement of the NGP 2016.
2016	Unification of Engineering Standards of Renault and Nissan (RNESB-00027)
2018	Alignment with NGP2022
2019	Mandate self-diagnostic assessment requirement added
2021	Revise of corporate purpose, data submission for LCA, description of CDP survey
2022	Revision of CO <sub>2</sub> emission reduction through value chain, technical standard and regulation revision
Supplier environmental data surveys in global	
2012-13	Conducted Nissan's original survey (CO <sub>2</sub> , water, waste)
2014-	Participate in the CDP supply chain program (FY2022 response rate Climate change: 81%, Water security: 74%)
THANKS activities	
2009	Promoted joint improvement THANKS activities*1 with suppliers

### Working with consolidated production companies

We encourage our 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 companies in Japan were held to exchange views on cooperation toward the goals outlined in NGP2022 as well as to work toward to a deeper understanding of the details of NGP2022 and sharing of the environmental initiatives undertaken by each company.

### Working with dealerships

We believe that concern for the environment at our dealerships is essential to earning the trust and appreciation of our customers for Nissan's environmental activities. Our dealerships in Japan have introduced an original approach to environmental management based on ISO 14001 certification called the "Nissan Green Shop" certification system. This program is managed through internal audits conducted by the dealerships every six months, in addition to annual reviews and certification renewal audits carried out every three years by Nissan Motor Co., Ltd. (NML). As of the end of June 2023, the system has certified approximately 2,700 dealerships of 150 dealers, including parts dealers, as Nissan Green Shops. Certified dealers introduce and proactively communicate their environmental initiatives to customers.

\*1 THANKS is abbreviation of Trusty and Harmonious Alliance Network Kaizen activity with Suppliers. Click her for more information. >>> P099

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## Working with future generations

We are working to share information on environmental issues with the younger generation, and to raise awareness among tomorrow's leaders.

We have been conducting environmental programs for students in school visits in Japan since 2008 in which more than 123,000 students had participated as of March 2023. In NGP2022, we have expanded the program in Japan and in other countries.

### Key activities in NGP2022

Youth education programs, such as Nissan Waku-Waku Eco School, an interactive program delivered by Nissan employees to schoolchildren, have been expanded globally to:

- Share knowledge of global environmental issues
- Introduce our environmental initiatives, such as the Nissan LEAF EV and our other green technologies

Through environmental education, the program encourages participants to adopt eco-friendly activities in their daily lives.



## Working with NGOs

Nissan believes that environmental activities are critical in social contribution activities, thus we are engaged in various activities to realize a low carbon society, including implementing educational programs to deepen understanding of global environmental issues. At the same time, in order to respond to the increasing complexity of environmental issues, we believe that it is effective to collaborate with NGOs, NPOs, governments, and various other stakeholders to enhance these activities while making the most of our mutual strengths.

In contributing to local communities, Nissan aims to create a society that is cleaner, safer, and offers equal opportunities to all. NGP2022 sought to support local communities through various projects by collaborating globally with NGOs to respond to issues such as climate change and water scarcity.

### Key activities in NGP2022

- Fostering employees' environmental awareness through participation in World Wide Fund for Nature Japan (WWF Japan) campaigns
- Continue participation in WWF Japan's worldwide Earth Hour environmental awareness-raising campaign toward greenhouse gas emission reduction
- Support the "Walk in Her Shoes" campaign organized by Care International Japan to build awareness of water scarcity and human rights issues in developing countries, and promote employees to participate in the campaign.