

DENSO

Sustainability Bonds Report (USD-denominated Straight Bonds Due 2026)

June 2024
DENSO CORPORATION

DENSO is contributing to SDGs
through its corporate activities



1. DENSO Group Long-term Policy 2030

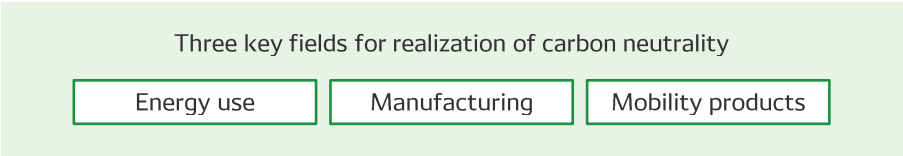
As pressing social issues emerge, such as global warming, aging societies and an increase in traffic accidents, DENSO has formulated the DENSO Group Long-term Policy 2030 and has been promoting activities to contribute to ensuring a society filled with smiling faces through the provision of new value inspired by the Company's initiatives, in addition to maximizing the values of "Green" and "Peace of Mind." DENSO will realize the Long-term Policy 2030 to respond to significant changes in the industrial structure and the business environment, with a view to further enhancing its corporate value.



Environmental Initiatives

Aiming to Achieve Carbon Neutrality by 2035

In pursuit of a sustainable society, DENSO has been promoting "environmental management" to reduce environmental impacts and create economic value through environmental protection activities. By further promoting the environmental initiatives DENSO has been engaged in so far, DENSO aims to realize carbon neutrality in our business activities by 2035.



Initiatives in Energy use

Entering the hydrogen business to solve energy issues ~ Trial Accelerates DENSO's Technological Developments to Achieve Carbon Neutrality by 2035 ~

In order to enter the hydrogen business by applying the heat management and material technologies DENSO has gained with automobiles, DENSO began testing the SOFC^{*1}, which generate electricity from hydrogen, and the SOEC^{*2}, which generate hydrogen from electricity, at our Nishio Plant and Hirose Plant in the fiscal year ended March 31, 2024. Through our future testing projects, DENSO will explore the efficiency of using green hydrogen energy without wasting it and the durability to safely use systems for long periods of time. DENSO will also take on the challenges of development that balances environmental factors and economic rationality.

*1 SOFC: Solid Oxide Fuel Cell

*2 SOEC: Solid Oxide Electrolysis Cell



SOEC testing facility

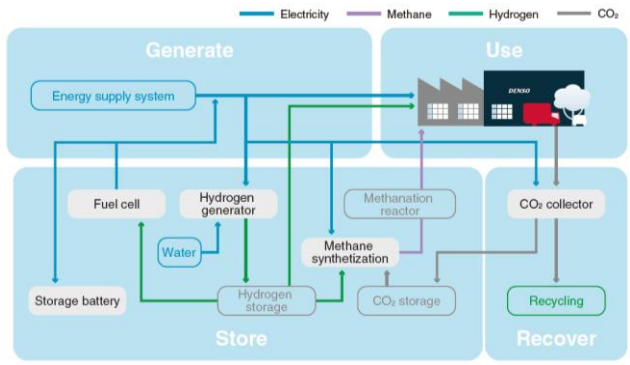
Initiatives in Monozukuri

DENSO intends to introduce the energy circulation system (case 1), factory-IoT (case 2), digitization (case 3) and energy-saving technologies to DENSO's plants worldwide with the aim of making all DENSO's plants carbon neutral.

Case
1

Energy Circulation System

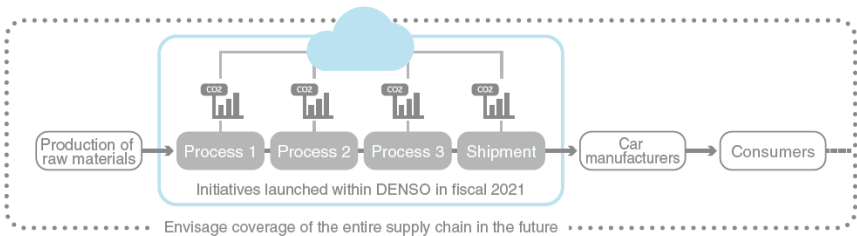
In order to achieve carbon neutrality in Monozukuri using renewable electricity, DENSO needs technology to “store” renewable electricity, which fluctuates depending on the weather and time of day, in the form of electricity, hydrogen, and fuel. DENSO also needs technology to “recover” CO₂, which is inevitably generated in the manufacturing process, as resources and energy that can be recycled and reused.



Case
2

Visualizing and Reducing CO₂ Emissions through Factory-IoT

Through “visualization” of CO₂ emissions, which involves measuring energy consumption in each manufacturing process, converting it using a unit equivalent to CO₂ emissions, and clarifying CO₂ emissions of each facility and process alongside production information, it will be possible to analyze the impact of equipment stoppages and quality losses on CO₂ emissions. Continuing to implement this cycle of analysis and improvement will enable DENSO to boost utilization rates and minimize energy loss.



Case
3

Widespread Digitization of Factories

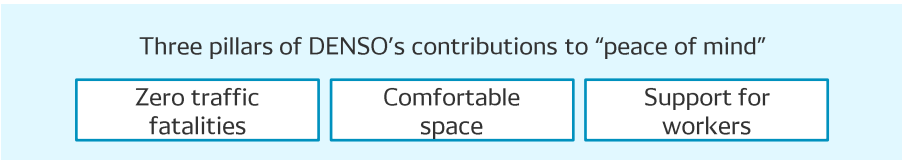
DENSO is promoting digitization of factories in a bid to save energy by reducing paper consumption, processes, travel time, and fuel. Factory digitization will contribute to the enhancement of operational efficiency and accuracy, as well as workstyle reforms.



Peace of Mind Initiatives

Aiming to Become a Leading Company that Provides “Peace of Mind” to Society

DENSO upholds providing peace of mind to society through our business activities as our mission. By contributing to the resolution of social issues, such as traffic accidents, air pollution, natural disasters, and aging populations, DENSO will promote initiatives to become a leading company that provides peace of mind to society.



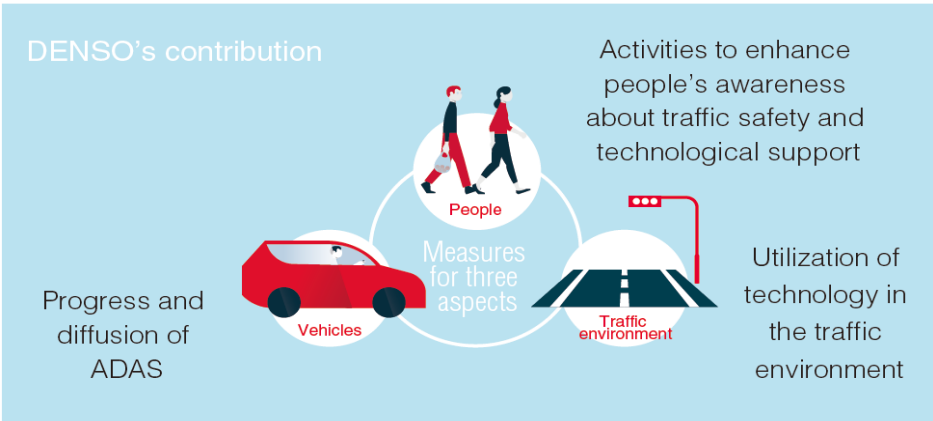
Initiatives to Eliminate Traffic Fatalities

In order to eliminate traffic fatalities, in addition to DENSO’s own initiatives, it is important to collaborate with all parties concerned, namely relevant government organizations, vehicle manufacturers and industries, so that measures are implemented for three aspects: people, vehicles, and the traffic environment. DENSO will contribute to initiatives to realize a society of zero traffic fatalities through technology.

DENSO’s Goals for Technological Progress and Diffusion







- Enhance advanced driver assistance systems (ADAS) to prevent/reduce all types of traffic accidents
- Develop technology to avert hazards through AI-based HMI* that predicts the risk of traffic accidents and prompts the driver to take appropriate action
- Expand and popularize the lineup of attractively priced ADAS products and retrofit products

*HMI: Human Machine Interface



2. Framework

DENSO has issued Sustainability Bonds to contribute to a sustainable society by providing new value in the fields of “Green” and “Peace of Mind” under the DENSO Group Long-term Policy 2030. DENSO will accelerate initiatives under the Long-term Policy by using net proceeds of Sustainability Bonds for projects with a positive environmental impact and social benefits. The details of DENSO’s Green Social and Sustainability Bond Framework are as below.

	Electrification	“Monozukuri” (Manufacturing)	Advanced Safety and Automated Driving
	Eligible Green Project = “Green”		Eligible Social Project = “Peace of Mind”
Objectives of the project, target and benefit	Electrification of mobility products that contribute to minimizing environmental impact of mobility by electrification of vehicles <ul style="list-style-type: none"> • Achieve sales of one trillion yen in electrification by 2025 	Carbon Neutrality in Manufacturing <ul style="list-style-type: none"> • Achieve carbon neutrality for electricity (use credits for gas) by 2025 • Achieve full carbon neutrality for manufacturing by 2035 	Pursue the goal to create a safe mobility society without traffic accident <ul style="list-style-type: none"> • All around in-vehicle sensors, strengthening map functions and V2X (vehicle technology to communicate with infrastructure or between vehicles) and DSM (Driver Status Monitor) • Achieve ADAS Sales 500 billion yen by 2025
Use of proceeds	Finance, in whole or in part, new or existing electrification businesses, research and development and capital expenditure <ul style="list-style-type: none"> • Research and Development: Technology development that contributes to improving performance such as energy efficiency and electric mileage of vehicle with Inverters, Motor Generators, Battery ECUs, etc., which are essential for driving system of electric vehicles • Capital expenditure: CAPEX to expand the production of the core products described above 	Finance, in whole or in part, new projects in “Monozukuri (Manufacturing)” <ul style="list-style-type: none"> • Introduction of renewable energy such as solar power generation facilities • Expenditures related to the purchase of renewable energy power etc.(including expenditures of the purchase of renewable energy through PPA / Renewable Energy Certificate) 	Finance, in whole or in part, new or existing Advanced Safety and Automated Driving business <ul style="list-style-type: none"> • Scope of Business: Electronic systems, services, and platforms relating to mobility, including but not limited to millimeter wave radar, image sensors, driver status monitors, airbag systems, and other areas • Research and Development: Technologies to improve the performance of millimeter wave radar and image sensors, both of which are the core products of Advanced Safety and Automated Driving • Capital expenditure: CAPEX to expand the production of the core products described above
Promoted Sustainable Development Goals (SDGs)	<div>       </div>		

3. Allocation Report

DENSO has committed to disclosing Allocation Reports on an annual basis until the net proceeds of any Green, Social, and Sustainability Bond issuances are fully allocated to projects meeting relevant eligibility criteria.

Allocation of net proceeds, and projects to which the net proceeds have been allocated, as of March 31 2024 are as below.

	Electrification	"Monozukuri (Manufacturing)"	Advanced Safety and Automated Driving
	Eligible Green Project		Eligible Social Project
Issued amount	500 million dollars		
Allocation			
Allocated amount	241 million dollars September 2021 ~ March 2022 74 April 2022 ~ March 2023 167	34 million dollars September 2021 ~ March 2022 3 April 2022 ~ March 2023 31	225 million dollars September 2021 ~ March 2022 173 April 2022 ~ March 2023 52
Allocated percentage	55%		45%
Unallocated amount	0 million dollars		
Case studies of eligible projects to which proceeds have been allocated	<ul style="list-style-type: none"> Technology development that contributes to improving energy efficiency and electric mileage of battery electric vehicles (BEVs), fuel cell electric vehicles (FCEVs) and air mobility (e-VTOL), such as specially designed inverters, motor generators, battery ECUs, and thermal management systems CAPEX to expand the production of the core products described above 	<ul style="list-style-type: none"> Purchase of renewable energy Expenditures related to the installation of photovoltaic equipment (e.g. in Asia) for the realization of carbon-neutral factories 	<ul style="list-style-type: none"> Technology development to improve the performance of millimeter wave radars and image sensors (such as increasing detection range, widening field of view, etc.), both of which are core products of Advanced Safety and Automated Driving CAPEX to expand the production of the core products described above

- The proceeds were allocated for research and development and capital expenditures commenced after the issuance of the bonds.
- DENSO has expanded the geographic scope of eligible projects. While the framework stated that the project location was Japan, DENSO has allocated the proceeds to the eligible projects in other regions (mainly in North America, Europe, China and Asia/Oceania) as well as in Japan, in light of the development of the projects.

4. Impact Report

DENSO has committed to disclosing the following performance indicators related to eligible projects until the applicable Sustainability Bonds are redeemed, subject to data availability and confidentiality.

The below information is output/impact indicators as at March 31, 2024.

<div>Electrification</div> <div>Objective and benefits: Contribute to the electrification sector by offering systems/products</div>	Eligible Green Project	<div>Percentage of sales increase from the year before the issuance of the bonds (from FY2020) +864.2%</div> <div>Percentage of sales increase in FY2023 +172.0%</div>
<div>Monozukuri</div> <div>Objective and benefits: Reduction of CO2 emissions by introducing renewable energy and green energy</div>	Eligible Green Project	<div>Reduction in CO2 emissions from the issuance of the bonds (from the second half of FY2021) 255,029 t-CO₂</div> <div>Reduction in CO2 emissions in FY2023 18,782 t-CO₂</div>

4. Impact Report

Advanced Safety and Automated Driving

Eligible Social Project

Objective and benefits:

Realize Safe Mobility Society without Accidents

- Develop products to cover all types of accidents
- Expand sales of core products and variation of retrofit products

Percentage of sales increase from the year before the issuance of the bonds (from FY2020)

+45.3%

Percentage of sales increase in FY2023

+18.0%

Status of Implementation of Safety Features Necessary for Advanced Safety and Automated Driving

Safety Technology System	Targeted Safety Feature	Types of Accidents	Achieved as of Sep 2021	Achieved as of Mar 2024
Autonomous emergency braking	Car-to-car	Rear-end collision	●	●
		Reversing	●	●
		Intersection (left turn across path/opposite direction, straight crossing path)		●
		Head-on collision		●
		Lane change (blind spot assistance)	●	●
	Car-to-pedestrian	Rear-end collision/crossing	●	●
		Intersection (crossing after turning)		●
		Reversing		●
	Car-to-bicycle	Rear-end collision/crossing	●	●
		Intersection (crossing after turning)		●
		Reversing		
	Car-to-motorcycle	Rear-end collision		●
		Reversing		
		Intersection (left turn across path/opposite direction, straight crossing path)		●
		Head-on collision		●
		Lane change (blind spot assistance)	●	●
Clash avoidance (low speed)	Vehicle/obstacles, etc.	Pedal error	●	●
Driver assistance/ automated driving (highway)	Vehicle/lane		●	●
	Road curvature			●
Driver assistance/ automated driving (general road)	Vehicle/lane/pedestrian			●
	Virtual lane guidance (map utilization)			
	Traffic signal			●
	Road sign (speed limit, etc.)		●	●
Parking assist system	Parking assist		●	●
Driver monitoring	Face direction/drowsiness		●	●

This chart on safety features pertain to automobiles; DENSO is contributing to equipping vehicles with these safety features.

Initiatives in This Fiscal Year

Initiatives for the Expansion of Electrification Businesses

DENSO and USJC Announce Mass Production Shipment of Automotive IGBT, Targeting Expanding Electric Vehicle Market

DENSO and United Semiconductor Japan Co., Ltd. ("USJC"), a subsidiary of global semiconductor foundry United Microelectronics Corporation ("UMC"), announced a joint collaboration to produce insulated gate bipolar transistors (IGBT), which have entered mass production at the 300mm fab of USJC.

As adoption of electric vehicles accelerates, automakers are seeking to boost powertrain efficiency while also increasing cost-effectiveness of electrified vehicles. The jointly invested line at USJC supports the production of a new generation of IGBT developed by DENSO, which offers 20% reduction in power losses compared with earlier generation devices. Production is expected to reach 10,000 wafers per month by 2025.

LINK: [DENSO and USJC Announce Mass Production Shipment Of Automotive IGBT, Targeting Expanding Electric Vehicle Market](#)

Initiatives Toward a Society with Zero Traffic Fatalities

Collaboration with KOITO MANUFACTURING to Enhance Night Driving Safety ~ Aiming to realize lighting function that enables image sensors to recognize pedestrians more quickly ~

DENSO and KOITO MANUFACTURING CO., LTD. begun collaborating to develop a system to improve the object recognition rate of vehicle image sensors by coordinating lamps and image sensors, with the aim of improving driving safety at night.

Each company is working to improve vehicle safety and realize a society with zero traffic accident fatalities, which is one of the largest challenges currently facing the automotive industry. In this work, improving driving safety at night is an important development theme.

KOITO has been contributing to safety by improving nighttime visibility with high-function, high-performance lighting technologies, such as the development of ADBs (Adaptive Driving Beams), which control the driving-beam to maintain better visibility without dazzling oncoming vehicles. DENSO also has deep expertise in developing sensors that recognize a vehicle's surroundings, which play the role of eyes in Advanced Driver-Assistance Systems, and is working to improve the object recognition rate of image sensors in various traffic situations, including at night.

In the collaboration, the companies will combine KOITO's strength in driving-beam photometry control technology and DENSO's strength in object recognition technology from image sensors to study the development of a system that can contribute to improving the safety of vehicles at night. In order to reduce the number of nighttime pedestrian fatalities*, which are approximately twice as many as during the daytime, the two companies will explore and establish specific development themes, such as the feasibility of lighting that enables image sensors to recognize pedestrians more quickly.

Through this collaboration, the two companies aim to further improve the safety of vehicles.

*Calculated from statistical data provided by ITARDA (Institute for Traffic Accident Analysis and Research)

LINK: [KOITO and DENSO Collaborate to Enhance Night Driving Safety](#)