

# TOKYO MOTOR SHOW 2011 DENSO PRESS CONFERENCE REMARKS

## “ Toward the Next Growth”

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Good afternoon, ladies and gentlemen. It is my great pleasure to welcome all of you here to DENSO's booth today. Before I begin, I would like to thank you for your outstanding support of our company this past year.

This year, the Tokyo Motor Show theme is “Mobility can change the world.” DENSO takes pride in its broad range of technologies - ranging from the environment and safety, to comfort and convenience. By taking advantage of these strengths, DENSO is developing automotive technologies from a vehicle system perspective. Today, I would like to talk about the details of our latest efforts, focusing primarily on the development of fuel-efficient technologies, safety technologies, and information and communications technologies.

First, let me talk about our developments for fuel-efficient technologies.

To preserve the global environment, CO<sub>2</sub> emissions regulations have been increasingly tightened in different countries. To meet those regulations and to conserve resources, it is expected that internal combustion engines will need to be further improved, stop/start systems will be increasingly employed, and the electrification of vehicles will further progress. DENSO has been working to develop technologies to increase the fuel efficiency of all of these powertrains.

Now, let me tell you about our developments for gasoline direct-injection engines.

In 1996, DENSO began the production of high-pressure injectors and high-pressure fuel pumps for gasoline direct-injection engines. Notably, DENSO has produced more than 20 million injectors. Our latest injector, released in 2010, features a spraying technology that can achieve the smallest fuel particle sizes in the world, in addition to our high-precision injection control technology. Meanwhile, our high-pressure fuel pumps achieve the highest injection pressure levels in the world. These components have been employed by our customers in Japan, the US, and Europe to help increase the fuel efficiency and output of their engines. One such example is Mazda's SKYACTIV engines.

Next, let me explain about diesel engine technologies.

In recent years, diesel engine performance has significantly improved with the use of diesel common rail systems, which are designed to reduce emissions, and increase fuel efficiency and output. In 1995, DENSO became the first company in the world to successfully mass-produce diesel common rail systems. Our continued commitment to technology improvement has led to the development of i-ART. With this system, a pressure sensor is built into each injector to measure the fuel injection pressure on a real-time basis. This system is the first in the world to individually control the fuel injection amount and timing for each injector based on feedback from sensors. It enables further improvement in fuel efficiency, while also reducing emissions and reducing operation noise.

It is noteworthy that DENSO's development project is underway to achieve even cleaner emissions of diesel engines for commercial vehicles, as well as agricultural and construction equipment. To this end, the maximum injection pressure will be raised from the current 200 MPa to 300 MPa.

Now let me tell you about the developments for stop/start systems.

This year, DENSO has developed a tandem solenoid starter (or, "TS starter"), and has started supplying to automakers in and outside Japan, including Daihatsu. This starter allows the engine to be stopped when a vehicle is decelerating, and allows the engine to restart before reaching zero rpm. Notably, the configuration of this starter is similar to that of conventional products, making it possible to mount this starter without major modifications in vehicle design.

In addition, DENSO has been working to develop a new stop/start system that includes the TS starter, a high-efficiency alternator, a high-efficiency battery, and a deceleration regeneration system. This system is expected to increase fuel efficiency by approximately 13 percent at maximum.

Looking from a long-term perspective, to cut CO<sub>2</sub> emissions, car makers are developing hybrid, plug-in hybrid, and electric vehicles using various types of systems.

DENSO began researching components for electric vehicles back in the 1970s, and ever since the Toyota Prius hit the market in 1997, we have mass-produced such products as inverters, DC/DC converters, battery monitoring units, and electric air conditioning systems.

In 2007, we developed an inverter that cools both sides of a semiconductor element. The output per volume of this inverter is 60 percent higher than that of inverters that cool only one side of a semiconductor element. At present, this inverter can be found on the Lexus LS, Lexus RX, and Hino Dutro light-duty trucks, as well as in the Toyota Camry that was released in August earlier this year. We will further advance cost reduction to meet the diversifying needs of customers.

Meanwhile, DENSO has been developing new products that will support growth. For example, we are developing a motor generator that incorporates our alternator winding technology. DENSO has another new product, which is a compact, high performance battery pack for electric vehicles that consists of a charger, a battery, a battery monitoring unit, and a cooling fan.

Now, let me tell you about DENSO's safety technologies.

Currently, traffic accidents account for approximately 1.3 million deaths across the globe each year. All of us in the auto industry want to see a society where there are no traffic accidents. In the 1970s, DENSO put forth research into airbag sensors. Ever since, we have commercialized safety technologies to protect cabin occupants in the event of an accident or to prevent an accident, by using laser radar, millimeter-wave radar, and cameras, as well as system products integrating these units with ECUs.

Also, to reduce traffic accidents at intersections, DENSO has been working with automakers and government agencies around the world to conduct vehicle-to-vehicle and vehicle-to-infrastructure communication verification tests to detect approaching vehicles and pedestrians at blind intersections and other traffic situations.

Accident data analysis shows us that, 75 percent of all accidents are caused by driver error or driver behavior. To realize a society with no traffic accidents, it is essential to eradicate the factors that lead to accidents. That's why DENSO has been researching how to commercialize on-board technologies that monitor the driver's physical condition, as well as fatigue and attention levels, among others, to provide driver alerts. These driver monitoring technologies are expected to be increasingly important against the backdrop of the aging population and the increasing average age of drivers.

DENSO will take advantage of its broad range of technologies in an effort to offer a sense of security and help achieve a safe and secure automotive society for everyone.

Because of the Internet, information is readily accessible anywhere with personal computers and mobile terminals. New vehicle users, primarily young people who have grown up in the Internet age, will expect to be online while inside their vehicles.

In an effort to help develop vehicles that are well-accepted by the Internet generation, DENSO and Toyota have co-developed a system that allows drivers to safely and easily obtain information from outside the vehicle. Specifically, this system is designed to show and operate mobile terminal contents on an on-board display, such as a car navigation system, via the Internet and a Bluetooth connection. That means drivers can safely use mobile terminal applications via the on-board display. This year, this system was launched in the North American market with the product name

of “Entune.” Using this technology, a project is now underway to develop DENSO’s own system named, “ARPEGGiO,” for the Japanese market, and is scheduled to come into service in 2012.

DENSO is also actively using its automotive technologies in the development for non-automotive technologies.

For example, DENSO has been working with housing companies to develop the Home Energy Management System, in which automotive technologies are used to enable the coordinated use of energy between house and vehicle. Devices in the home, including ECO-Cute heat pump water heaters, storage batteries and a photovoltaic power generation system are connected to an electric vehicle or hybrid vehicle to manage energy use and achieve higher efficiency. We will continue to apply automotive technologies, such as sensing technologies, in diverse fields, including security, health, and medical treatment.

DENSO will stay committed to enhancing the various technologies that it has refined since its founding and continue the challenge to achieve further growth.

DENSO will continue to develop new technologies and contribute to realizing an advanced automotive society.

We appreciate your continued interest in and support of DENSO.

Thank you for your kind attention.

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