Japanese innovation
made in Germany

DENSO’s approach to electrify the future mobility

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Agenda

1. DENSO General Information
2. Aachen Engineering Center (AEC) Overview & Facilities
3. R&D Projects
4. Summary
DENSO is contributing to the improvement of both industrial and social productivity by working to provide new mobility value, establish factory automation (FA) and industrialize agriculture.
DENSO Global Network / EU Engineering

EU Technical Center

Aachen Engineering Center
PT, E/E, ELEFI

Coventry (UK)

Munich (DE)

Gothenburg (SE)

TEC (DE & Italy)

GERMANY
• Compressors

Czech (2003)
• Airconditioners
• Heat Exchangers

ITALY
• Airconditioners
• Heaters
• Radiators

SPAIN
• ECU
• Ignition Coils
• Stick Coils
• Air Flow Meter

PORTUGAL
• Intercoolers
• Heaters
• Gasoline Coolers

HUNGARY
• Common rail systems

POLAND
• Airconditioners
• Heat Exchangers

U.K.
• Airconditioners
• Heaters
• Radiators
• Oil Coolers
• Intercoolers

Development- and Sales Center

Headquarter

Production: A/C-Components

Production: Powertrain, Electric, Electronic

Sales Offices
DENSO DNDE AEC / Localization

Rheinland in NRW

Wegberg
DENSO AEC

Düsseldorf

Aachen Engineering Center

Aachen

Aldenhoven ATC

Wegberg
Aachen Engineering Center (AEC) Overview & Facilities
DENSO DNDE AEC / Site Information

Establishment / 2005
Location / Wegberg, Germany
Site area / 40,200 sqm
Total floor area / 9,500 sqm
Employees / 120

15 years anniversary (July 2020)
DENSO DNDE AEC / Capabilities

- **R&D**
  - Benchmarking
  - Concept Making
  - Technology Research

- **Advanced Engineering**
  - System Engineering
  - Demo Engine/Vehicle

- **Testing**
  - System Engineering
  - Demo Engine/Vehicle
DENSO AEC / Overview of Facilities

- **High Voltage Test Benches**
- **Chassis Dyno**
- **Engine Dyno Passenger Car**
- **Engine Dyno Heavy Duty**
- **Fuel Lab**
- **Electronic Lab**

Test track

Lab B (2010)

Lab A (2005)

Building C
Office area (2015)

6550 square meter

Main entrance
3

R&D Projects
DENSO’s Partners in NRW within Hy-Nets Projects

Source: https://www.duesseldorf.de/fileadmin/Amt40-601/lps/grafik/771_767_karte_nrw.jpg
Hy-Nets – Project Overview

Global traffic and network simulation with traffic flow

Paderborn City

Vehicle, sensor and environment simulation including vehicular communication

Test bench (E-Machine, Inverter, Engine)

Real-time exchange

Vehicle Car2X

Influence between all layers

Partners:

dSPACE
RWTH AACHEN UNIVERSITY
PADERBORN UNIVERSITY
DENSO
Crafting the Core

Hy-Nets focussed on development of new holistic approach
**Hy-Nets – Project Details**

**Key project facts:**

- Project partner mix: Academia, Tool vendor & Automotive supplier
- Paderborn City representing typical German City with vehicle traffic
- Final traffic simulation with DENSO component testing in real-time:
  - DENSO high power density E-Machine and Inverter
  - Performance: 160 Nm / 80 kW / 15,000 rpm

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**Partners:**

![Vendor Logos]

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**DENSO Electrification hardware in traffic simulation environment**


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Project meeting with all partners at AEC in Wegberg, NRW
DENSO’s Partners in NRW within SeLv Project

Source: https://www.duesseldorf.de/fileadmin/Amt40-601/lps/grafik/771_767_karte_nrw.jpg
SeLv – Fuel Cell Demo Trucks

Key project facts
- Leader: PEM of RWTH Aachen University
- 3 Fuel Cell Demo Trucks will be built up in 2022 by RWTH Aachen University and later used by several companies (including Henkel, based in Duesseldorf)
- DENSO E-Machines will be integrated into axle by BPW (German commercial vehicle axle maker based in NRW) to drive the Fuel Cell Trucks
- Energy stored in battery and hydrogen tanks → Future Mobility Concepts: Electrification and Hydrogen Society

DENSO E-Machines will drive Fuel Cell Truck “Made in Germany”

Sources: https://www.pem.rwth-aachen.de/go/id/mfigp?aaaaaaaamfimi;BPW
Summary
Summary

- DENSO is well represented in Germany with a major R&D center in NRW
- Local partners appreciate collaboration and rely on DENSO’s electrification expertise
- DENSO profits from vast experience of local partners to create innovative technology
- DENSO’s E-Machines “Made in Germany” will drive future mobility concept Fuel Cell Demo Trucks in 2022 (→ Electrification and Hydrogen Society)