Past, Present, and Future

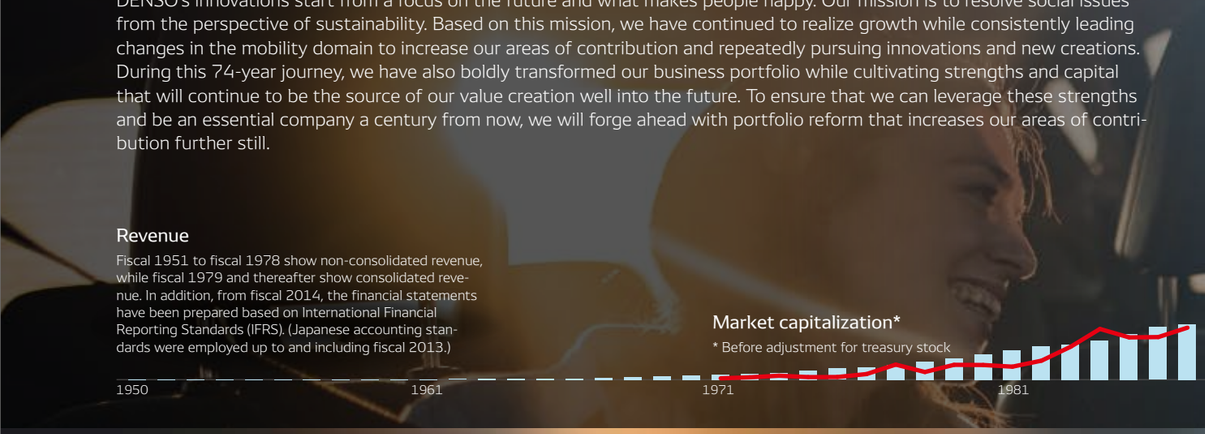
DENSO's innovations start from a focus on the future and what makes people happy. Our mission is to resolve social issues from the perspective of sustainability. Based on this mission, we have continued to realize growth while consistently leading changes in the mobility domain to increase our areas of contribution and repeatedly pursuing innovations and new creations. During this 74-year journey, we have also boldly transformed our business portfolio while cultivating strengths and capital that will continue to be the source of our value creation well into the future. To ensure that we can leverage these strengths and be an essential company a century from now, we will forge ahead with portfolio reform that increases our areas of contribution further still.

Revenue

Fiscal 1951 to fiscal 1978 show non-consolidated revenue, while fiscal 1979 and thereafter show consolidated revenue. In addition, from fiscal 2014, the financial statements have been prepared based on International Financial Reporting Standards (IFRS). (Japanese accounting standards were employed up to and including fiscal 2013.)

Market capitalization*

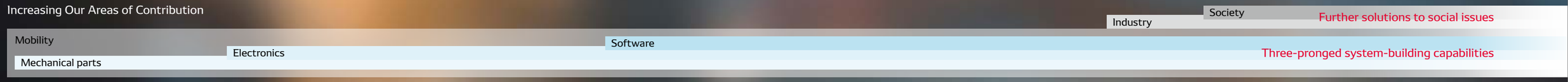
* Before adjustment for treasury stock



Notes: 1. Market capitalization is as of the end of July 2023.
2. The projected figure for fiscal 2024 revenue is based on fiscal 2024 first quarter results.

Our Cultivated Strengths P.22–25
Our Accumulated Capitals P.26–27

Increasing Our Areas of Contribution



History of Creating Value to Address Social Issues and Ambitious Initiatives for the Coming Era

1950s
Postwar Reconstruction and Motorization

Taking on the challenge of resolving social issues using cutting-edge technologies from the time of our founding

- Developed the DENSO-GO electric vehicle
- Developed Japan's first car and bus air-conditioning systems

1960s and 1970s
Popularization of Private Cars and Emergence of Numerous Social Issues

Taking measures ahead of exhaust gas regulations and laying foundations for "peace of mind" products

- Developed exhaust gas-controlling products compliant with the world's strictest regulations
- Began development of semiconductors in anticipation of the coming era

1980s
Globalization and Trade Friction

Accelerating the commercialization of safety systems for preventing traffic accidents causing fatalities

- Gradually realized the practical application of safety systems, including airbag sensing systems
- Commenced the mass production of vacuum sensors, which represented the world's first in-vehicle semiconductor sensor

1990s and 2000s
Global Warming and Spread of Digital and Information Technologies

Contributing to eco-friendly lifestyles with core technologies

- Developed the QR Code®, which increases efficiency at manufacturing sites
- Developed the world's first electronic control-type common rail system
- Developed the world's first inverter with dual-side cooling

2010s
ICT Advancement and SDG Adoption

Entering into a once-in-a-century paradigm shift

- Developed Global Safety Package, the first generation of our advanced safety system
- Began providing services in the agriculture and factory automation fields

2020s
Escalation of Social Issues

Aiming for excellence in the domains of green and peace of mind

- Developed Global Safety Package 3, the third generation of our advanced safety system
- Developed our first inverter to use SiC power semiconductors

Four Ideals of the DENSO Creed

Established at the time of the Company's founding, the DENSO Creed sets forth a clear commitment to pursuing innovation in anticipation of changing times and to addressing social issues through quality products and services. This commitment is also the starting point of our sustainability management, which we are currently accelerating.

Be trustworthy and responsible.
The trust that our predecessors worked earnestly to build over the years underpins the DENSO of today. We will therefore maintain this trust and seek to build it up further so that we can pass it on to the next generation. By doing so, we will meet the expectations of society and fulfill our responsibility to ensure DENSO's future.

Cherish modesty, sincerity, and cooperation.
We work to refine not our appearance or job title but the essence of who we are as a part of DENSO, and we work in collaboration to perform our duties with sincerity. The sincere and cooperative relationships we have with each other as employees will bring forth inspiration and help us build long-lasting relationships with our customers and business partners.

Be pioneering, innovative, and creative.
By consistently leading the times with our research and creativity and continuing to refine our technologies and know-how, we will swiftly create new value that truly benefits society, thereby paving the way to the future.

Provide quality products and services.
We will earnestly approach each issue facing this ever-changing society and continue to bring hope and happiness to all people while aiming to provide our customers and society with products and services of the very best quality.

DENSO Integrated Report 2023
DENSO's Value Creation Story

Tradition of Sustainability Management

The DENSO Creed calls on us to "provide quality products and services," expressing the essence of our approach to sustainability management, which focuses on benefiting society by utilizing businesses to pursue ambitious initiatives that address social issues. Our mission is to continue our legacy by putting into practice the commitment that our predecessors established when drafting the creed and by passing on this commitment to the next generation.

In advancing sustainability management, DENSO has incorporated future social issues into its Long-term Policy for 2030 and as an integral part of its material issues (Materiality), and the Company is addressing these social issues through business activities. As well as maximizing our provision of green value and peace of mind value—two long-standing areas of focus—we have established "inspiring" as a watchword. Accordingly, we will provide society with new value that inspires diverse stakeholders.

Establishment of the DENSO Heritage Center

In December 2021, we established the "Heritage Center" with the aim of enabling all employees to return to DENSO's origins, which are represented by the DENSO Creed and the principles of quality and safety, and to provide them with an opportunity to consider what they themselves want to pass on to the next generation of DENSO. At the DENSO Heritage Center, we have established areas that introduce events that happened at the time of the Company's founding, which represent the starting point of DENSO. We also have areas where visitors can reflect on DENSO's history of offering quality and peace of mind. The Heritage Center is visited by a large number of employees every day.

History of Innovation and Creation

Just as it did when DENSO was founded, the commitment set out in the DENSO Creed is the Company's starting point to this day. With our second founding well underway, we must boldly take on unprecedented challenges, such as promoting initiatives toward CASE* and realizing carbon neutrality. By once again reflecting on the desire embodied in the DENSO Creed and returning to our starting point as a company, we will steadily move forward toward our aim of bringing happiness to people and society as a whole.

* CASE: Connected, autonomous, shared & service, and electric

1930s to 1950s: Taking on the challenge of resolving social issues using cutting-edge technologies from the time of our founding

External Environment	Postwar Reconstruction and Motorization
Social Needs	International Standards of Technology and Quality

1935: Taking On the Challenge of Producing Electrical Equipment In-House

An automobile department was established within Toyoda Automatic Loom Works, Ltd. (currently Toyota Industries Corporation). In 1935, the executive director of Toyoda Automatic Loom Works, Kiichiro Toyoda, instructed Ryuichi Suzuki (who would later become a member of the Board at DENSO) to take on the challenge of producing electrical equipment in-house. However, developing such equipment proved challenging due to the unreliable quality of electrical equipment at the time. In fact, Mr. Toyoda stated to Mr. Suzuki that this task seemed to be far harder than he had imagined, and he asked Mr. Suzuki whether they should quit at that juncture. Mr. Suzuki pleaded to Mr. Toyoda to allow him to continue his efforts for one more month in order to realize in-house production. Sometime after doing so, the enthusiasm and persistence of Mr. Suzuki and the young engineers on his team led to the official adoption of electrical equipment in Toyoda vehicles.

Team in Charge of Electrical Equipment Development
At the time, a team of approximately 30 engineers and technicians devoted themselves to the in-house development of electrical equipment, often going without sleeping and eating.

1949: Birth of NIPPONDENSO

With the Japanese economy in an extremely difficult state due to the promotion of the Dodge Line by the General Headquarters of the Supreme Commander for the Allied Powers, the electrical equipment department split off from Toyota Motor Co., Ltd., and was established as NIPPONDENSO CO., LTD. The company's first president, Torao Hayashi, aimed to rapidly expand the company not just in Japan but also overseas. For that reason, he expressed the company's determination to become independent by choosing the name NIPPONDENSO ("Nippon" meaning Japan), rather than KARIYADENSO, AICHIDENSO, or TOKAIDENSO, which are names of the local area where the company was founded.

1953: Start of Technical Cooperation with Robert Bosch GmbH

In the early 1950s, a technological gap clearly existed between NIPPONDENSO and Western companies. Consequently, we urgently needed to achieve world-class technologies and quality. At this juncture, we encountered German-based company Robert Bosch GmbH, which was an order of magnitude larger than us. Thanks to the mediation of Dr. Tokushichi Mishima, who was the inventor of MKM steel, and the determination of our management, we concluded a technical alliance with Robert Bosch. By learning from our new partner, we established the foundations of internationally competitive technologies and quality.

Specific Initiatives

- Beginning in the 1950s, we catered to the needs of customers, especially Toyota Motor Corporation. At the same time, we established and grew a business field centered on mechanical parts and realized the provision of products supported by internationally competitive technologies and quality.

Green Value and Peace of Mind Value Provided

●	Developed and mass-produced the DENSO-GO electric vehicle to help mitigate global gasoline shortages
●	Developed Japan's first car and bus air-conditioning systems. Although there was a concern that such systems would impede driving performance, these systems were able to overcome that notion and quickly grew in popularity due to their high level of convenience and comfort.

● Green ● Peace of mind

1960s and 1970s

External Environment	Popularization of Private Cars during the Period of Rapid Economic Growth Together with the Emergence of Traffic Accidents, Air Pollution, and Numerous Other Social Problems
Social Needs	High-Mix, Variable-Volume Production Capabilities and Development of Environmental and Safety Technologies

Specific Initiatives

- Received the Deming Prize, the most prestigious award for quality control. Winning this prize laid the foundations for the "Quality First" approach and corporate culture that we still adopt to this day.
- Received the Okochi Memorial Production Prize in recognition of the high-precision, high-quality *Monozukuri* enabled by our integrated in-house production system
- Established the IC Research Center in 1968 in anticipation of a shift to the electronic control of automotive components; began developing semiconductors; and manufactured the automotive industry's first semiconductors. Accumulated a large amount of knowledge on semiconductor and IC specifications by conducting thorough analysis
- Established Nippon Soken Inc. through a joint investment with 10 other automotive component manufacturers with the aim of researching technologies to address exhaust gas

Green Value and Peace of Mind Value Provided

●	Achieved the practical application of electronic fuel injection (EFI) systems ahead of regulations on exhaust gas. After doing so, we continued to develop products that respond to environmental regulations, one after the other.
●	Developed O_2 sensors as an important tool for controlling exhaust gas. Vehicles equipped with DENSO systems comprising EFI, O_2 sensors, and a three-way catalyst were able to comply with Japan's Showa 53 (1978) exhaust gas regulations, which were said to be the world's strictest regulations at that time. The number of cars equipped with these systems began to rapidly increase.
●	Participated in the Comprehensive Automobile Traffic Control System (CACS) project initiated by the Ministry of International Trade and Industry (currently the Ministry of Economy, Trade and Industry). The technologies cultivated through our participation in this project would later help us develop car navigation systems and connected driving products.

Electronic fuel injection system

Received the Deming Prize

1980s

External Environment	Globalization and Trade Friction
Social Needs	Overseas Production and Higher-Performance Vehicles

Specific Initiatives

- Established manufacturing companies and technical centers overseas to realize regionally optimized product development, manufacture, and supply capabilities
- Helped address pollution, global warming, and other social issues by acting as a trailblazer in the creation of products compliant with environmental regulations
- Launched a project for the practical application of robots. Furthermore, the development of such technologies as barcode readers and RFID,* which we pursued in a similar manner as we did with robots, helped establish the foundation of our current factory automation (FA) business.
- Focused efforts on progressing in electronic control-type systems and other software fields
- Commercialized a series of safety system products that helped improve the safety performance of vehicles

* RFID (radio frequency identification): A non-contact system that reads data from RF tags using electromagnetic waves

Green Value and Peace of Mind Value Provided

●	Developed the world's first electronic control-type diesel pumps, which impressed the world with their ability to control exhaust gas, reduce fuel consumption, and realize high output
●	Commenced the mass production of vacuum sensors, which represented the world's first in-vehicle semiconductor sensor. With this technology, we led the way ahead of other companies by equipping semiconductors with sensors and thereby adding value.
●	Gradually realized the practical application of safety systems, including anti-lock brake systems, airbag sensing systems, and forward collision warning systems

DENSO (MALAYSIA) SDN. BHD. at the time of its establishment in 1980

In-vehicle test in Europe

1990s

External Environment	Collapse of the Bubble Economy and Acceleration of International Debate on Global Warming
Social Needs	Compact, Fuel-Efficient Vehicles and Environmentally Friendly Lifestyles

Specific Initiatives

- Established the Fundamental Research Center (currently the Advanced Research and Innovation Center), which has created a large number of innovative technologies that have led to the development of world-first and world-best products
- Commenced Excellent Factory (EF) activities. We began to expand activities on a global basis to improve our factories, led by personnel on the front lines of production. These EF activities represent the origins of DENSO's ambitious activities focused on quality improvements.
- Utilized core technologies to develop products that contributed to eco-friendly lifestyles
- Developed the QR Code® with large capacity and high-speed readability that is compatible with high-mix, low-volume production at plants

Green Value and Peace of Mind Value Provided

●	Focused on the development of car air-conditioning systems that use natural refrigerant to curb the destruction of the ozone layer caused by conventional refrigerant
●	Developed the world's first electronic control-type common rail system. Pioneered the way with common rail systems that would later dominate the market
● ●	Commercialized household heat pump water supply systems that contribute to energy savings. Also, developed water filters, QR Codes®, and other products that make people's lives more comfortable

Advanced Research and Innovation Center

QR Code®

2000s

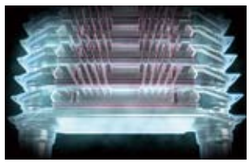
External Environment	Spread of Digital and Information Technologies and Creation of International Frameworks and Regulations for Global Warming Prevention
Social Needs	Diversification of Powertrain Technologies and Introduction of Products for Hybrid Electric Vehicles (HEVs) and Other Electric Vehicles

Specific Initiatives

- Established DENSO Training Academy Thailand, our first overseas regional training center. This center helped us build a structure for educating engineers and technicians on a global basis.
- Formulated Eco Vision 2005. Leveraged outstanding environmental technologies to accelerate the reduction of CO_2 emissions from business activities
- Marketed products for CASE vehicles to promote the introduction of electric vehicles and the popularization of safety products

Green Value and Peace of Mind Value Provided

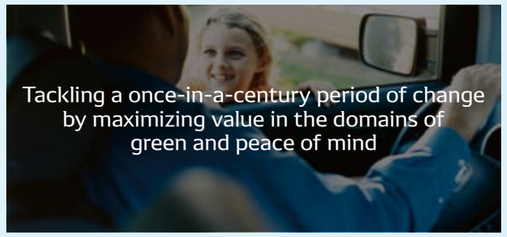
●	Developed the world's first inverter with dual-side cooling. DENSO's technological capabilities were acknowledged through the development of these inverters, leading to a rapid increase in their production volume.
●	Developed the world's first forward-looking radar sensor using millimeter waves. Able to operate even in rainy and foggy environments, these sensors helped enhance the safety of automobiles.



Structure for cooling both sides of the inverter

● Green ● Peace of mind

2010s to 2020s



External Environment	ICT Advancement and SDG Adoption, and an Escalation of Social Issues
Social Needs	Conversion to CASE Vehicles

Specific Initiatives

- Completed the establishment of technical centers in seven regions across the globe. Through these centers, we have set up a structure to create competitive products that can promptly meet diversifying local needs.
- Formulating comprehensive strategies in the domains of green and peace of mind
- Established the Electrification Innovation Center (EIC), which promotes efforts to strengthen the development and production of products powered by electricity, and Global R&D Tokyo–Haneda, which conducts the development of automated driving and other technologies. By doing so, we have accelerated our R&D activities in the domains of green and peace of mind.
- Developed high-performance advanced safety systems and improved the safety performance of existing vehicles through the provision of retrofitted products
- Began providing services in the agriculture and factory automation fields
- Strengthening our development structure and global production structure for products powered by electricity, including at the Hirose Plant and the EIC. Through these efforts, we aim to realize an annual production of 12 million inverters by 2025.

Green Value and Peace of Mind Value Provided

●	Developed motor generators. These motor generators realize highly efficient, eco-friendly power generation and driving.
●	Saw cumulative production of inverters, which are our mainstay product in the environment field, reach 20 million units worldwide in 2021
●	Developed Global Safety Package, an advanced safety system using a monocular camera and millimeter-wave radar sensor. Equipped with this safety system, the Toyota Prius received the top five-star rating in the European New Car Assessment Programme (Euro NCAP).
●	Developed Global Safety Package 3, which helps improve safety performance by recognizing the environment surrounding the vehicle. We are expanding the scenarios in which to use accident prevention, safety, and driver support products. We are also commencing efforts to expand the global sales of such products based on the concept of realizing compactness and low cost.
●	Developed retrofitted acceleration control devices for when drivers accidentally step on the gas pedal, thereby enhancing the safety performance of vehicles already sold and on the road

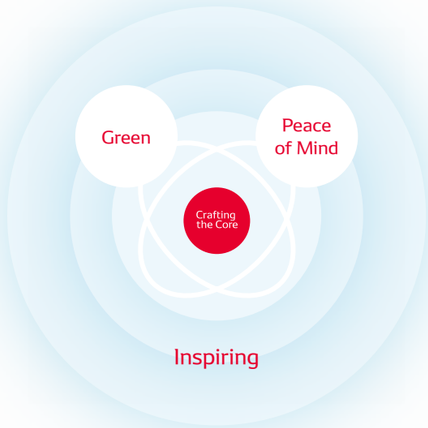
2030s ~

External Environment	Global Warming, Resource Shortages, and Escalation of Such Social Issues as an Aging Society
Social Needs	Recycling-Based Society Centered on Renewable Energy

Specific Initiatives

- Expand businesses and address social issues in the fields of mobility, industry, and society with a view to realizing a carbon-neutral society and eliminating traffic accident fatalities by 2035
- Accelerate the development of technologies and partnerships with regard to five essential elements (the free movement of people, the flow of goods, energy utilization, minimization of resource requirements, and the flow of data) with the aims of realizing high-value mobility and manufacturing that contributes to peace of mind, supporting the continuation of society's activities, and catering to diverse values and views of well-being

Our Vision for the Future: Long-term Policy for 2030



DENSO's Value Creation Process

Maximizing the Value of "Green" and "Peace of Mind" to Continue to Grow with Society

DENSO puts sustainability management into practice by taking the resolution of social issues as a starting point and then utilizing accumulated strengths and capital to implement business activities and advance value creation processes. Through this approach, we aim to contribute to a sustainable society and enhance our corporate value.

Tradition of Sustainability Management P.28–29

Principal social value we offer and related indicators (Fiscal 2026)

- Realization of carbon-neutral manufacturing: Achievement of carbon-neutral plants through the procurement of renewable energy and the utilization of carbon credits (carbon neutrality without carbon credits by fiscal 2036)
- Contribution to an environmentally friendly mobility society: Dissemination of electric vehicle components (production of inverters: 12 million units; production of thermal management products: 2.8 million units; production of power supply systems: 7.6 million units)
- Contribution to the elimination of traffic accident fatalities: The types of traffic accident covered by DENSO safety products account for 56% of the traffic accidents that result in fatalities (aim to increase this to 100% by fiscal 2036)

Principal financial value we offer and related indicators (Fiscal 2026)

- Expansion of equity spread over the medium to long term (ROE: 10% or higher; operating margin: 10%)
- Cash generation through business portfolio reform (Electrification domain revenue: ¥1 trillion; ADAS domain revenue: ¥500 billion)
- Balance between disciplined restraint and targeted investment (Capital expenditures: ¥350 billion; R&D expenditure: ¥450 billion)
- Long-term, stable shareholder returns (DOE: 3.0% or higher; flexible share buybacks)

Realizing a Sustainable Society

Contributing to the SDGs through our corporate activities

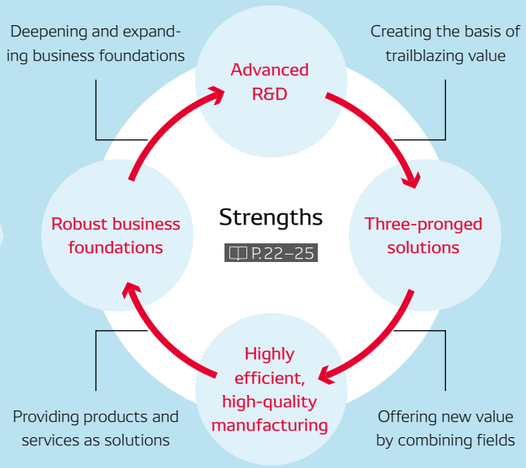
Strengthening Our Capitals

Capital Strategies P.66–97

Financial Capital	Human Capital	Manufacturing Capital
Intellectual Capital	Natural Capital	Social and Relationship Capital

Reinforcing Our Strengths

Cycle of Strengths



Social Issues

DENSO Philosophy

DENSO Spirit

Foundation of Our Value Creation

The DENSO Creed, which embodies the spirit of our founding, and the DENSO Spirit, which serves as an action guideline, form the foundation of our value creation. Each and every employee respects the DENSO Creed and DENSO Spirit and works to earnestly reflect them in their actions. This, in turn, helps invigorate the value creation process.

DENSO Creed

Growth Strategy

Long-term Policy for 2030

Materiality

Important issues for achieving the Long-term Policy for 2030

Green | Peace of Mind

Corporate Foundation

Mid-term Policy for 2025

Serves as a path for completing targets by fiscal 2026 that will help us realize our Long-term Policy for 2030

Strategies Related to Green and Peace of Mind

Medium- to long-term strategies aimed at promoting efforts toward maximizing the value of green and peace of mind

Seven Core Businesses

Overview by Product P.48–65

Advancement of Three Priority Areas

- Mobility
- Industry
- Society

DENSO's Vision

Maximizing the Value of "Green" and "Peace of Mind" to Be Inspiring

Foundations Underpinning Value Creation

Human Capital	Corporate Governance
P.74–77	P.98–118

Controlling Factors That Negatively Impact Our Value Creation

We are implementing measures to respond to risks that could negatively impact our value creation.

Efforts to Maximize the Value of "Green" P.90–93
Risk Management and Compliance P.114–118
Undertaking Initiatives toward Respecting Human Rights P.96

Our Cultivated Strengths

Over its 70-year history, DENSO has cultivated various unique strengths. Since the founding of the Company, these strengths have been augmented and passed down to become part of its DNA—the DENSO Spirit—which permeates the actions of all DENSO employees around the world. The connections between these strengths have driven DENSO's growth over the years. Amid a challenging business environment going forward, DENSO will further enhance these strengths as the driving force behind value creation that is uniquely DENSO.

Robust Business Foundations

DENSO's business activities are supported by robust foundations built over many years, giving the Company an advantage that cannot be easily replicated. The driving force behind all our business activities is our relationships with diverse stakeholders, including customers, suppliers, and business partners, as well as the expertise of our approximately 170,000 employees and 200 Group companies worldwide. By evolving and increasing such relationships and expertise, we will realize further growth.

Roots of Our Strengths

1954 Established the Technical Training Center. This center fostered the principles of "*Monozukuri* is *Hitozukuri* (Our performance relies on our people)" and "Engineering and technique go hand in hand." These principles continue to be passed down within the Company.
Began establishing a network of service stations (centers) to enhance quality for end-users in each region across Japan
1959 Deepened cooperation with suppliers by establishing the DENSO Cooperative Association (currently DENSO HISHOKAI), which currently accounts for annual procurement of ¥2.7 trillion from approximately 7,360 suppliers
1966 Opened a Chicago sales office and a Los Angeles branch office. Anticipated trade liberalization and other global trends through the establishment of this first overseas sales office
2016 Formulated Eco Vision 2025. Accelerated concrete measures aimed at addressing environmental and energy issues and thereby helping realize a sustainable society
2020 Opened the Hirose Plant, which together with the Electrification Innovation Center established outstanding development and production capabilities and became the core of our electrification domain

The Key to Our Strengths

Human Resources

Monozukuri is *Hitozukuri*

Personnel Who Create New Value

Based on the belief that excellent personnel make the best products, we view human resources as our most important management resource. DENSO is developing the leaders and highly skilled engineers and technicians who will drive the Company forward.

Number of employees worldwide: Approximately 170,000

Stakeholders

Creation of Allies

Mutual Advancement with Business Partners

As our business domain extends beyond automobiles, we are strengthening our alliances even further based on trust cultivated over many years. These alliances will enable us to combine our strengths with those of partners and thereby realize entirely new types of value.

Number of alliances: Stakes in more than 80 companies*
* In the 10 years through fiscal 2023

Global Presence

Bases in 35 Countries and Regions

Delivery of Value to People Worldwide

To grasp the needs and trends of each region in a timely, accurate manner and reflect them in R&D and manufacturing, we have established production, development, and sales bases around the world. At the same time, all of our employees make concerted efforts to develop our businesses and deliver value.

Number of bases worldwide: 191

Further Enhancing Our Strengths

Accelerating Global Expansion of the Agricultural Production Business to Address Global Food and Agriculture Issues

With the climate change-related instability of agricultural production and a decrease in the number of farmers emerging as issues in recent years, the establishment of stable, sustainable agricultural production capabilities is needed. Aiming to address such issues in the food and agriculture field, in August 2023 DENSO announced its acquisition of all shares of Certhon Group, a Dutch horticultural facility operator. With a history of more than 125 years, our new acquisition is a leading corporate group renowned for world-class advanced technologies related to horticulture. The group excels not only in the development of solutions tailored to diverse customers but also in integration capabilities that combine multiple systems to realize optimal solutions. By combining the process design and automation technologies that DENSO has developed in the automotive field with Certhon Group's cultivation and horticultural system technologies, the companies will develop innovative farm models and globally roll out solutions that meet regional characteristics and needs.

Advanced R&D

With a commitment to world-first and world-best offerings, DENSO has contributed to mobility by creating an array of competitive products that accurately cater to social needs. Amid increasingly complex social issues and diversifying values, we aim to extend the scope of our contribution beyond mobility to encompass society as a whole. To this end, we have defined priority fields in accordance with our green and peace of mind principles. Moreover, we are planning technologies and strengthening R&D capabilities with an eye on the future.

We will continue creating new value through our technical centers and laboratories around the world as well as through collaborative initiatives that transcend Group boundaries and include external research institutions and universities.

Roots of Our Strengths

1953 Commenced a technical cooperation agreement with Robert Bosch GmbH. Under this agreement, we established a technological and production base with the aim of becoming a comprehensive manufacturer of automotive parts that can keep pace with global companies.
1985 Established Nippondenso America, Inc., with which we jointly created our first overseas technical center. Through this center, we built an optimized structure for the development, production, and supply of local products.
1991 Established the Fundamental Research Center (currently the Advanced Research and Innovation Center), which conducts R&D on future technologies that cover a wide range of fields
2014 Completed the establishment of technical centers in seven regions across the globe. Through these centers, we have set up a structure to create competitive products that can promptly meet diversifying local needs.
2020 Established the Electrification Innovation Center (EIC), which strengthens our capabilities in the development and production of electric vehicle components. Accelerated R&D activities in the green and peace of mind domains
2022 Received IEEE Corporate Innovation Award in recognition of our development of the QR Code® and our contribution to its global popularization

The Key to Our Strengths

Foresight

Commitment to World-Firsts

Creating Over 180 World-First Products

We have established "contributing to a better world by creating value together with a vision for the future" as the DENSO Philosophy. By keenly ascertaining social changes, we have been engaging in product development with a commitment to world-firsts since our establishment. We have created over 180 world-first products, including gas injection heat pump systems, common rail systems, millimeter-wave radar sensors, and ejectors, which have provided us with a driving force for growth.

Number of world-first products: Over 180

Speed

Global Development Network

Technical Centers in Seven Regions throughout the World and Laboratories in Epicenters of Innovation

We have established technical centers in seven regions across the globe, in addition to laboratories in Canada, Israel, Silicon Valley, and other epicenters of innovation. We also promptly incorporate diversified regional needs into our development process to create competitive products, which are subsequently delivered to our customers.

Number of global R&D bases: 13

Advanced Technologies

Advanced Research with a View to the Future

Advanced Research That Anticipates Future Mobility

Since its establishment in 1991, our Advanced Research and Innovation Center's mission has been to contribute to an advanced automotive society through the creation of innovative technologies. Guided by this mission, the center has pioneered advanced technologies in such fields as semiconductors, electronic materials, AI, and ergonomics. By integrating in-house technologies and skills as well as by creating industry–government–academia partnerships and collaborations with business partners, the Advanced Research and Innovation Center creates innovative technologies that help resolve social issues.

Number of new patent registrations in the automotive industry (fiscal 2023): Japan, 3; United States, 8

Further Enhancing Our Strengths

Developing Secure Industry-wide Data Linkage for the Electric Vehicle Age

In addressing increasingly complex social tasks, such as the realization of a resource-recycling society and carbon neutrality, the establishment of systems that facilitate accurate transmission of data throughout the supply chain is becoming increasingly important.

With a view to building an industry-wide ecosystem for electric vehicle batteries, NTT DATA JAPAN CORPORATION and DENSO have begun studying the establishment of a data space that will enable data management throughout battery life cycles. The companies will build the data space by leveraging DENSO's traceability technologies—which utilize in-house-developed QR Code® and in-vehicle blockchain technology—as well as the Company's expertise in the automotive industry together with NTT DATA JAPAN's know-how and extensive track record in building and operating large-scale platforms.

NTT DATA JAPAN and DENSO have concluded a basic agreement on studying a joint venture. Also, to create an industry-wide ecosystem for electric vehicle batteries, the companies made a joint application to a solicitation of proposals under the subsidy program of the Ministry of Economy, Trade and Industry, officially receiving approval as business operators in September 2022.

Our goal is for the ecosystem's platform to serve as a next-generation information infrastructure that allows the secure use of data not only among companies in industries related to electric vehicle batteries but also companies in other industries. With the aim of commercializing services by the end of fiscal 2024, NTT DATA JAPAN and DENSO will launch a study on a common platform for the automotive and manufacturing industries.

Three-pronged Solutions for Systems

DENSO has always optimized its business portfolio ahead of the times to provide society with valuable products and services that meet customer needs. For example, we expanded from our founding business in the mechanical parts field to foray into the electronics and software fields. While expanding, we enhanced our capabilities in each field and, as a result, we are now able to go beyond the manufacture of stand-alone components to offer optimal whole-system solutions that combine mechanical parts, electronics, and software. These system solution capabilities set us apart from competitors.

Roots of Our Strengths

1995 Became the first in the world to mass-produce an electronic fuel injection system (common rail system), a precursor to current system solutions, which are aligned with overall vehicle specifications as a matter of course
2007 Mass-produced an inverter with dual-side cooling. Combined our proprietary technologies from the mechanical parts, electronics, and software fields to develop a differentiated hybrid system, which was highly acclaimed by the market
2008 Launched the DENSO Project Companywide initiative. Adapted to stricter environmental regulations by enhancing ability to provide optimal vehicle solutions that straddle technology fields
2017 Developed the world's first gas injection heat pump system for mass-produced vehicles. Helped increase driving distance by managing the heat of the entire vehicle
2021 Began recurrent education program for software engineers. Met the growing need for software development and supported employees in transfer to growth fields

The Key to Our Strengths

Expertise and Know-How

Ability to Identify Customers' True Needs

Provision of Value That Exceeds Expectations

We are able not only to provide high-performance, highly reliable products and services but also to use relationships of trust with customers worldwide to gain a timely, accurate understanding of their vision and needs as well as the needs of end-users. Based on this competence and insight, we will propose solutions and participate in the early stages of vehicle development and, on occasion, participate in vehicle development in close collaboration with customers. Even as the concept of vehicles evolves in the CASE vehicle era, we will continue to realize unchanging DENSO-style value.

No. 2 share of the global market for automotive components

Realization Capabilities

Proven Technologies for Mechanical Parts, Electronics, and Software

Realization Capabilities Unique to a Comprehensive Systems Manufacturer

In addition to the mechanical parts field, in which we have been engaged since our earliest days, we have been involved in the electronics and software fields for more than half a century. DENSO has contributed to the development of mobility by combining its technologies in the fields of mechanical parts, electronics, and software to create next-generation inverters and advanced safety systems. An extensive product lineup and a long track record of utilizing and verifying technologies in the real world provide foundations for our efforts to improve each technology and realize world-beating systems.

Establishment of the IC Research Center: 1968

Human Resources

World-Class Engineers

Implementation of Technology Integration

Around the world, DENSO professionals specializing in the fields of mechanical parts, electronics, and software absorb the leading-edge technologies in each region and benefit the world by conducting rigorous evaluation and testing of products under actual operating conditions, including temperatures and usage methods. At each base, our engineers collaborate globally with customers and companies in other industries to move technologies forward and bring society the most advanced technologies and products.

Fiscal 2023 R&D expenditure: ¥521.6 billion

Further Enhancing Our Strengths

Evolving Our Software Capabilities—Toward Realization of a Vehicle Security Monitoring Service

NTT Communications Corporation and DENSO are collaborating to provide a security monitoring service for vehicles that will protect vehicles from cyberattacks. With the rapid proliferation of connected vehicles in recent years, cyberattacks are steadily increasing in sophistication. Utilizing their respective expertise in the IT and automotive fields, the companies will work together to provide a service that monitors connected cars, detects and analyzes attacks at an early stage, and takes appropriate countermeasures. Moreover, DENSO is actively promoting the standardization of vehicle security technologies through Japan Automotive Software Platform and Architecture (JASPAR).*1 Also, we are contributing to the Japan Automotive Information Sharing and Analysis Center (J-Auto-ISAC),*2 which enhances the security readiness of the wide range of companies in the automotive industry by expediting the sharing of information on cyberattack methods and software flaws targeted by cyberattacks.

*1 A standardization body for automotive technology
*2 A general incorporated association that collects and analyzes cybersecurity information and promotes the creation of infrastructure to protect connected vehicles

Highly Efficient, High-Quality *Monozukuri*

Since its inception, DENSO has consistently emphasized the creation and utilization of in-house technologies. We design and manufacture equipment, production lines, materials, and processing methods. This emphasis on in-house *Monozukuri* (manufacturing) has enabled us to provide society with products that give concrete form to the leading-edge technologies conceived by our R&D team. Having our own production technologies has also allowed us to develop high-speed, efficient production lines and compact facilities as well as streamline distribution and inspection. Moreover, in recent years we have been digitalizing know-how accumulated over many years of manufacturing and utilizing it as explicit knowledge. Such initiatives are enabling us to realize highly efficient, high-quality *Monozukuri* that adds even more competitiveness and value to our products.

Roots of Our Strengths

1968 Created the IC Research Center to establish a structure for the production of semiconductors completely in-house in anticipation of the shift to the electronic control of automotive parts in the future
1972 Established our first overseas production company. Since then, we have accelerated the establishment of additional overseas production companies and conducted production activities that meet the needs of each region.
1979 Received the Okochi Memorial Production Prize. This prize was received in recognition of our highly accurate, high-quality *Monozukuri* that was realized through our comprehensive in-house manufacturing of production lines and equipment.
1984 Launched a project for the practical application of robots. Furthermore, the development of such technologies as barcode readers and RFID,* which we pursued in a similar manner as robots, helped establish the foundation of our current factory automation (FA) business.
1997 Commenced Excellent Factory (EF) activities. Through plant improvement led by frontline production personnel, globally developed a *kaizen* (improvement) culture, which is the source of our ambitious improvement activities
2019 Began operating Factory-IoT, which networks plants worldwide to enable the accumulation, analysis, and utilization of various data. Took advantage of digital technologies to accelerate long-standing improvement activities

* RFID (radio frequency identification): A non-contact system that reads data from RF tags using electromagnetic waves

The Key to Our Strengths

Technological Capabilities

World-Leading Production and Engineering

Mass Production of World-First and World-Best Products

DENSO boasts world-class micro-processing accurate to 1/1000mm and assembly lines that increase both production efficiency and quality. Our research on leading-edge production, elemental, processing, and measurement technologies as well as our development of production lines and systems that incorporate these technologies underpin products with world-leading performance and quality.

Amount of capital expenditures (fiscal 2023): ¥366.8 billion

Analytical Capabilities

Factory-IoT (F-IoT) That Leverages the Knowledge of People to the Greatest Extent Possible

Working to Improve Productivity That Connects People and Factories Globally

We analyze the abundance of data we have on people, products, and facilities and convert it into valuable information, such as information on signs of equipment flaws and information on the know-how of experts. We offer such information to people that desire it at the times they need it and in a format that they prefer. By doing so, we are accelerating activities aimed at making improvements and contributing to the growth of people. The linking of approximately 130 plants globally is improving productivity Groupwide.

Number of plants with F-IoT: Approx. 130

Frontline Capabilities

Excellent Factory (EF) Activities That Realize Growth for Both Factories and People

Eliminating Product Defects and Lost Operational Time

All plant personnel participate in EF activities led by plant managers. By seeking overall plant optimization and conducting careful verification before production line start-ups, EF activities create plants in which issues are readily identifiable. When issues occur, all plant personnel address them by continuously making improvements. In this way, EF activities foster personnel who are particularly skilled in realizing improvements and enable DENSO to achieve world-class competitiveness.

Energy conservation grand prize award: Received for 13 consecutive years

Further Enhancing Our Strengths

Saving Energy by Utilizing Data and Mobilizing All Personnel

To save energy in frontline *Monozukuri* operations, DENSO is incorporating data utilization expertise it acquired when improving the efficiency and quality of production activities.
(1) Converting veteran employee insights into explicit knowledge so that anyone can benefit from the veterans' understanding and wisdom
(2) Using dedicated tools to visualize normal and abnormal conditions, automatically calculate effects, and facilitate the data-driven flagging of situations requiring attention
(3) Calculating the energy required for the manufacture of a single product to establish management indicators that can evaluate improvement efforts regardless of production fluctuations

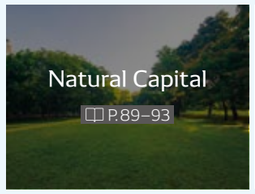
By incorporating the above three features of data utilization into the management of energy-saving activities and systematizing them, we have realized data-driven energy-saving activities that are not dependent upon particular individuals and to which all employees can proactively contribute. More specifically, we created energy loss analysis models based on veteran employee insights, standardized data analysis results into "diagnostic tables," and then introduced KPIs that were acceptable to all personnel. As a result, production line personnel are now able to manage energy savings themselves.

The aforementioned efforts have led to the discovery of new measures, which are enabling energy savings of between 1% and 5% on each production line. Moreover, personnel continuously pursue a 4% annual improvement in energy savings—DENSO's ambitious energy-saving target. In recognition of its advanced data-driven energy-saving initiatives, in fiscal 2023 DENSO received an energy conservation award—the Director-General Prize of the Agency of Natural Resources and Energy.

Our Accumulated Capitals

The capitals that we have accumulated while achieving growth as a company now support our business activities and provide us with a source for enhancing our corporate value. Efforts to refine the substance of the strengths that drive our growth will allow us to reinforce our human, manufacturing, intellectual, natural, and social and relationship capitals, which in turn will help us increase our financial capital. To realize sustainable growth through this kind of cycle, we will not only maintain but also strengthen these capitals going forward.

Correspondence of Financial and Non-Financial Capitals to Business Growth and Social Issue Resolution

Capitals	Our Vision	KPIs (FY2026 Targets)	Initiatives to Strengthen Capitals	Business Growth: Creation of New Value	Business Growth: Profit Growth	Business Growth: Reduction in Capital Cost	Social Issue Resolution	Relationship with SDGs
	Striving to Realize a Lean, Sturdy, and Flexible Operating Structure	ROE: 10% or higher Operating margin: 10%	• Reinforce profit structure • Reduce low-profit assets • Improve capital structure • Engage in dialogue with markets	• Bold investment in new and growing fields through well-focused investment • Development of next-generation technologies through swift R&D, including collaboration with partners	• Improvement in ROIC through business portfolio reweighting • Growth in profits based on realization of growth in the CASE vehicle field • Curbing of fixed costs through disciplined investment management • Improvement of asset efficiency based on reduction of cross-shareholdings and reduction of cash on hand	• Improvement of capital structure through utilization of borrowings and augmentation of shareholder returns • Reduction in cost of shareholders' equity through stepped-up investor relations activities	• Carbon-neutral society • Elimination of traffic accident fatalities • Carbon-neutral *Monozukuri* • Optimal logistics systems with no waste • Stable global production and supply • Creation of a global environment where people can live with peace of mind • Development of *Monozukuri* personnel	
	People and Organization That Form a Group of Professionals with the Ability to Make Their Ambitions a Reality	Rate of affirmative responses in employee engagement survey: 78% Number of women in management positions Business fields: 200 Technical fields: 200	• Renewal of human resource policies and systems • Support for employee career realization • Creation of open workplaces full of vitality	• Creation of innovation through interaction among employees who are diverse in terms of their personalities, values, and experience	• Increase in profits through deployment of personnel to growth fields • Improvement of efficiency based on enhanced digital transformation literacy • Optimal resource utilization through deployment of personnel to the most suitable in-house positions	• Increase in highly productive personnel through the utilization of evaluation and compensation systems based on roles and performance		
	Realization of Resilient *Monozukuri* through Technical Skills That Continuously Evolve and the Utilization of Global and Digital Technology Capabilities	Capital expenditures: ¥350.0 billion Planned investment in efforts to reduce CO_2 emissions: ¥100.0 billion (FY2023–FY2026) • Increase in ability to respond on a global basis to volatility	• Establishment of global production and supply capabilities • Realization of digital-twin plants	• Realization of a circular economy through energy recycling systems and resource reuse	• Pursuit of sales growth and profits through global production and supply capabilities • High quality and production efficiency that are enabled by digital-twin plants • Productivity improvement based on data analysis • Cost reduction through disciplined investment decisions • Contribution to energy and resource savings	• Reduction of supply risk through the building of a resilient supply network • Stable manufacturing based on integration of the supply chain		
	Promoting R&D Activities That Realize World-First and World-Best Offerings with a Focus on the Trends of the Times	R&D expenditure: ¥450.0 billion Number of software engineers: 12,000 • Expansion and acceleration of R&D	• Augmentation of semiconductor development • Increase in the efficiency of mass production development • Development of software engineers • Acceleration of advanced research • Building of an intellectual property portfolio	• Creation of world-best and world-first products through leading-edge technology research	• Establishment of competitive advantages for CASE vehicles and semiconductors through investment in and deployment of personnel to growth fields • Improvement in the efficiency of software development through the utilization of digital transformation	• Establishment and maintenance of competitive advantages inside and outside the automotive industry through an increase in the creation of patents that can be utilized by other companies		
	Pursuing Environmental Neutrality to Both Preserve the Global Environment and Create Economic Value	Realization of industry-leading carbon neutrality (manufacturing) FY2026 (with carbon credits) FY2036 (without carbon credits) • Efficient utilization of natural capital • Reduction of environmental impact	• Thorough energy-saving activities in all facets of our operations • Introduction of renewable energy based on economic rationality • Efficient utilization of natural capital through recycling, among other measures • Minimization of environmental impact based on the reduction of waste and emissions	• Creation of innovative energy-saving technologies, such as CO_2 recycling systems, through the application of automotive environmental technologies	• *Monozukuri* that is both carbon neutral and profitable • Development and popularization of electric vehicle components in response to increasingly stringent environmental regulations	• Environmental impact reduction activities that lower the cost of countermeasures for future physical risks related to the environment • Reduction of resource depletion risks through the effective use of resources • Acquisition of excellent human resources through the establishment of an environmental brand		
	Strengthening Our Bonds with Diverse Stakeholders through Dialogue in Pursuit of Mutual Growth	Number of suppliers: Approx. 7,360 (FY2023 results) • Establishment of good relationships • Reinforcement of other capital through the creation of allies	• Enhancement of dialogue with all stakeholders • Building of an unshakable corporate foundation	• Creation of new value through collaboration with business partners	• Offering of products and solutions that inspire customers and greater society • Achievement of supply stability through reinforcement of relationships with suppliers and reduction of production costs through risk management	• Elimination of information asymmetry with shareholders and investors through the provision of timely, appropriate information		

DENSO Integrated Report 2023
DENSO's Value Creation Story

Tradition of Sustainability Management

Since its founding, DENSO has taken on ambitious initiatives to address social issues through its businesses. In other words, we practice sustainability management and continuously provide society with new green value and peace of mind value. Our consistent approach to business reflects the DENSO Creed, which calls on us to "provide quality products and services."

To continue in the spirit of our creed and keep practicing sustainability management even as times change, we have established the DENSO Group Sustainability Policy and incorporated social issues into the Long-term Policy for 2030 and as an integral part of our material issues (Materiality P.36–37). We are currently tackling these social issues through our business activities. This section provides an overview of our structure for promoting sustainability management implementation as well as specific related initiatives.

Business Activities (Corporate growth) × **Social Issue Resolution** (Sustainable society creation) = **DENSO Sustainability Management**

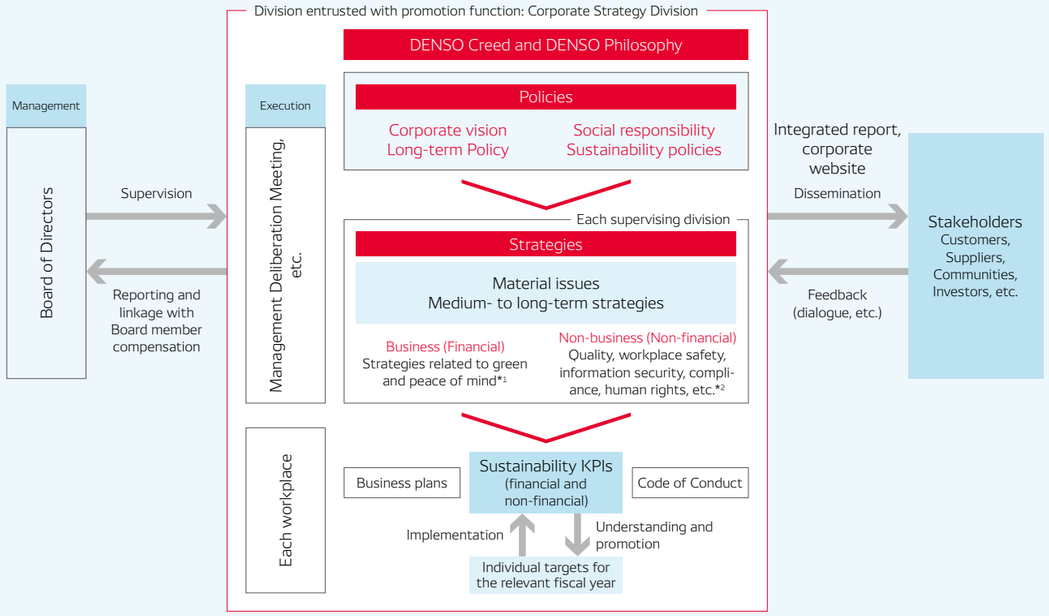
Promotion Structure for Sustainability Management

The executive vice president and representative member of the Board supervises the Corporate Strategy Division, which is responsible for promoting Companywide sustainability management. This division is involved in such efforts as drafting policies and action plans related to sustainability, providing follow-up support for the sustainability activities of each division, and engaging in internal and external communication.

Furthermore, matters such as the direction of sustainability management and the status of Companywide sustainability activities are reported to and deliberated on by the Company's formal committees (such as the Management Deliberation Meeting) and overseen by the Board of Directors. In addition, the divisions in charge of individual sustainability themes promote activities to address these themes in collaboration with relevant divisions and after deliberation on said themes by each expert committee.

Also, to promote and entrench a culture of sustainability and disseminate related information, each DENSO CORPORATION division, domestic Group company, and overseas regional headquarters appoints one sustainability leader, who is tasked with ensuring the penetration of a culture of sustainability throughout workplaces.

Promotion Structure and Division for DENSO's Sustainability Management



*1 Strategies deliberated on by the Management Strategy Meeting and the Management Deliberation Meeting (see page 100)
*2 With committees in charge of these themes, such as the Quality Assurance Meeting and the Companywide Safety, Health, and Environment Committee serving as the secretariat, initiatives to address these themes are deliberated on by the Company's formal committees.

Please see this URL to view the DENSO Group Sustainability Policy.
https://www.denso.com/global/en/-/media/global/about-us/sustainability/management/management-doc-sustainability-policy-en.pdf

DENSO Integrated Report 2023
DENSO's Value Creation Story

TOPIC

The DENSO Group is further accelerating the implementation of sustainability management by advancing the following initiatives.

Company and Management	Establishing sustainability KPIs and following up on progress toward Company goals P.36–37 Incorporating sustainability KPI achievement levels into evaluation indicators for officer remuneration P.104–106
Employees	Group companies and regional headquarters educate and communicate information to employees in effective ways that reflect the culture of their respective region or company so that each individual can practice and discuss sustainability in their work.

Example 1: Communication Sheet (Personal Work Goals) × SDGs × Employee ID Cards (Japan and other countries)

When setting personal work goals for the year, employees consider which SDGs their work contributes to, and the icons of these SDGs are then displayed on their employee ID cards and business cards. This allows employees to recall at any time the SDG-related personal goals that they have set themselves. Also, sharing these goals with coworkers from time to time provides employees with an opportunity to talk about contributions to the SDGs.

Example 2: "The SDGs and I" Essay Contest (China)

To encourage each employee to think about the connection between their work and the SDGs, we invited employees throughout China to submit essays themed on "The SDGs and I." From among the approximately 500 submissions, we selected a first-place essay and other excellent essays and presented awards accordingly. Via the intranet, the essays were shared with the DENSO Group employees not only in China but also in other countries to provide Group employees with a reference for thinking about the connections between their work and the SDGs.

Example 3: Caravan Activities for Group Companies in Europe

In Europe, our Group companies operate across multiple countries. To share the sustainability management philosophy throughout our operations in the region, SDG ambassadors and SDG experts held briefing sessions for the senior management of European Group companies. We also instilled the philosophy by sharing a video on the SDGs, which the head of the European headquarters created, and by holding workshops at Group companies, which sustainability leaders from the European headquarters conducted.

MESSAGE

Each Employee × Sustainability
Realization of Sustainability through My Work

I want to realize carbon-neutral *Monozukuri* and create a sustainable society.

Yusuke Shioya
Safety, Health & Environment Division

I formulate and promote energy strategies aimed at achieving carbon-neutral *Monozukuri*. I find my work very satisfying because purchasing the most inexpensive and stable renewable energy helps DENSO achieve both competitiveness and CO_2 emissions reduction, which in turn advances the Company. My goal is to realize carbon neutrality so that we remain competitive while helping society as a whole grow sustainably.

I am proud that the spread of automated driving will save many lives.

Nanami Maki
Vehicle Safety System Technology Department

I am responsible for the development specifications of the interface of Global Safety Package, a product that assists drivers and helps improve the safety performance of vehicles. My mission is to provide society with high-quality products. I take great pride in the fact that my work is directly linked to the reduction of automotive accidents, which saves many lives.

Special Feature: Value Creation in Action

Popularizing Carbon Recycling by Taking On the Challenge of Efficiently Capturing CO_2 Anywhere

In the quest for carbon neutrality, as well as the reduction of CO_2 through decarbonization, the capture and reuse of CO_2 emissions, known as carbon recycling, is becoming a focus of attention. To efficiently realize CO_2 capture anywhere, DENSO is developing and introducing a compact, highly efficient CO_2 capture system.

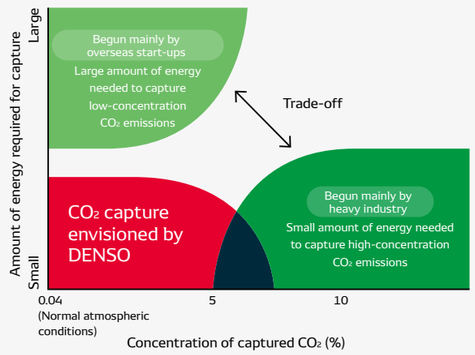
Social Backdrop

Although society's realization of carbon neutrality is premised on the decarbonization of the power generation sector, other sectors must also convert to energy that does not emit CO_2, such as electricity and hydrogen. However, in fields where utilizing electricity or hydrogen is challenging, other approaches are required. The basis of such approaches are CO_2 capture, utilization and storage (CCUS) technologies. These technologies must not only capture the CO_2 emitted in the future but also the CO_2 emitted by humans in the past. For example, since 2022 DENSO has been using a CO_2 recycling plant installed at the Anjo Plant to conduct verification tests of CCUS technologies.

Developing a System That Can Efficiently Capture CO_2 Anywhere

In developing systems that efficiently capture CO_2 anywhere and enable carbon recycling to become ubiquitous, making CO_2 capture possible in a wide range of locations and with minimal energy consumption is critical. If we are to realize carbon neutrality, we must economically capture the massive amounts of CO_2 emitted by manufacturing, transportation, and other human activities.

The energy used to capture low-concentration CO_2 emissions must be less than the energy gained through emissions capture. Also, ideally, CO_2 emissions should be captured near utilization locations to minimize CO_2 emissions resulting from the transport of captured CO_2.



DENSO will capture low-concentration CO_2 emissions with small amounts of energy.

With respect to the trade-off between the energy consumed for CO_2 capture and CO_2 concentration, DENSO aims to realize a compact, highly efficient CO_2 capture system by taking advantage of the vehicle technologies that the Company has developed. If we can create a compact system that efficiently captures low-concentration CO_2 and is usable anywhere, CO_2 capture that is more closely integrated with daily life will become possible through installation of the system on rooftops, in homes, and in myriad other locations.

Developing a System That Leverages DENSO's Strengths

To enable the efficient capture of CO_2 anywhere, DENSO is developing a system that utilizes a new capture method. Conventional CO_2 capture uses a thermal method, which entails temperature increases and decreases. Consequently, this method requires large amounts of energy for heating and cooling. Systems that use this method tend to be large.

DENSO is utilizing its vehicle technologies to develop a CO_2 capture technology known as the electric-field method. This method captures CO_2 by switching voltages, rather than by raising and lowering the temperature. Our system only requires small amounts of energy to capture CO_2. Moreover, it is more compact than conventional systems as the unit does not need heating and cooling equipment.

In developing technologies for the electric-field method, we are using many of the elemental technologies that we have developed over the years, including air, heat, and power management technologies as well as our expertise in ceramic catalyst manufacturing. In addition to elemental technologies, we have expertise in system optimization that advances both hardware and software elements as well as in technologies for the mass production of high-quality products at low cost. By combining these advantages, we aim to realize and popularize a compact, highly efficient CO_2 capture system.

Utilizing CO_2 in the Future

We plan to proceed with the in-house verification of the aforementioned CO_2 capture system and begin real-world utilization and verification of the system in fiscal 2024. We will gather feedback from the market and our partners to discover the type of locations in which DENSO's compact CO_2 capture system is needed and then explore various ideas for its utilization.

There are multiple ways to utilize CO_2. As well as the direct use of CO_2 for such applications as food processing, we anticipate the recycling of captured CO_2 for other applications. The various potential uses of CO_2 are attracting attention, which include utilization for conversion to minerals, the production of chemicals such as plastics, and as an alternative to city gas and other fuels.

For carbon recycling to succeed, however, technologies related to hydrogen and other such substances are also necessary. Therefore, we are collaborating with our hydrogen-related development team and many different partner organizations to explore optimal recycling approaches. At the Anjo Plant's CO_2 capture verification plant, we are conducting verification tests in which methane is synthesized from captured CO_2 and hydrogen that is produced through the use of solar power-derived electricity. The methane is then reused as a heat source for the Anjo Plant.

We will contribute to carbon neutrality by adopting a two-pronged approach to technology development for CO_2-based carbon recycling. On the one hand, we are focusing on utilizing captured CO_2 as soon as possible. In parallel with these efforts, we are adopting a longer-term viewpoint and exploring carbon recycling methods that use captured CO_2.

Value Provided to Society

Showing the Way to Carbon Neutrality by Increasing the Potential of CO_2 Capture

By promoting the widespread utilization and verification of our compact, highly efficient CO_2 capture system, we will enable CO_2 capture in all manner of locations, making carbon recycling more accessible and increasing the options for its introduction. Our aim is to contribute to carbon neutrality by establishing a different paradigm to that of decarbonization. As well as our current utilization of the CO_2 recycling plant at the Anjo Plant to conduct verification tests, we are promoting CO_2 capture in various situations to accelerate the trend toward energy recycling throughout society. Through utilization of the CO_2 capture system and other initiatives, we aim to achieve a 25% reduction in our Scope 3 CO_2 emissions compared with fiscal 2021 by fiscal 2031.

MESSAGE

Capturing Humanity's Legacy CO_2 Emissions

DENSO has supplied society with numerous automotive systems. For example, we develop systems with excellent environmental performance that minimize CO_2 emissions. However, entirely eliminating the CO_2 emitted by vehicles that use our systems and by manufacturing processes is not possible. Therefore, we hope to utilize in-house developed technologies to effectively capture and recycle past and future CO_2 emissions. We believe advancing such efforts is our corporate responsibility.

Going forward, the flexibility of the CO_2 capture system, which makes full use of DENSO's technologies, may facilitate CO_2 local-production-for-local-consumption arrangements whereby CO_2 emissions captured from households and commercial buildings are utilized for an array of different applications. With our sights set on carbon neutrality, we will work with various partners to create a major carbon-recycling trend.

From left:
Minoru Morisaka, Business Development Department, Environment Neutral Systems Development Division
Kenji Tani, CO_2 Systems Development Department, Environment Neutral Systems Development Division
Kurumi Usuki, Social Energy Design Project Department, Automotive & Life Solutions Division