



Thermal Systems

As the company with the world's top market share in thermal products that deal with the increasing heat issues of vehicles, we see it as our responsibility to address an increasing number of thermal challenges in vehicles by applying our technologies in air-conditioning and cooling technologies to comprehensive thermal management systems for vehicles and expanding our area of contribution. By incorporating industry-leading energy-saving technologies into our thermal management products, we aim to move one step closer to carbon neutrality. At the same time, through early adoption of recycled resin and aluminum, we will lead the circular economy and pass on a sustainable global environment to the next generation.

Katsuhiko Takeuchi Head of Business Group

Business Strengths	Opportunities	Risks
- Over 2,500 environmental technology patents, world-first products, and products with number one shares of global markets - Internal co-creation that marshals technological strengths, along with customers and new partners around the world - A regionally rooted global supply chain supporting 56 bases worldwide	- Growing environmental awareness, sense of urgency, and demand driven by extreme weather events that have become the norm - Increasingly diverse and widespread thermal energy challenges in society and vehicles - Rapid growth and acceleration of EV adoption worldwide, driven by commercialization of next-generation batteries and technological advances	- Delays in vehicle electrification or refrigerant regulations due to legal revisions or shifts in market needs - Product development hindered by constraints on consumer choices and social tensions from widening disparities and policy shifts - Cost pressures and disruptions to fair competitive environments and supply chains due to geopolitical risks

Business Strategy

We will further refine the refrigerant, water, and air heat exchange technologies we have cultivated in automotive applications to continuously support our customers through improvements and advances in core products, thereby achieving sustainable operations. We will also expand from air-conditioning to full-vehicle thermal management, further accelerating efforts toward carbon neutrality and the circular economy, while expanding our business portfolio with products featuring enhanced environmental performance. In addition, we will take on the challenge of developing innovative technologies to "control" heat and create new value. By broadening the scope of our contributions from people and vehicles to society as a whole, we aim to provide concrete solutions to climate change.

Progress on Mid-term Policy for 2025 and Outlook

Business Transformation to Sustain the Industry

To ensure a stable supply during the transition to electric vehicles, we have worked with customers to standardize HVAC systems, reducing the number of variants by 40% compared to previous models. In March 2025, we commenced mass production on a new line that is resilient to fluctuations in volumes and models. DENSO will continue to consolidate and restructure its operations in collaboration with strategic partners that share its commitment to ensuring a stable supply. On the environmental front, we created an energy-saving joining process for the production of heat exchangers, which consumes vast amounts of electricity, and achieved our CO₂ emissions reduction targets three years ahead of schedule.

Creating Technologies to Enhance Environmental Performance

We have deployed heat pump technology to reduce the energy consumed for heating, a factor that reduces the driving distance of electric vehicles during the winter. In addition, we brought to market a thermal management system that significantly improves energy efficiency by solving performance degradation from frost buildup on heat pumps, with the world's first defrosting technology that utilizes waste heat while driving. We also commenced mass production of the world's first energy-conserving heating technology that safely warms vehicle occupants directly using radiant heat, rather than releasing warm air into the cabin or toward the seats.

Expanding Our Scope of Contribution through New Value Creation

To realize carbon-neutral *Monozukuri*, in collaboration with Toyota Motor, DENSO launched the Fukushima Model, a local production for local consumption initiative for green hydrogen, enabling in-plant hydrogen production and utilization on our heat exchanger production line. In January 2025, we renamed the division as the Thermal Social Solutions Business Unit and strengthened our organization to address thermal challenges in society through AI and digital technologies.

Toward the Realization of Energy Neutrality

As electric vehicles become more widespread, it is necessary to both manage driving power and control the temperature of batteries and interior cabins using limited battery energy, making full-vehicle thermal management essential to avoid wasteful energy loss. We have already developed technology that reduces energy consumption in temperature control by 50% compared with the 2019 level. Along with academic and industrial partners, we are now accelerating the development of innovative energy conversion technologies to achieve "energy neutrality" by 2035, reducing vehicle thermal control energy to net zero in coordination with society. We aim not only to steadily expand product adoption but also to apply the technologies we have developed, including the use of recycled materials, to help solve a wider range of thermal issues in society.

