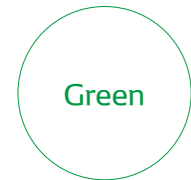


3 Strategies for “Green” and “Peace of Mind”

With the aim of contributing to the happiness of people, DENSO has been working to maximize the value it provides through its business activities in the fields of “green” and “peace of mind.” To that end, we have established medium- to long-term targets to accelerate the maximization of value in these fields and are promoting the following specific initiatives in order to achieve these targets.



Aiming to Become Carbon Neutral by Fiscal 2036

We aim to realize carbon neutrality within our *Monozukuri* activities in the not-too-distant future of fiscal 2036 by further promoting the environmental efforts in which we have engaged thus far. To make this ambition a reality, we are pursuing efforts in the three fields of “*Monozukuri* (manufacturing),” “mobility products,” and “energy use,” while making use of the Green Innovation Fund* and other frameworks.

* Green Innovation Fund: An initiative offered by the New Energy and Industrial Technology Development Organization (NEDO) to provide ongoing support to companies committed to achieving ambitious goals related to achieving carbon neutrality through the research, development, demonstration, and practical application of their technologies over the long term within the priority areas for which action plans have been established under the Green Growth Strategy

Monozukuri (Manufacturing)

Aim: Realize complete carbon neutrality in our *Monozukuri* activities

We will reduce CO₂ emissions by utilizing renewable energy such as solar power and enhancing the efficiency of our manufacturing process. In addition, we aim to realize complete carbon neutrality in our *Monozukuri* activities, without the use of carbon credits, by capturing the CO₂ emitted in the production process and reusing it as energy.

Specific Initiatives	Target for Fiscal 2036
<ul style="list-style-type: none"> At our plants, rigorously engage in energy-saving activities and promote the use of renewable energy by promoting in-house power generation through reforms to our production and supply structure Seek to achieve carbon neutrality in fiscal 2026 by offsetting the CO₂ emitted from electricity-derived energy through the procurement of renewable energy and offsetting the CO₂ emitted from gas-derived energy through the use of carbon credits Realize carbon neutrality at our plants by fiscal 2036 and work to expand carbon neutrality throughout the supply chain 	Achievement of complete carbon neutrality in our <i>Monozukuri</i> activities Current Level of Achievement CO ₂ emissions (global): 1.41 million t-CO ₂ e (Scope 1 and 2)

Note: The above CO₂ emissions figure reflects the utilization of carbon credits. The targets are domestic and overseas production bases (including DENSO Group production companies).

Mobility Products

Aim: Contribute to the electrification of cars to reduce CO₂ emissions to the greatest extent possible

We will help popularize HEVs, BEVs, FCEVs, and other electrified vehicles (xEVs) by advancing products powered by electricity. In addition, we will apply the electrification technologies cultivated in the automotive industry to the field of air mobility in an effort to significantly reduce CO₂ emissions in all facets of mobility.

Specific Initiatives	Target for Fiscal 2026
<ul style="list-style-type: none"> Centered on driving systems, such as inverters, and thermal systems, promote farsighted technological development in all facets of mobility, from HEVs, BEVs, and FCEVs through to eVTOL (electric vertical take-off and landing) aircraft, thereby realizing energy management that connects cars and other forms of mobility with society Apply electrification technologies to the new field of air mobility. At the same time, utilize the high-output, high-efficiency, and ultra-lightweight technologies acquired through this effort in the manufacture of automobiles 	Electrification domain revenue ¥1 trillion Current Level of Achievement Electrification domain revenue ¥680.0 billion

Energy Use

Aim: Realize an energy-recycling society through the development and popularization of technologies that make effective use of renewable energy

We will establish technologies that store and reuse energy in a highly efficient manner, regardless of location or time, and work to popularize them. By doing so, we will help realize an energy-recycling society.

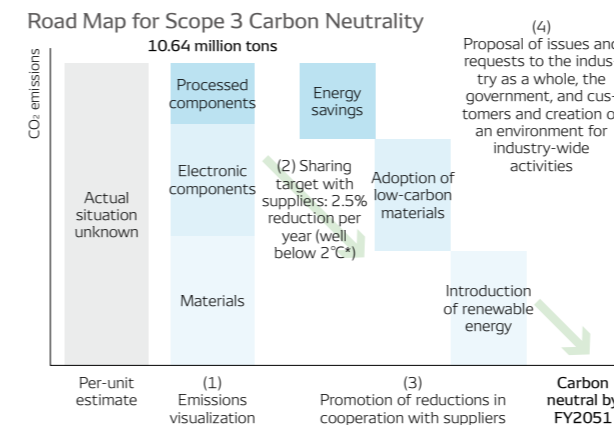
Specific Initiatives	Target for Fiscal 2036
<ul style="list-style-type: none"> Develop and commercialize batteries that store fluctuating or excess renewable electricity, hydrogen manufacturing technologies, and fuel conversion technologies. Make full use of renewable energy and further contribute to its expanded introduction Realize technologies that can reuse energy by capturing CO₂ emitted from industry and CO₂ in the atmosphere at the necessary locations, then solidifying said CO₂ and converting it into resources, thereby reducing CO₂ emissions in society as a whole 	Revenue from commercialization of renewable energy ¥300.0 billion Current Level of Achievement Accelerated verification tests (CO ₂ capture and recycling systems, solid oxide fuel cells, and solid oxide electrolyzer cells)

Toward Carbon Neutrality throughout the Value Chain

As the world accelerates decarbonization efforts, DENSO has been boldly tackling environmental issues through initiatives for environmentally friendly *Monozukuri*. Specifically, we have been developing mobility products with excellent fuel and energy-saving technologies, which have been areas of strength since our founding. In fiscal 2022, we declared that our goal was to achieve complete carbon neutrality in *Monozukuri* activities by fiscal 2036. Since then, we have been increasing the pace of efforts to achieve carbon neutrality throughout the entire value chain. For details on this goal, please see “Natural Capital” on [P89-93](#).

Scope 3: Upstream (Suppliers)

CO₂ emissions reduction target: 25% by FY2031 (versus FY2021), carbon neutral by FY2051



Strengthening Collaboration with Suppliers

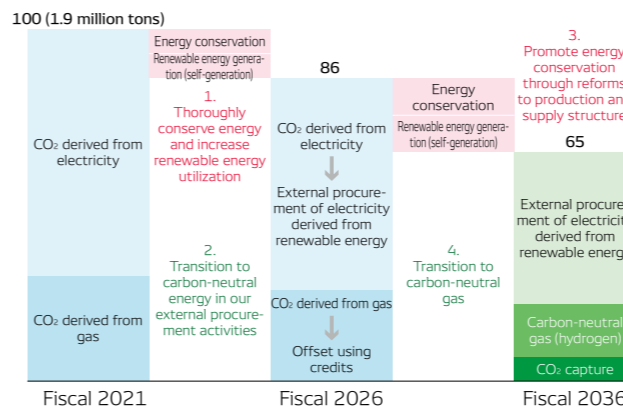
Having visualized emissions and shared specific CO₂ emissions reduction targets with 360 major suppliers, we are promoting various initiatives for the realization of carbon neutrality. For example, we are sending managers from our facilities’ management-related division to suppliers’ operating bases to analyze and offer recommendations on energy-saving measures, lending suppliers energy measurement equipment, encouraging the active use of aluminum and plastic materials that emit less CO₂, and promoting the introduction of renewable energy. Moreover, by compiling feedback on the problems and requests of suppliers arising from our support activities and making proposals to industry associations based on this feedback, we are driving the industry-wide establishment of conditions conducive to carbon neutrality and strengthening competitiveness.

* The target of keeping the rise in temperature well below 2°C, which is a Scope 3 target under the 1.5°C standard

Scope 1 and 2: DENSO Plants

CO₂ emissions reduction target: Completely carbon-neutral *Monozukuri* by FY2036

Road Map for Scope 1 and 2 Carbon Neutrality



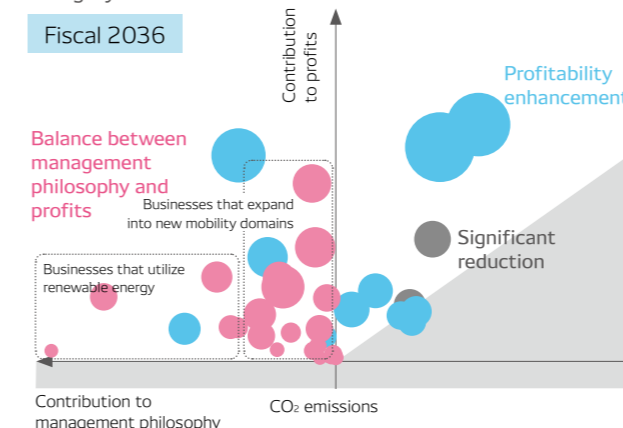
Realizing New *Monozukuri* through Unflinching Efforts and Innovative Technologies

DENSO is thoroughly implementing energy-saving activities, which have always been one of its strengths, and securing and utilizing renewable energy sources, including the utilization of carbon credits. In addition, we are developing innovative energy-creating technologies by combining our many different types of manufacturing expertise. At model plants in Japan, we will verify and enhance the leading-edge technologies required for energy creation and then incorporate them into optimal energy creation activities tailored to the energy situations of respective regions. Also, by introducing internal carbon pricing into business feasibility assessments, which serve as an indicator for investment decisions, we are virtually converting CO₂ emissions into losses and reflecting them in these assessments. Consequently, internal carbon pricing is accelerating our investments in energy-saving measures and renewable energy facilities. Further, we achieved carbon neutrality at the Anjo Plant in fiscal 2022 as well as at the Nishio Plant, the Hirose Plant, DENSO FUKUSHIMA CORPORATION, and all DENSO plants in Europe in fiscal 2023.

Scope 3: Downstream (Product Use)

CO₂ emissions reduction target: 25% by FY2031 (versus FY2021)

Relationship between CO₂ Emissions and Profits by Product Category



Accelerating Business Portfolio Transformation

When analyzing business strategies, the Strategy Deliberation Meeting discusses the positioning of and strategies for each product category based on three decision-making criteria: CO₂ emissions, profitability, and growth potential. As a result of this approach, we are promoting the de-emphasis and discontinuation of internal combustion engine (ICE) products, which entails rightsizing and withdrawing from businesses related to these products, an accompanying shift of resources to battery electric vehicles (BEVs) and other areas of the vehicle electrification field, and a changeover to new businesses, such as those that utilize renewable energy. Thanks to these activities, the growth of revenue from our inverters, heat pumps, and other products in the vehicle electrification field is outpacing market growth. By fiscal 2026, we aim to double revenue from this field compared with that of fiscal 2022, to ¥1 trillion.

Note: Size of circles indicates scale of revenue.
 ● New businesses
 ● Growth businesses (CASE)
 ● Maturing businesses (ICE-related)
 ■ Domains that produce a deficit when factoring in carbon price



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

For a company like DENSO, which aims to contribute to the happiness of people, part of our mission is to provide peace of mind to society by resolving social issues through our business activities. This section introduces the three pillars of DENSO’s contributions to the field of “peace of mind,” through which we aim to become a leading company that provides peace of mind to society.

Elimination of Traffic Accident Fatalities

Aim: Popularize safety products through efforts focused on “depth” and “width,” thereby realizing free mobility without fatalities from traffic accidents

With the aim of eliminating traffic accident fatalities, we are promoting efforts under a two-pronged approach focused on “depth,” which involves reaching the cutting edge of technology, and “width,” which involves realizing the widespread adoption of safety products in a large number of cars. For “depth,” we are further evolving our safety products and working to have them adopted in a greater number of advanced mobility fields. For “width,” we are promoting the further popularization of our safety products by working to realize attractively priced safety products and enhance our lineup of retrofitted products.

Specific Initiatives	Target for Fiscal 2026
<ul style="list-style-type: none"> Respond to various accident situations and strive to prevent accidents through not only 360-degree sensing but also in-vehicle sensing and vehicle–infrastructure linkages Fully leverage AI technologies to predict “unseeable danger” and inform the driver about it, thereby ensuring the driver avoids hazardous situations In tandem with the evaluation of ADAS, expand lineup of retrofitted products that can be applied to already-sold vehicles in an effort to provide value that responds to various situations, vehicle types, and needs 	ADAS domain revenue ¥500.0 billion
	Current Level of Achievement
	ADAS domain revenue ¥391.0 billion

Road Map for the Development of ADAS Technologies: Business Analysis (Mobility Electronics) P.51

Creation of Comfortable Spaces

Aim: Enhance relevant technologies for creating peaceful, comfortable spaces

Following the progression of automated driving, there has been a growing need for providing cars not simply as a means of transportation but also as a “private space that enables mobility.” To that end, DENSO seeks to create comfortable spaces by evolving the environment within vehicles.

Specific Initiatives	Target for Fiscal 2026
<ul style="list-style-type: none"> Innovate purification and sensing technologies to eliminate viruses and visualize toxic substances, thereby realizing safe and secure air quality Refine technologies to create and expand comfortable interiors in passenger vehicles and public transportation vehicles 	Popularize in-vehicle general-purpose products
	Current Level of Achievement
	Investment in the market for radiant heaters that efficiently heat passengers’ legs

Support for Working People

Aim: Draw on the technologies we have cultivated in the mobility domain to establish a society where people are supported and their potential is nurtured

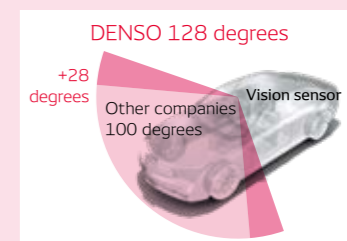
One major social issue is the significant decline in the workforce in various industries. To address this issue, DENSO will draw on the technologies it has cultivated in the mobility domain, such as automation technologies and ICT, to realize a society where all people are supported and can take on new challenges with peace of mind.

Specific Initiatives	Target for Fiscal 2031
<ul style="list-style-type: none"> In the agricultural field, contribute to the stable and secure supply of food by resolving issues throughout the food value chain In the logistics field, provide ultra-high-quality comprehensive solutions that cover everything from framework improvement through to the rationalization of entire factories For plant operations and factory automation (FA), combine core technologies such as robots and sensors with automation technology and improvement know-how in order to provide systems and products catered to the front lines 	Revenue from the agricultural, logistics, and plant operation/FA fields: ¥300.0 billion
	Current Level of Achievement
	Gradual progress in business expansion

Overview by Product (Factory Automation, Social Solutions, and Food Value Chain) P.64–65

Wider-Angle Vision Sensors for Improved Accident Scenario Coverage Elimination of Traffic Accident Fatalities

We have further widened the detection angle of our vision sensors, which support safe driving by recognizing pedestrians and bicycles in the vicinity of vehicles. In Japan, traffic accidents caused by pedestrians suddenly stepping out from roadsides are said to account for approximately 30% of all traffic accidents involving pedestrians. With this in mind, DENSO took on the challenge of further widening the angle of its vision sensors. As a result, we have realized vision sensors with a detection angle of 128 degrees—28 degrees wider than the products of other companies. The wider angle improves the detection of bicycles crossing roads when vehicles are moving at low speeds and helps prevent accidents caused by pedestrians suddenly stepping out from roadsides at intersections and in other areas.



While a wider angle enables the detection of more objects, it also enables vision sensors to detect objects that may not actually pose any danger. One example would be a scenario in which a bicycle that is about to cross the road is detected, but the bicycle then brakes and stops, meaning that the vehicle will be able to pass by without colliding with the bicycle. In such a scenario, activation of the vehicle’s automatic braking system to avoid a collision could in fact cause another dangerous situation due to the vehicle’s sudden, unexpected stop. Therefore, we have reduced the occurrence of unnecessary vehicle movements by incorporating AI technology to estimate time-series movement and determine whether a collision will actually occur. In this way, DENSO has created vision sensors that simultaneously realize the advantages of wider-angle detection and real-world usability.

Our vision sensors have been incorporated into certain grades of the Subaru Outback (North American specifications) and into the new Subaru Crosstrek (Japanese specifications), both of which were launched in 2022.

Newly Developed Radiant Heater That Warms Passengers’ Legs Creation of Comfortable Spaces

DENSO’s newly developed radiant heater was incorporated into the Toyota bZ4X, launched in 2022. Our radiant heater has a distinctive safety structure and contributes to passenger comfort and longer driving distances.



Radiation is energy from the infrared rays emitted by highly heated objects. Rather than using warm air, radiant heaters warm occupants’ legs directly by using far-infrared rays emitted from the heater surface, which reaches temperatures of up to 100°C. The radiant heat from the heater surface is efficient because it only warms the occupants. When used in combination with a heat pump system, our heaters reduce the air-conditioning energy required by the entire vehicle, thereby helping to extend the distance that can be driven with the heater on.

Moreover, the adoption of a thin film structure for the heater surface enables its temperature to increase to a maximum of 100°C in about one minute, quickly warming occupants’ legs and creating a comfortable environment. In addition, our products are the world’s first heaters with structures that instantly reduce the temperature of the surface to 50°C or lower when anyone comes into contact with it. Heat generation is stopped through the combined use of control technology and surface film with an in-built sensor that detects human contact. Thus, the new product achieves both high temperatures and advanced levels of safety.

Utilization of ICT during Disasters Support for Working People

Aiming to create ICT-enabled systems and capabilities for efficient emergency countermeasures as well as for recovery and reconstruction in the event of a disaster, we have concluded an agreement on cooperation and collaboration with the city of Kirishima in Kagoshima Prefecture. The initiative will entail mutual cooperation through systems development and the utilization of Kirishima municipal authority’s disaster prevention app, which is supported by DENSO’s Life Vision local information distribution system.



The app is used by the municipal authority as a communication tool. Benefiting from DENSO’s expertise in the development of car navigation systems and other mobility products, the app features a user-friendly interface that allows anyone to readily understand information issued by the municipal authority. Going forward, we will further enhance the app’s functions to realize efficient disaster countermeasures through the provision of a framework for managing evacuation center supplies and facilitating exchanges of supplies between evacuation centers.

Main Results of Our Strategies for “Green” and “Peace of Mind” in Fiscal 2023

Since our founding, we have been working to maximize the value of green and peace of mind, and efforts to do so have been steadily accelerating. In this section, we look back on the results we achieved with our initiatives over the course of fiscal 2023. In addition, the following three projects, which are featured in this integrated report, have been selected as Green Innovation Fund projects by the New Energy and Industrial Technology Development Organization (NEDO).

- Development of manufacturing technology for next-generation power semiconductor devices (for electric vehicles)
- Development of next-generation storage batteries and motors
- Development and verification of technology for the small- and medium-scale separation and capture of CO₂ from plant exhaust gas

For more details, please see the “Newsroom” section of our corporate website.
<https://www.denso.com/global/en/news/newsroom/>



Independent Third-Party Verification of Environmental Performance Data

To enhance the reliability of its environmental performance data on greenhouse gas emissions, energy consumption, and other matters, DENSO has received independent third-party verification from SGS Japan Inc. We will continue to improve our environmental performance data by extending the scope of verification activities.

For details, please visit the website below.
<https://www.denso.com/global/en/about-us/sustainability/environment/verification/>



Note: The verification results included on the above website are for environmental performance data in fiscal 2022. We are currently undergoing an audit for fiscal 2023 (April 1, 2022 to March 31, 2023), and the results of this audit are scheduled to be available on our website around January 2024.

2022

2023

Green

We are striving to reduce CO₂ emissions from our *Monozukuri* activities and develop and popularize mobility products that contribute to the electrification of automobiles.

Mobility Products

First Adoption of a DENSO Electric Motor for Electric Aircraft

For the first time, one of our electric motors has been incorporated into an aircraft. A compact, lightweight, and high-power electric motor jointly developed by DENSO and Honeywell International Inc. has been adopted by Lilium N.V. for its electric aircraft. We will use the launch of this product to begin accelerating our development of products for electric aircraft.



Mobility Products

Collaboration with USJC in the Manufacture of Automotive Power Semiconductors

We have agreed to collaborate with United Semiconductor Japan Co., Ltd. (USJC), a subsidiary of global semiconductor foundry United Microelectronics Corporation, in the manufacture of power semiconductors needed for electric vehicles. In May 2023, we began shipping next-generation insulated gate bipolar transistors that are compact and have low loss.

Mobility Products Monozukuri Energy Use

Highest Evaluation from CDP

In recognition of outstanding initiatives with respect to climate change and water security as well as in relation to disclosure of these initiatives, DENSO has received an “A List” rating from CDP, the highest rating provided by the international non-profit organization.

Energy Use Mobility Products

Trial Introduction of an Energy Management System That Uses BEVs

In collaboration with Chubu Electric Power Company, Incorporated and Chubu Electric Power Miraiz Company, Incorporated, we will conduct the trial introduction of a system that maximizes the convenience of car sharing as well as the effectiveness of BEVs as storage batteries and which enables the sharing of renewable energy within communities.

Mobility Products

Development of the First Inverter to Use SiC Power Semiconductors

The first DENSO inverter to use SiC power semiconductors has been integrated into the BluE Nexus eAxle and incorporated into the new LEXUS RZ. By significantly reducing power loss, our highly efficient inverter increases the electric mileage of BEVs, thereby helping to extend their driving distance.

Monozukuri Energy Use

Verification Test Aimed at Realizing Hydrogen Local Production for a Local Consumption Model

In partnership with Toyota Motor Corporation, DENSO FUKUSHIMA CORPORATION has begun a verification project for the production of green hydrogen and in-plant hydrogen utilization. Through this project, we aim to build hydrogen local production for a local consumption model and realize a carbon-neutral plant.



Energy Use

Joint Technical Verification Using Our CO₂ Capture System

By using its CO₂ capture system to efficiently capture and utilize CO₂, DENSO will conduct joint technical verification with TAISEI CORPORATION. We will promote installation of the system in buildings, thereby contributing to the realization of a carbon-neutral society.

Monozukuri Energy Use

Verification Test of a Plant Energy Management System That Utilizes Solid Oxide Fuel Cells

We will realize a more-efficient energy management system, which meets the power demand of plants by controlling the recharging and discharging of batteries for storing solar-generated power and by controlling the amount of power that our in-house developed solid oxide fuel cells generate.

Peace of Mind

We are striving to develop safety products, provide services that realize comfortable spaces, and utilize the technologies we have cultivated in the mobility domain.

Elimination of Traffic Accident Fatalities

Launch of the Obu yuriCargo Project

Through traffic safety initiatives based on driving data and support for maintaining and improving the driving skills of elderly drivers, we aim to help develop towns where safe, unrestricted mobility is available to everyone.

Elimination of Traffic Accident Fatalities

Verification Tests of the Utilization of Drive Recorders to Support the Driving Safety of Seniors

In partnership with the Toyota Mobility Foundation, we are conducting verification tests of an AI driving diagnosis system that helps lower the accident risk of seniors by providing advice on safe driving that is based on AI analysis of drive recorder images and other data.

Elimination of Traffic Accident Fatalities

Development of Wider-Angle Vision Sensors

DENSO has further widened the detection angle of its vision sensors, which recognize objects in the vicinity of vehicles. Our vision sensors help detect pedestrians and bicycles suddenly emerging from roadsides and have been installed in the new Subaru Crosstrek.



Support for Working People

Comprehensive Partnership Agreement with Kumamoto Prefecture in the Fields of Food and Agriculture

We will take advantage of our *Monozukuri* technologies to optimize the food value chain by improving efficiency and adding value in the production and distribution fields.



Creation of Comfortable Spaces

Collaboration to Provide Security Monitoring Services for Vehicles

We have begun collaborating with NTT Communications Corporation to provide a vehicle security monitoring service that protects vehicles from the threat of cyberattacks.

Support for Working People

Agreement on Collaboration with the City of Kirishima for ICT Utilization during Disasters

By utilizing our Life Vision local information distribution system to establish disaster readiness capabilities, we aim to heighten the efficiency of emergency countermeasures, recovery, and reconstruction in the event of a disaster.

Support for Working People

Launch of Mimamori Maintenance Package to Support the Logistics Industry

To help ensure the stable operation of vehicles and alleviate labor shortages in the logistics industry, we will offer a package that comprises maintenance services and D-FAMS, a remote monitoring service for refrigeration equipment. Moreover, by identifying the early signs of abnormalities, our package helps curb CFC emissions through the minimization of refrigerant (CFC substitute) leakages resulting from breakdowns.



Management Foundation

We are working to bolster our management foundation to underpin efforts to maximize the value of green and peace of mind.

Briefing on Semiconductor Strategies

With demand for semiconductors increasing due to the proliferation of CASE vehicles, we presented our strategies for semiconductors in three fields: microcomputers and system-on-a-chip, power and analog, and sensors.

For details, please visit the website below.
<https://www.denso.com/global/en/news/newsroom/2022/20220601-g01/>



Gold Medal at the WorldSkills Competition

Viewing the foundations of *Monozukuri* as being the advanced skills and expertise that enable the realization of technologies, we are focusing efforts on training technicians and passing on skills.

IEEE Corporate Innovation Award

In recognition of our development of the QR Code® and our contribution to its global popularization, we received the IEEE Corporate Innovation Award from the Institute of Electrical and Electronics Engineers (IEEE), the world's largest technical professional organization for electrical and electronic engineering.

DENSO DIALOG DAY 2022

DENSO announced distinctive initiatives that are focused on five essential elements and aimed at helping realize a society that promotes cycles of well-being. We also announced our corporate value enhancement strategy, which will bolster the corporate foundations that support value creation.

For details, please visit the website below.
<https://www.denso.com/global/en/news/newsroom/2022/20221216-g01/>

