“Focus on the Future”

University of Michigan Transportation Research Institute
“Focus on the Future” Conference
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DENSO International America, Inc.
1. Denso History & Profile

2. Challenges of the Global Auto Industry

3. Solutions
1. DENSO Establishment

Establishment of Nippondenso Co., Ltd. (Currently DENSO Corporation)
1. DENSO History: 1949 – 2000

- **1949**: Established Nippon Denso Co., Ltd. (Now DENSO Corporation)
- **1954**: First technical training school
- **1961**: Awarded Deming Prize
- **1966**: Integrated Circuit Research Center
- **1968**: First overseas manufacturing subsidiaries: Australia and Thailand
- **1971**: First overseas subsidiary: Los Angeles
- **1972**: DENSO Europe B.V. established
- **1973**: Nukata Testing Center
- **1977**: DENSO Research Laboratories
- **1984**: Corporate name change to DENSO Corporation
- **1985**: DENSO employee received the first gold medal in WorldSkills Competitions.
- **1991**: DENSO International America, Inc. established
- **1995**: DENSO International Asia Pte. Ltd. established
- **1996**: DENSO’s NAVI system offers complete map coverage for United States
- **2000**:
DENSO History: 2001 - Current

- **2001**: DENSO Establishes North American Foundation
- **2003**: DENSO Manufacturing Arkansas, Inc. established
- **2006**: DENSO Mexico establishes worm farm
- **2007**: DIAM named GM supplier of the year
- **2008**: DIAM named GM supplier of the year
- **2009**: DIAM named preferred supplier by Ford Motor Company
- **2010**: Approximately 126,000 employees work at DENSO today, in more than 35 countries and regions
- **Current**:
### DENSO Today

#### Capital
- **US$2.3 billion (187.4 billion yen)**

#### Net sales
- **US$39.4 billion (3,154.6 billion yen)**

#### Employees
- **126,036**

#### R&D investment
- **US$3.7 billion (298.4 billion yen)**
  - 9.5% of net sales

#### Engineers
- **14,100**
  - (FY 2012, as of March 31, 2012)

### Sales Breakdown
**By Region**
- **Japan**: 52.0%
- **North America**: 16.0%
- **Europe**: 11.8%
- **Asia-Oceania**: 18.4%
- **Others**: 1.8%

### By Product
- **Thermal**: 29.9%
- **Powertrain**: 24.9%
- **Information & Safety**: 16.0%
- **Electronic**: 9.7%
- **Electric**: 9.2%
- **Small Motors**: 7.3%
- **Others**: 3.0%
Products

Automotive

- **Powertrain Related Products**
  - Engine management system,
  - electronically-controlled diesel system,
  - starter, alternator, radiator, etc.

- **Climate Control Products**
  - Automatic air conditioner, car heater,
  - rear cooling unit, compressor,
  - sensors, etc.

- **Body Electronics Products**
  - Instrument cluster, windshield wiper
  - remote keyless entry system,
  - IC flasher, horn, etc.

- **Driving Control and Safety**
  - Cruise control system, airbag sensing system,
  - vehicle stability control, antilock braking system,
  - traction control system, etc.

Non-Automotive

- QR Code
- Barcode and Two-Dimensional Code Handy Terminal
- Kerosene Heat Pump
- Vertical Articulated Robot
Innovation - World’s First Products

Environment

- '95 Diesel Common rail system
- '07 Inverter for HV
- '11 TS Starter for S&S
- '11 Motor Generator for HV
- '12 Lithium-ion Battery Pack

Safety

- '03 Millimeter-Wave Radar
- '09 Passenger Vehicle Air Conditioning System Using an Ejector

Convenience

- '87 Car Navigation System (Digital map produced by CD-Rom format)
- '94 QR Cord

History of World First Products Across Product Areas
World Challenges next 5 – 10 years

1. Global Growth of Auto Industry

2. Pace of Technology Innovation

3. Rapid Globalization on the Auto Industry
1. Challenges - Global Growth of the Auto Industry

Automotive Market Growth

- 110 Million Vehicles are expected in 2020.
- Vehicle number will be doubled in emerging countries.

![Bar chart showing automotive market growth](chart.png)

(million vehicles)

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<th>Year</th>
<th>Emerging countries</th>
<th>Advanced countries</th>
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<td>2015</td>
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<td>2020</td>
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1. Challenges - Global Growth of the Auto Industry

Due to the increase of Vehicles in emerging countries, traffic fatalities are expected to increase significantly.

Increase of Motor Vehicle Fatalities

Traffic Fatalities Worldwide
(‘thousand people)
2. Challenges – Powertrain & Fuel Efficiency

Powertrain Share Forecast

Fuel Economy Requirements

- Fuel efficiency and Electrification are the key factors to meet 54.5 Café regulations.

(Source: DENSO)
2. Challenges – Technology Changes

Connectivity

- Evolution of telecommunication technologies
- Connectivity between vehicles and social infrastructure
2. Challenges - Rapid Pace of Innovation

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1. Global Strategy
2. Development Policy
3. Key Areas of Development
1. Global Mid-term Strategy

Ideal situations for FY2016 - 2020

Ideal Situation

Company that continues to grow

Three Fundamental Principles

World-Class Excellence

Global Collaboration

Nimble

Trust of customers and community members
DENSO is enhancing its global development

- Develop products that meet customer’s needs in each region
- Cooperate development with regions on technology that is advanced or unique in the regions
- Enhance industry-government-academia cooperation worldwide

DENSO’s Core Technical Centers

*(): Year of establishment

1. Globalization of R&D - Global Technical Centers
2. Development Policy

Development Strength

- Combine focus and strength to develop total system solutions

Create products from vehicle system standpoint
3. Key Areas of Technology Development

- Environment -

EPA Cycle

Real World Savings

Gasoline Direct injection
- High-pressure pomp
- Common Rail System

EV/EHV
- Inverter

More Fuel Efficiencies
- Variable Compressor
- TS Starter for ISS
- Efficiency Alternator

Systems Integration for regional needs
3. Key Areas of Technology Development

- Safety -
  - 77GHz mm-wave radar
  - Laser radar
  - Surround Camera

Core technologies for sensing, system control, and HMI to develop advanced safety technologies as a system supplier.

- Information Services / HMI -

Integrate various information and safety systems in the cockpit, rather than developing individual components and systems.

Develop Technology to Anticipate the Drivers Needs
3. World First – New Technology Products

Latest World First Products

2010
Dual injector

2011
20MPa fuel pump & Injector

2011
TS starter for ISS

2012
Battery pack & cold storage system for ISS

Pace of Product Introduction Increasing
Strategy in North America

How North American DENSO can contribute to the Global Growth

**OEM**
- R&D for Global Growth
  (Adopting Core Products to Regional Needs)
  - Connectivity [V2X]
  - Human Machine Interface (HMI)

**Aftermarket**
- New Business Unit
- Expand Main-Market business
- Product Breadth/Depth

**Non-Auto**
- Incorporate New NA Technologies into DENSO’s Global Business