Past, Present, and Future /

DENSO's Value Creation Story

Continuing to Create Value for the Mobility Society

/ Identity /

DENSO Culture Inherited from the DENSO Creed

In 1956, seven years after the Company's founding, we formulated the DENSO Creed to express in words the mentality of all DENSO employees—which we have had even before splitting from Toyota Motor Co., Ltd.—while taking the next step toward new progress based on a clear self-awareness.

Without changing the values encapsulated in the DENSO Creed, we formulated the DENSO Philosophy in 1994 to reflect the social changes occurring at the time. In addition, to share our value system on a global basis, we established the DENSO Spirit in 2004. The four ideals of the DENSO Creed, which have served as the source of the Company's progress, have been gradually passed down through the years and are still inherited today by our approximately 170,000 employees across the globe.

Four Ideals of the DENSO Creed

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 for 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.

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.

Hardships and Challenges at the Time of Our Founding

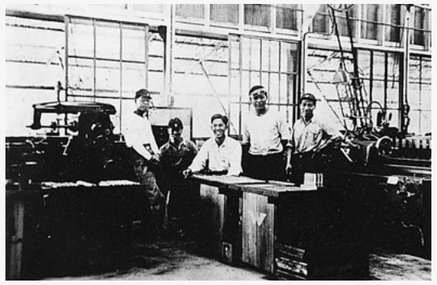
DENSO overcame the numerous hardships it faced at the time of its founding and continued to develop since with the desire to realize an even better society, which is encapsulated in the DENSO Creed. The desire serves as the starting point of DENSO and remains with the Company even to this day. Recently, as DENSO enters into the period of its second founding, there is a need to 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.

1935

Taking on the Challenge of Producing Electrical Equipment In-House

During an extremely difficult period in which we did not possess the proper tools and equipment, our determination alone is what allowed us to achieve success.

In 1933, an automobile department was established within Toyoda Automatic Loom Works, Ltd. (currently Toyota Industries Corporation). In 1935, 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 internally became an extremely difficult task. At the time, the quality of electrical equipment was unstable, and there was a growing opinion that promoting the in-house production of such equipment was not a task the company should undertake. As a result, Mr. Toyoda stated to Mr. Suzuki that this task seemed to be far harder than he 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 to realize in-house production for one more month. Sometime after doing so, the enthusiasm and the 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

The Birth of NIPPONDENSO

Even without a clear path forward, we were resolved to make one on our own and move forward on it no matter what the outcome.

In 1949, 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 chose the name NIPPONDENSO ("Nippon" meaning Japan), rather than KARIYADENSO, AICHIDENSO, or TOKAIDENSO, which are names of the local area where the company was founded, to display his conviction toward becoming self-reliant and expanding the company. Amid a recession and a lack of materials and equipment, NIPPONDENSO got off to a rough start. However, a strong bond was formed among the company's employees.

Initiatives after Splitting Off and Being Established as a Separate Entity

Development of Electric Vehicles
In 1950, we commenced production of a battery electric vehicle (BEV) that could travel up to 195 km with one charge.

Development of Electric Washing Machine
In 1950, we launched a drum-type electric washing machine, which at one point was the best-selling washing machine in Japan, selling over 1,000 units per month.

Modernization of Facilities
In 1952, we decided to purchase new facilities over a four-month period for a total of ¥160.0 million (net sales at the time were ¥1,148 million).

1950

Moving Forward with a Strong Labor–Management Relationship after Settling Labor Disputes

Pursuing the Highest Quality and the Lowest Price through the United Efforts of All Employees to Become No. 1 in the Industry

Chaotic economic conditions continued after NIPPONDENSO split off from Toyota Motor to become its own company, and in 1950, the company declared its intention to rebuild itself. Then company member of the Board Tatsuo Iwatsuki (who would later become president of DENSO) stated that, "we are approaching rough seas as a company, and I would like to see management make a proposal in order to stop this ship from sinking." A workforce reduction of 473 employees, which was roughly one-third of all employees at the time, was subsequently carried out. In addition, Mr. Iwatsuki also penned a startling article in the company newsletter, titled "Will NIPPONDENSO fail?" in which he stated how it would be difficult to protect the company from failure in the domestic market if dramatic changes were not made. He also communicated to employees that, "to be the No. 1 company in the industry, we have no choice but to compete by offering the highest quality at the lowest price." After a 29-day labor dispute, labor and management achieved mutual trust, and this trust helped commence efforts to build a management foundation that aimed for the highest quality and the lowest price through the united efforts of all employees.

Initiatives That Leveraged the Knowledge Gained from Robert Bosch

Origins of *Hitozukuri*
In 1954, we established a technical training center offering a three-year course to people who have graduated from junior high school, thereby fostering the principle of "*Monozukuri* is *Hitozukuri* (our performance relies on our people)."

Establishment of Standards and Regulations
We created the original DENSO Design Standard based on the German "Bosch" standards (a rigorous set of standards that cover everything from production to management).

Establishment of a Service Station Network
In 1954, we commenced plans to establish a network of service stations in an effort to enhance quality for end-users in each region across Japan.

1953

Start of Technical Cooperation with Robert Bosch GmbH

Becoming a Trusted Company That Customers Could Feel Confident in Choosing

After resolving labor disputes and beginning efforts to rebuild, the special demand stemming from the Korean War breathed new life into NIPPONDENSO's management. However, in terms of technology, there was a clear disparity between NIPPONDENSO and companies in Europe and the United States, resulting in an urgent need to achieve international-level technology and quality as quickly as possible. At the time, the German-based Robert Bosch GmbH was roughly 10 times larger than NIPPONDENSO, but through the mediation of Dr. Tokushichi Mishima (inventor of MKM steel), the recommendation of Kazuo Kawamata (the president of Toyo Motors), and the determination and agility of our management, we were able to enter into a technical alliance with Robert Bosch. While learning various aspects from this company, we established a technological, quality, and business foundation that could compete on an international level.

1956 Formulation of the DENSO Creed

Of the 1,450 employees of NIPPONDENSO at the time, roughly 40% joined the company after it split off to become its own company. This meant that there were a growing number of employees who did not know about the struggles the company had faced since its founding. To that end, we established the DENSO Creed based on ideas submitted by employees in order to clarify our purpose and our vision for employees.

Value Creation That Draws on DENSO Culture

The DENSO Creed, formulated after overcoming the hardships and challenges we faced since our founding, and the principles enshrined within it provide the source of our value creation to this day. In this section, we introduce iconic examples that embody the four principles of the DENSO Creed and that demonstrate how we have delivered value to our customers and society throughout the years.

1959

Pursuing Efforts to Achieve the Deming Prize

Competing on a Global Stage with Quality, Not Price

International competition began to intensify with the approaching liberalization of automotive trade. To survive under such circumstances, we decided to pursue efforts to achieve the Deming Prize, one of the most prestigious awards for quality control. Accordingly, we participated in interviews with companies that had received the prize and attended outside seminars. We also established quality-related educational activities specific to employee rank. Further, study sessions for employees on the front lines were held on a near-daily basis. Without being overly confident in the knowledge and experience we had accumulated in the past, we worked on a Companywide level to learn about quality control and revised the way we approached our work from the bottom up. As a result, in October 1961, we became the first Toyota Group company to receive the Deming Prize. Our efforts toward receiving this prize laid the foundations for the "Quality First" approach and corporate culture that we still embrace to this day.

"Cherish modesty, sincerity, and cooperation."

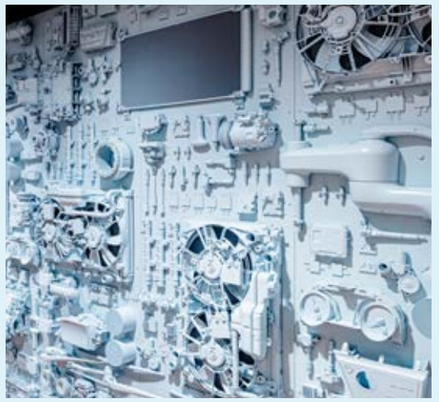
1968

Transition to the In-House Production of Semiconductor Products

Learning and Acting with the Utmost Sincerity So That We Could Pave the Way for the Creation of Products with Social Value

In 1968, we established the IC Research Center in anticipation of the shift to the electronic control of automotive components in the future. Through this center, we commenced the automotive industry's first full-scale development of semiconductors, including their manufacture. We believed that only an automotive component manufacturer such as ourselves could realize semiconductors that operate in the unique environment of an automobile. Accordingly, to provide products that offer true value to society, we worked to acquire production facilities, establish an R&D structure that included external experts, and sought knowledge from large-scale semiconductor manufacturers in other industries. After successfully mass-producing semiconductor products, we continued to challenge ourselves with the development of even more ambitious products, which helped grow electronic-related products, including semiconductors, into one of our mainstay products today.

"Be trustworthy and responsible."



Development of Over 130 World-First Products

Creating Technologies That Led the Era

We began to expand from electrical equipment to overall system development, including power transmission and air-conditioning, and promptly established the IC Research Center in anticipation of the shift to the electronic control of automotive components in the future. Through such efforts, we have thus far created over 130 world-first products, including the independent development of robots and QR codes. To this day, we remain determined to further refine our technologies in various fields at our cutting-edge research centers, global technical centers, and other locations with a focus on five to 20 years in the future.

"Be pioneering, innovative, and creative."

Development of QR Codes—Resolving Individual Issues on the Front Line

In the 1990s, frontline manufacturing began to shift toward the production of a wide variety of products in small quantities. Against this backdrop, there was a need to increase barcode capacity in order to manage production in a more meticulous manner. As we started to understand the limitations of improving barcode scanning alone, we commenced the production of two-dimensional codes which have larger capacity than conventional ones. Furthermore, to accelerate reading speed, we analyzed the proportions of various letters and symbols to incorporate ones with unique proportions into these codes. By doing so, we developed QR codes with large capacity and high-speed readability. QR codes are now being used in a wide variety of settings across the world. Particularly, in recent years, QR codes are being put to use in a wider range of areas, such as traceability systems that leverage these codes together with blockchain technology.

Please see the following URL, "Revolutionizing traceability with QR Codes and blockchain," for examples of QR code utilization.
https://www.denso.com/global/en/news/stories/all/211018-01/blockchain

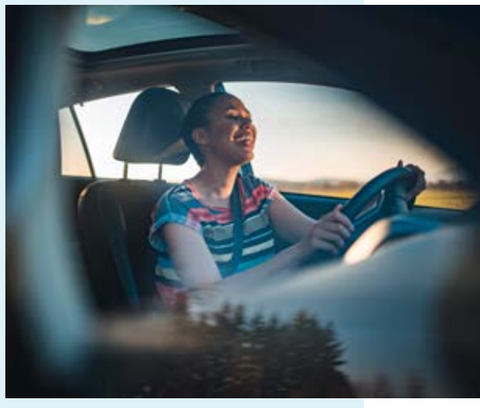
1972

Leading the World with the Electronic Control of Engine Combustion

Understanding That We Are Working to Bring Smiles to the People of the Future

The United States became the first country in the world to enact regulations on exhaust gas due to the worsening problem of air pollution. With regulations regarding automobiles becoming more rigid in the 1960s, we developed electronic fuel injection (EFI) systems with a focus on creating an even better tomorrow. As EFI systems have free control over the engine, we believe they could become a future mainstay product that could clear next-generation environmental regulations without sacrificing fuel efficiency and drivability. We therefore commenced the development of these systems even without a previous track record of doing so. Based on the idea that individual components should be thought about, designed, and evaluated based on the overall system that is the automobile, we were able to produce a demo vehicle equipped with an internally developed EFI system. This demo vehicle was introduced to and eventually adopted by our customers. The endeavor reflected our desire to enhance the attractiveness of automobiles while addressing their negative aspects and to provide the highest level of quality possible from the customer's perspective. This desire remains unchanged to this day.

"Provide quality products and services."



/ History /

History of Innovation and Creation

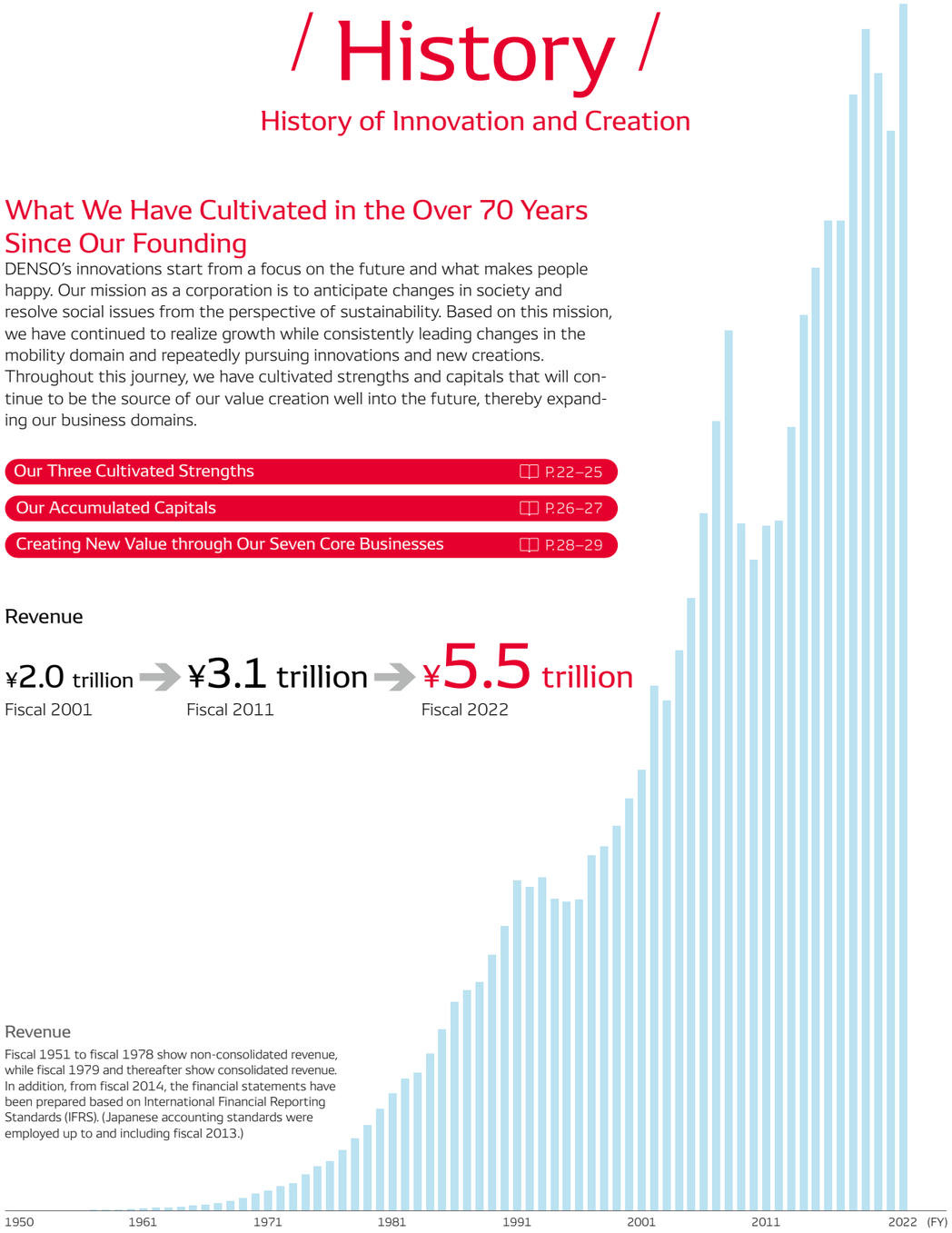
What We Have Cultivated in the Over 70 Years Since Our Founding

DENSO's innovations start from a focus on the future and what makes people happy. Our mission as a corporation is to anticipate changes in society and 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 and repeatedly pursuing innovations and new creations. Throughout this journey, we have cultivated strengths and capitals that will continue to be the source of our value creation well into the future, thereby expanding our business domains.

Our Three Cultivated Strengths P.22–25
Our Accumulated Capitals P.26–27
Creating New Value through Our Seven Core Businesses P.28–29

Revenue

¥2.0 trillion (Fiscal 2001) → ¥3.1 trillion (Fiscal 2011) → ¥5.5 trillion (Fiscal 2022)



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.)

History of Creating Value to Address Social Issues

● Green ● Peace of mind

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

●		Developed and mass-produced the battery electric vehicle "DENSO-GO" to reduce 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.

1960s
Taking on the challenge of addressing air pollution in advance of tightening emission regulations

●		Achieved the practical application of 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.
●	●	Established a system for the complete in-house production of integrated circuits (ICs) for automobiles. Accumulated a large amount of knowledge on the importance of semiconductors and ICs by conducting thorough analysis

1970s
Responding to full-fledged regulations on exhaust gas and building a foundation for safety products

●		Established Nippon Soken Inc. through a joint investment with 10 other automotive component manufacturers with the aim of researching technologies to address exhaust gas
●		Developed O_2 sensors as an important tool for controlling exhaust gas. Vehicles equipped with DENSO systems comprising EFI, O_2 sensors, and three-way technology 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. Due to the fact that our EFI systems could comply with strict exhaust gas regulations, 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.

1980s
Accelerating the commercialization of safety systems for preventing traffic accidents causing fatalities

●		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

1990s
Contributions to eco-friendly lifestyles with core technologies

●		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-type 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

2000s
Popularizing and expanding safety products and products powered by electricity

●		Formulated DENSO Eco Vision 2005. Accelerated efforts to reduce CO_2 emissions from business activities
●		Developed 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 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.

2010s
Entering into a once-in-a-century paradigm shift

●		Developed motor generators. These motor generators realized highly efficient, eco-friendly power generation and driving.
	●	Developed Global Safety Package 1, 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 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
	●	Developed *Proform T-cube*, an environmental control device for agricultural greenhouses, with the aim of supporting agriculture in Japan and avoiding future food crises

2020s–
Aiming for excellence in the domains of green and peace of mind

●	●	Formulating comprehensive strategies in the domains of green and peace of mind. We are accelerating initiatives with the aim of realizing carbon neutrality by 2035 and becoming a leading company in terms of offering peace of mind to society.
●		Strengthening our development structure and global production structure for products powered by electricity, including at the Hirose Plant and the Electrification Innovation Center. Through this effort, we aim to realize an annual production of 1,200 inverters by 2025.
	●	Developing 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.

2030s–
Responding to the dramatic changes in the social environment by leveraging our long-cultivated strengths to adapt and expand our areas of contribution

Through these efforts, we aim to be a company with an indispensable presence in society.

Adapting and Expanding Our Areas of Contribution

Expanding our business domains

In-vehicle products	Air mobility	CO_2 capture Industrial devices (FA)	Urban development Social solutions
Automobiles	Mobility	Industry	Society

The Greatest Strengths That Have Driven DENSO's Growth

Our Three Cultivated Strengths

Over its 70-year history, DENSO has cultivated various unique strengths. These strengths have been passed down since DENSO's founding and further refined through the Company's 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.

Relationship Between Our Three Strengths

Support and realize sustainable growth as a source of value creation

Refine and strengthen frontline technologies and capabilities

Create world-leading technologies as products

Leverage knowledge gained from products in technological development

Initiatives That Combine Our Three Strengths

Significantly Enhancing the Performance of BEVs through a Highly Efficient Eco Heat Pump—A World-First Technology

Our highly efficient eco heat pump system, which is adopted in the Toyota bZ4X and the Subaru Solterra, is a new product that helps increase the practicality of BEVs. This system makes effective use of energy in BEVs, which do not have an engine to provide a heat source, by extracting heat from outside air and using it as a heat source.

To significantly increase cooling and heating performance compared with conventional products, we used advanced heat control technologies to simplify the refrigeration cycle into a receiver cycle. By doing so, we successfully improved cooling and heating performance while reducing the number of required components. In addition, the heat pump system is equipped with the world's first defrosting function that activates when the BEV is moving, utilizing driving exhaust heat. This function helps improve the energy efficiency of BEVs. Furthermore, through DENSO's ultrafine processing technologies, a strength of our *Monozukuri* activities, we realized the system's high-performance compact chiller, which contributes to greater battery cooling performance.

Through the introduction of model-based control development, we have significantly reduced the development period and working hours required to develop these kinds of new products, which bring together our strengths and world-first technologies. In addition, the development project for this heat pump system was made possible by the comprehensive knowledge and capabilities of the project's diverse team members, comprising personnel from four Toyota Group companies and 16 divisions of DENSO. Going forward, we will continue to create attractive products for BEVs together with our customers by bringing together our three strengths of *Hitozukuri*, R&D, and *Monozukuri*.

1: *Hitozukuri*

"The best products are made by the best human resources." DENSO has positioned human resources as its most important management resource. Accordingly, the Company has focused on the training and skill development of employees based on the idea that human resource development supports R&D and *Monozukuri* (manufacturing). We are also globally promoting a broad range of initiatives to develop leaders who can take charge of new businesses and oversee the future of DENSO so that we can continue to achieve continuous growth going forward.

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.
1961	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.
1977	Received our first gold medal in the WorldSkills Competition. Receiving this medal was the result of our skills training on which we have been focusing our attention since our founding.
2001	Commenced the Technology Discussion Forum, which encourages healthy competition among our engineers through group discussion and interaction.
2005	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.

The Key to Our Strengths

Spirit of Our Founding + Diversity + Skills

DENSO Spirit + Global human resource development + Cultivation of young technicians

Boldly Taking On New Challenges No Matter What the Circumstances

The DENSO Spirit is one of foresight, credibility, and collaboration. It also establishes a culture of values and beliefs that DENSO has cultivated since its establishment in 1949. Accordingly, the DENSO Spirit is shared among all employees. As an action guideline that provides the driving force for contributing to the mobility society and the lifestyles of people as well as the source of our competitiveness, the DENSO Spirit permeates the actions of the approximately 170,000 DENSO Group employees around the world. Guided by this spirit, we are using the passion and ambition of all our employees as the driving force for implementing our day-to-day work procedures and accelerating innovation amid this period of dramatic change.

Number of employees (fiscal 2022): Approx. 170,000

Introducing a Global Common Personnel Management System to Promote the Active Role of a Diverse Group of Employees

DENSO introduced a global common personnel management system targeting the members of senior management at its headquarters and at each Group company. This system incorporates a "Global Individual Grade" that focuses on the individual capabilities of senior management members. By using a common grading tool to evaluate and promote its senior staff, DENSO allows its personnel around the world to develop their careers on a global scale.

Ratio of local employees in leadership roles at overseas bases (fiscal 2022): 26%

Nurturing Advanced Technicians as the Key to Corporate Growth

To nurture advanced engineers and technicians, DENSO has been operating the DENSO Industrial School (offering industrial high school and specialized vocational high school courses), which carries on the tradition of the technical training schools established in 1954. In addition to domestic Group companies, this school supports the development of technicians from certain suppliers and overseas offices. Many young technicians who participated in our educational systems have gone on to become WorldSkills Competition medalists who compete at the world's highest level.

Total number of medals earned at the WorldSkills Competition (as of August 31, 2019): 69

Further Enhancing Our Strengths

Promoting "DENSO Culture DX" through the Cultivation of AI-Savvy Human Resources

DENSO is promoting "DENSO Culture DX" activities, which involve maximizing the performance of its approximately 170,000 globally diverse human resources and fully utilizing the on-site know-how and data that it has cultivated for over 70 years. As part of the foundation to support these activities, we are accelerating efforts to provide AI-related training to all employees so that they can begin working in a manner that offers more added value. Specifically, we provide a wide range of educational content in accordance with employees' level of AI understanding and individual position. These educational activities help employees not only improve their own individual work and the work performed by their respective department but also realize operational and business reforms in collaboration with external shareholders. Through the promotion of these activities, we aim to enhance the AI literacy of all employees at DENSO CORPORATION (training of 15,000 employees already completed as of June 2021) so that they are able to properly utilize AI within their work. In addition, by the end of fiscal 2023, we aim to cultivate 2,000 AI-savvy human resources who can fully leverage AI in their duties.

2: Research and Development

By accurately ascertaining social needs, DENSO has created competitive products with a commitment to world-first and world-best offerings. In our R&D activities, which have been the starting point for the value creation that allows us to create such products, we are planning technologies in a wide range of fields with a focus on five to 20 years in the future and strengthening our R&D structure. Additionally, to create optimal products in each region, enhance the appeal of mobility, and contribute to the future mobility society, we operate technical centers and laboratories around the world.

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). At this center, we have carried out R&D activities on future technologies that cover a wide range of fields. Today, this center continues to create a large number of innovative technologies that lead to the development of world-first and world-best products.
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 promotes efforts to strengthen our 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.

The Key to Our Strengths

Foresight | Speed | Advanced Technologies

Commitment to world-firsts

Creating Over 130 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 130 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 130

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 research with a view to the future

Advanced Research That Estimates and Anticipates the Future Mobility Society

Since its establishment in 1991, DENSO's Advanced Research and Innovation Center contributes to an advanced automotive society through the creation of innovative technologies. Guided by this mission, the laboratory led the way with advanced technologies such as semiconductors, electronic materials, AI, and ergonomics. By integrating such technologies with the skills of DENSO's R&D personnel, the Advanced Research and Innovation Center has created innovative technologies that help resolve social issues.

Number of new patent registrations in the automotive industry (fiscal 2022): Japan, 4; United States, 7

Further Enhancing Our Strengths

Enhancing Development Efficiency and System Proposal-Making Capabilities through Model-Based Development

The importance and complexity of software development has been rising with the progression of CASE. Amid these circumstances, it is necessary to enhance the added value of products and significantly reduce the development period through *Monozukuri* activities that link hardware with software. To that end, we have adopted the highly effective method of model-based development (MBD), which involves utilizing simulated models in order to enhance the efficiency and reduce the time of complex system development. Through the utilization of MBD, extensive system inspection can be executed via computers from the initial design phase. In addition, MBD enables simulations to determine specifications and performance of the entire vehicle, including electrified powertrain systems and air-conditioning and cooling systems.

By doing so, MBD eliminates the need for repeated prototype development and testing, thereby reducing the burden of reworking designs. In these ways, MBD allows us to strengthen our engineering capabilities and offer optimized proposals for overall systems to our customers as a comprehensive system supplier.

In addition, the Japan Automotive Model-Based Engineering Center seeks to popularize MBD across the entire automotive industry. Through this participation, we are tackling such endeavors as standardizing interfaces in an effort to enhance the international competitiveness of Japan's automotive industry.

3: *Monozukuri*

Since its inception, DENSO's *Monozukuri* (manufacturing) has thoroughly integrated in-house technologies. Through *Monozukuri* positive steps are taken to design and manufacture equipment, production lines, materials, and processing methods. This enables us to provide society with the world's most advanced groundbreaking technologies and products conceived by our R&D team. We have striven to develop speedy and efficient production lines and compact unique facilities, as well as streamline distribution and inspection with our own production technology. In recent years, we have commenced efforts to digitalize the know-how we have accumulated over many years on the manufacturing front lines and leverage it as explicit knowledge. This has enabled us to also ensure high efficiency and high quality and offer competitiveness and added 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, helping us gain an understanding of the needs in each region and begin production activities that meet those needs.
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. 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.

The Key to Our Strengths

Technological Capabilities | Analytical Capabilities | Frontline Capabilities

World-leading production and engineering

Production Structure That Enables Mass Production of World-First and World-Only Products

DENSO leverages world-class micro-processing, paying attention to detail down to the 1/1000 mm, and an assembly line that improves production efficiency and quality. DENSO also supports world-first products and the world's highest level of product performance and quality through research on cutting-edge production, elemental, processing, and measurement technologies as well as through the development of production lines and systems that adopt such technologies.

Amount of capital expenditures (fiscal 2022): ¥353.9 billion

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 take our abundance of data on people, products, and facilities and convert it into valuable information, such as information on signs of equipment flaws and information that contributes to expert know-how. 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. We aim to form global linkages between our 130 plants in an effort to improve productivity on a Groupwide basis.

Number of plants with F-IoT: 130

Excellent Factory (EF) activities that realize growth for both factories and people

Promoting EF Activities Focused on Eliminating Product Defects and Lost Operational Time

Our plant general managers lead the way with EF activities in which all factory workers participate. By focusing on making improvements to areas that are easily overlooked and establishing production lines that create high-quality products, EF activities make it easy to identify issues within our factories. Through the continued efforts of all employees to address issues when they do occur, EF activities cultivate human resources that are dedicated to making improvements and also help us realize a global-leading level of competitiveness.

Energy Conservation Grand Prize Award: Received for 12 consecutive years

Further Enhancing Our Strengths

Receipt of Energy Conservation Grand Prize Award in Recognition of Reducing Steam Amounts by Roughly 70% through the Reuse of Plant Waste Heat

In fiscal 2022, DENSO received the Energy Conservation Center Chairman's Prize, the Grand Prize, in the Examples of Energy Conservation Division of the Energy Conservation Center, Japan (ECCJ)'s Award Program, in recognition of the Company's efforts to reuse plant waste heat in order to reduce the amount of steam used to heat pure water for the cleaning of semiconductors. This marked the 12th consecutive year in which DENSO has won this award.

The cleaning process for semiconductors uses pure water that has had all impurities removed via a filtration device. During the filtering process, it is necessary to raise the temperature of the water, and steam is generally used as the means to do so. In our effort to reduce steam amounts, we were extremely adamant about reusing the waste heat that is dispersed throughout our plants, and by making efforts to reuse waste heat from such facilities as cooling towers, we were able to reduce the amount of steam needed for heating pure water by a total of 67%. This is equivalent to a 491.5-kL reduction in crude oil a year. Going forward, we will continue to pursue thorough energy-saving activities with the aim of realizing carbon neutrality within our *Monozukuri* (manufacturing) activities.

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

Capitals That Enable Us to Be a Leading Company in the Mobility Domain

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 enhance these capitals going forward.

Financial Capital

Striving to Realize a Slim, Sturdy, and Flexible Operating Structure

To continue to contribute to society through the concepts of "green" and "peace of mind," we need to be able to realize sustainable business growth by expanding our equity spread. By accomplishing this, we are able to generate capital for investing in capital expenditures, R&D activities, and human resources. Through the steady execution of our new financial strategies, we aim to realize a slim, sturdy, and flexible operating structure.

P.57–64

Human Capital

Turning Our People and Organization into a Group of Professionals with the Ability to Make Their Ambitions a Reality

To create new value, it is essential to have a group of employees with diverse thoughts and ideas working with enthusiasm and sufficiently leveraging their capabilities. To that end, we will promote efforts to enable employees to envision their dreams and make them a reality while also striving to improve the well-being of employees and maintain and enhance their level of engagement with their work and the organization.

P.65–67

Manufacturing Capital

Skills That Continuously Evolve and On-Site Capabilities That Enable Constant Improvements

As software becomes more extensively involved and utilized in automobiles and as DENSO grows its business domains, we believe there are two major elements to achieving differentiation: "high-quality, highly reliable, and world-leading *Monozukuri*," which we have cultivated in the automobile domain, a domain where people entrust their lives to us, and "the ability to offer a stable supply on a global basis." To that extent, we strive to evolve *Monozukuri* through the utilization of digital-twin technologies, energy-saving technologies, and other innovative technologies.

P.68–69

Intellectual Capital

Promoting R&D Activities That Realize World-First and World-Best Offerings with a Focus on the Trends of the Times

We find ourselves in the midst of a paradigm shift in which new technologies are being created at a tremendous speed, and the nature of business itself is changing. In this environment, there is a need to bolster R&D capabilities to secure a competitive advantage if we are to enhance corporate value. To that end, we will boost our investment efficiency through the introduction of cutting-edge technologies and promote intellectual property (IP) strategies that are integrated with our business strategies. By doing so, we will expand our development domains and accelerate development speed.

P.70–71

Natural Capital

Pursuing Environmental Neutrality in Order to Both Preserve the Global Environment and Create Economic Value

DENSO's business activities have a close relationship with natural capital as we make use of industrial water and mineral resources as raw materials for our products. For that reason, minimizing the impact we have on natural capital is an important theme for DENSO. In addition to further refining our long-cultivated environmental technologies, we will pursue a wide array of efforts to become environmentally neutral, including the efficient use of natural capital and the reduction of our environmental burden.

P.72–76

Social and Relationship Capital

Strengthening Our Bonds with Diverse Stakeholders through Dialogue in Pursuit of Mutual Growth

For a company like DENSO, which promotes its business activities while being involved with a wide range of stakeholders, building good relationships with stakeholders and gaining even more allies are imperative elements for enhancing corporate value. To that extent, we are repeatedly holding dialogues with stakeholders in order to deepen our understanding of social expectations and external opinions. We are also working to increase the number of allies with whom we collaborate. Such efforts will allow us to strengthen and expand our various types of capital.

P.77–79

ROE

3.4%
Fiscal 2021

By achieving ROE that exceeds the cost of shareholders' equity, which is the expectation of our stakeholders, we aim to realize ROE of over 10% by fiscal 2026 so that we can enhance corporate value on a continuous basis.

Ratio of Overseas Employees

53%
Fiscal 2021

With business operations in over 30 countries and regions around the globe, DENSO enjoys an employee base comprising approximately 170,000 individuals of different genders, ages, nationalities, and lifestyles and brimming with a diverse array of thoughts and ideas.

Capital Expenditures

¥374.3 billion
Fiscal 2021

We are accelerating necessary investment in focus fields such as electrification and advanced safety. At the same time, we are engaging in highly disciplined investment decision-making and promoting management in accordance with changes in the external business environment.

R&D Expenses

¥492.0 billion
Fiscal 2021

We will support our business strategies by building an IP portfolio centered on our focus fields and strengthening IP activities geared toward open innovation.

CO_2 Emissions (Consolidated)

2.06 million tons
Fiscal 2021*
* Adjusted to pre-pandemic levels

Aiming for the ambitious target of becoming carbon neutral (achieved with carbon credit use by 2025 and completely achieved by 2035), we are steadily working to reduce our CO_2 emissions.

Number of Supplier Companies

Approx. 6,450 companies
Fiscal 2021

With the support of our various stakeholders, including our customers, suppliers, local community members, and employees, we are promoting business activities to ensure that we can deliver products and services to customers around the globe.

Pursuing a Variety of Businesses That Will Support the Mobility Society of the Future

Creating New Value through Our Seven Core Businesses

DENSO was established as a manufacturer of electrical equipment and radiators. Since its establishment, the Company has expanded its business domains in conjunction with social change, applying the technologies it has cultivated in the mobility domain, its main area of operation, to develop lifestyle- and industrial-related equipment. At the moment, DENSO has seven core businesses that devise solutions for the mobility society of the future. Centered on these core businesses, DENSO is making full use of the technologies it has accumulated in the mobility domain as it pursues a variety of businesses that support the mobility society of the future.

Relationship between Our Four Focus Fields and Seven Core Businesses

Four Focus Fields

Electrification

Reducing Environmental Burden and Realizing Highly Efficient Mobility

DENSO has been engaged in the development of electrified vehicle systems that are eco-friendly and enable even more comfortable travel. As a result, DENSO has realized high-functioning, compact, and fuel-efficient products integral to these systems and is producing these products around the world. Going forward, we will leverage our expansive business domains to form linkages between various in-vehicle systems and products in an effort to efficiently manage energy within vehicles. In this manner, we will further improve fuel efficiency and contribute to the conservation of energy.

Advanced Safety and Automated Driving

Realizing a Safe Society without Fatalities from Traffic Accidents, and Free and Comfortable Mobility

DENSO aims to create a mobility society without fatalities from traffic accidents and in which all people can move safely and with peace of mind. Guided by this aim, DENSO has developed reliable, high-quality safety technologies. By enhancing our long-cultivated sensing technologies as well as our AI and information technologies, we will further contribute to the development of automated driving. Also, we are moving forward with the development of control technologies, including for in-vehicle air quality and temperature, in order to realize more comfortable mobility. Maintaining our firm commitment to quality, which we have adopted since our founding, we will deliver genuine peace of mind for the future of the mobility society.

Connected Driving

Realizing a New Mobility Society That Connects Vehicles, People, and Goods

Amid the major transition from the trend of owning a vehicle to the trend of using a vehicle as a service, DENSO is pursuing efforts in the Mobility-as-a-Service (MaaS) business, which involves providing mobility services that move people and goods. Going forward, we aim to provide safe, secure, and efficient transportation methods with low environmental burden for people with vehicles and for those without, thereby contributing to the realization of a new mobility society.

Non-Automotive Businesses (FA and AgTech)

Contributing to Improved Social and Industrial Productivity

DENSO has a solid track record of introducing factory automation (FA) systems in 130 factories. Leveraging this record, we will propose and provide FA systems that can meet the diverse needs of our customers, thereby making extensive contributions to the development of the *Monozukuri* (manufacturing) industry. Also, with the aim of delivering happiness to all people through agriculture, we will draw on the expertise and know-how we have cultivated in the automotive field to offer new value in the food and agriculture industries.

Seven Core Businesses

Electrification Systems P.84–85
Supporting electrification in all areas of mobility to realize an enriched environment and comfortable mobility
Main products: Power control units, motor generators

Powertrain Systems P.86–87
Providing solutions that help overcome the seemingly contradictive task of balancing the joy of life with vehicles with superior environmental performance
Main products: Diesel common rail systems and gasoline direct-injection products

Thermal Systems P.88–89
Resolving various thermal-related issues present in the mobility society in order to realize a more comfortable society for both the earth and its people
Main products: Heat pump systems
Main products: Car air-conditioning systems, bus air-conditioning units

Mobility Electronics P.90–91
Realizing a society in which all people can move comfortably and with peace of mind (Quality of Mobility)
Main products: HEV ECUs, BEV ECUs
Main products: Vision sensors, millimeter-wave radar sensors
Main products: Road-to-vehicle and vehicle-to-vehicle communication devices, integrated electronic platforms, digital key systems for mobility service operators

Advanced Devices P.92–93
Leading the industry in sensing and semiconductor technologies and energy management that are eco-friendly and help realize a mobility society with comfort and peace of mind
Main products: Power cards, MCV-e
Main products: Semiconductor sensors

Industrial Solutions P.94–95
Enhancing the productivity of the *Monozukuri* (manufacturing) industry and contributing to an improved quality of life
Main products: Automated modules, vertical articulated robots

Food Value Chain P.96–97
Combining technologies and ideas to contribute to an enriched society where all people can live safely and with peace of mind
Main products: Horticultural facility-related products, compact mobile refrigeration units

Advanced Devices P.92–93
Main products: Semiconductor sensors

Providing new value to the mobility society of the future

DENSO's Value Creation Process

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

To fulfill the DENSO Philosophy, we are incorporating social issues into our Long-term Policy for 2030 and into our material issues (Materiality) and are implementing sustainability management that works to resolve social issues through our business activities. By doing so, we will contribute to a sustainable society and improve our corporate value.

Strengthening Our Capitals

Capitals P.57–79

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

DENSO's Sustainability Management

Growth Strategy P.35–55

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

Long-term Policy for 2030

Seven Core Businesses

Corporate Governance P.99–116

Strengths P.22–25

Hitozukuri	Research and Development	*Monozukuri*

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

Social Issues

Progress in Our Four Focus Fields

- Electrification
- Advanced Safety and Automated Driving
- Connected Driving
- Non-Automotive Businesses (FA and AgTech)

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

Green → Inspiring ← Peace of Mind

The value we offer society

- We contribute to an eco-friendly mobility society by promoting the widespread use of products powered by electricity. P.50, 84–85, 88–89
- We contribute to an energy-efficient society through CO_2 capture, storage, and recycling technologies. P.50
- We will realize completely carbon-neutral *Monozukuri* activities by achieving net-zero emissions at our plants. P.50, 68–69, 72–76
- We contribute to the permanent preservation of the global environment by reducing environmentally harmful substances. P.72–76
- We help eliminate fatalities from traffic accidents by popularizing and enhancing safety products. P.51, 90–91
- We provide comfortable spaces that meet the need for safe air environments. P.51, 88–89
- We offer technologies that support working people to address the issue of a declining workforce. P.51, 94–97
- We provide safe and secure products and technologies through rigorous quality control activities. P.115

Realizing a Sustainable Society

Contributing to the SDGs through our corporate activities

Controlling Factors That Negatively Impact Our Value Creation

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

TCFD P.73–76

Risk Management P.114–115

Undertaking Initiatives toward Respecting Human Rights P.79

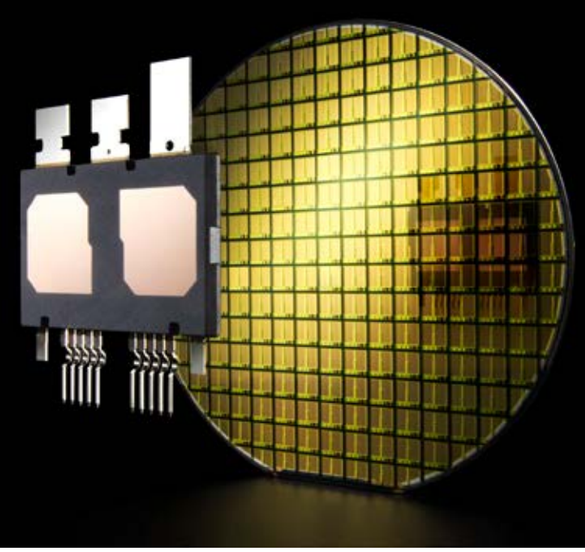
Reinforcing Our Strengths

DENSO Integrated Report 2022
DENSO's Value Creation Story

Special Feature: Value Creation in Action

Promoting Electrification and Contributing to a Carbon-Free Society through Next-Generation Silicon Carbide Power Semiconductors

To realize the DENSO Philosophy, which is grounded in the ideals of the DENSO Creed, we are pursuing sustainability management that focuses on resolving social issues through our business activities. Using our newly developed silicon carbide (SiC) power semiconductors as an example, this section introduces DENSO's value creation story, including the strengths we have cultivated over our history that have led to the resolutions of social issues as well as our vision for the future.



Social Issues

Increase in Electricity Consumption Following the Evolution of Mobility and Popularization of Electrified Vehicles

The sales volume of electrified vehicles that significantly contribute to reducing environmental burden is estimated to increase by 15 times between 2020 and 2035, leading to an expected increase in the volume of electricity consumption. Enhancing power usage efficiency and controlling the rise in electricity consumption are the keys to promoting the popularization of electrified vehicles and the shift to smart mobility in the future.

Contribution to Popularizing Electrified Vehicles and Reducing CO_2 by Enhancing Power Efficiency through SiC Power Semiconductors

To popularize electrified vehicles and contribute to the reduction of CO_2 while resolving the social issue of increasing electricity consumption, DENSO has developed SiC power semiconductors that incorporate unique patented structural technologies and production technologies.

Characteristics of SiC Power Semiconductors and Contributing Fields

Power semiconductors are semiconductors that receive instructions from the electronic control unit (ECU) to operate inverters or motors. To ensure that power semiconductors required for the energy management of electrified vehicles endure the harsh in-vehicle environment, it was necessary to develop power semiconductors that use SiC. Since SiC performs very well under high-temperature, high-frequency, and high-pressure environments compared with the silicon that has been used up until now, it has gained attention as a raw material that reduces power loss in inverters, contributes greatly to downsizing, and accelerates the electrification of mobility. However, since commercially available SiC materials did not deliver the quality requirements for in-vehicle use, it was necessary to develop the material in-house. DENSO has produced SiC that can endure the in-vehicle environment by developing high-quality materials.

Equipping inverters with DENSO's SiC power semiconductors has reduced the volume by approximately 60% and power loss by around 70% compared to previous power semiconductors, realizing the downsizing of the product and enhancement of fuel efficiency. As a result, we have been able to contribute to the resolution of the social issue of increasing electricity consumption.

Capitals and Strengths Built Up during Our History of Semiconductor Development to Date

The reason DENSO was able to develop semiconductors that can endure the harsh in-vehicle environment was the capitals and strengths built up during our long history of developing semiconductors.

The history of initiatives for in-vehicle semiconductors at DENSO dates back to the 1960s, when a research center for in-vehicle semiconductors was set up with the aim of shifting to in-house production. Additionally, we have promoted initiatives for mass production and commercialization through vertically integrated development capabilities that cover the entire process, from material development and production through to system design. Furthermore, DENSO has completed the development of tough semiconductor products by repeatedly measuring and improving the endurance of products under extreme environments to understand what kind of environment the developed products can operate normally under.

DENSO has also completely commercialized SiC power semiconductors over a period of approximately 25 years.

These power semiconductors have been utilized in the Toyota MIRAI, which was launched in December 2020. This was the result of the strength of the ideals of the business unit that has continued to deliver in-vehicle semiconductor products since the semiconductor team was founded in the 1960s. The employees never gave up on commercialization despite facing the difficulty of controlling the quality of a material such as SiC for close to 30 years.

Members of the Electrification Components Advanced Development Division that develops inverters

Capitals	Manufacturing capital: Production structure and quality assurance structure that continue to provide society with in-vehicle semiconductor products Intellectual capital: Pioneering knowledge of in-vehicle semiconductor development built up since the 1960s Social and relationship capital: Collaboration with MIRISE Technologies, which is responsible for SiC development
Strengths	*Hitozukuri*: Knowledge handed down by predecessors and synergized with the creative power of young employees in response to issues specific to in-vehicle environments that have accumulated over time Research and development: Vertically integrated development capabilities that apply technology built up through mobility-related development and utilize comprehensive strengths *Monozukuri*: In-house production capabilities for semiconductors that clear difficult in-vehicle standards

Value Provided to Society

Realization of a Carbon-Free Society

By further popularizing the SiC power semiconductors newly developed by DENSO, we have been able to popularize electrified vehicles and promote CO_2 reduction, contributing to one of the goals of DENSO's environmental strategy—"contribute to the electrification of automobiles and reduce our CO_2 emissions to the greatest extent possible." Furthermore, we aim to achieve a low-carbon society and then carbon neutrality by 2035 for a future where electricity will be essential in even more situations.

Message from an Employee

Further Evolution of Power Semiconductors and Their Connection to Carbon Neutrality

Despite achieving commercialization of SiC power semiconductors, SiC is only just at the threshold of electrification. The true value of DENSO's semiconductors will be tested to see whether they can fully meet the expectations for electrification, which is experiencing a fully-fledged acceleration. Furthermore, there are numerous possibilities for SiC power semiconductors. Going forward, the application of power semiconductors in wireless power and wireless power transfer to moving vehicles in the future will enable power supply systems to become significantly smaller and more efficient. Additionally, semiconductors must become even tougher as new electrified mobility becomes tougher, as exemplified by the all-electric vertical take-off and landing (eVTOL) aircraft, which is essentially a flying car, relative to construction machinery and conventional mobility like commercial trucks. Power semiconductors that operate in a stable manner should be used in these situations. We will continue striving to meet new needs as a whole by utilizing experience gained from the commercialization of SiC.

From left:
Kazuhiro Tsuruta of MIRISE Technologies and Shoji Kanda from the Sensing Systems & Semiconductor R&D Division