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On the Road to Sustainable Mobility

Emission Free Mobility with Fuel Cell Powertrain

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Mercedes-Benz USA

Advanced Product Planning

6/12/09

Drivetrains for Various Driving Cycles

Long Distance	Interurban	Urban
		

Combustion Engine

Hybridization

Plug-In/Range Extender

Battery Drive

Fuel Cell

- **Only fuel cell technology is suited equally for both, short and long distance mobility**

Daimler's Investments in Fuel Cell Technology

Investments in Fuel Cell Electric Vehicles
Cars with electric powertrain and a fuel cell system as an energy source

Since 1994
approx. $ 1.7 BN
(1.2 BN €)

Investments in Fuel Cell Electric Buses
City buses with electric powertrain and a fuel cell system as an energy source

Since 2000
approx. $ 111 M
(80 M €)

- **From 2009 to 2011 Daimler will invest approx. $ 700 M in research, development and commercial production of fuel cell vehicles**

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Mercedes-Benz Next Generation Fuel Cell

A-Class F-CELL

2004 – 2009
Technology Demonstration

B-Class F-CELL

2009
Small Series Production

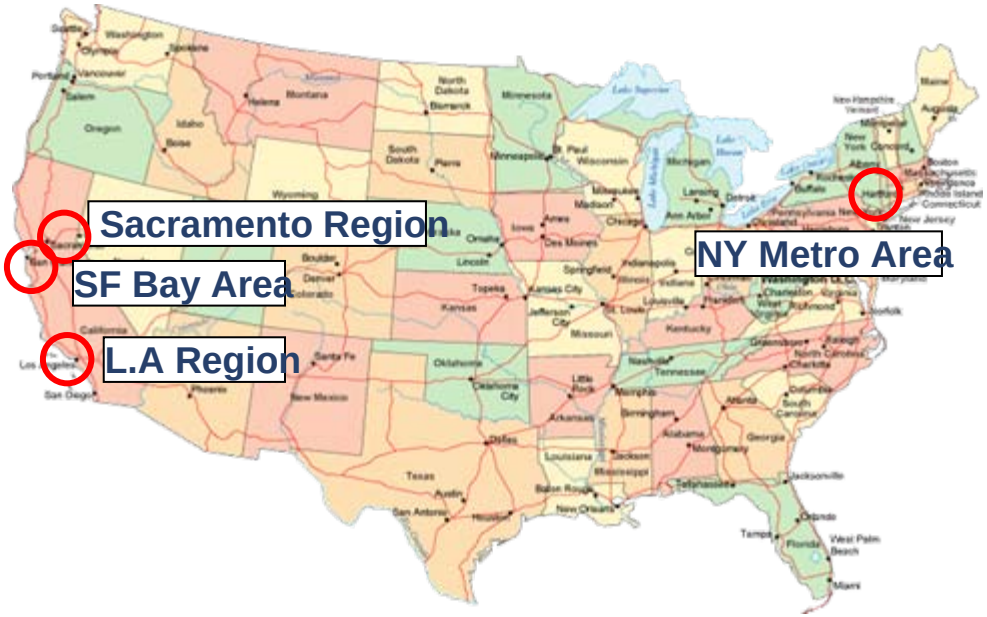
- Longer range
  (105 mi ➔ approx. 250 mi)
- Higher stack lifetime
  > 2000 hours
- More power
  87hp (65kW) ➔134hp
  (100kW)
- High reliability
- Consumption adjusted
  78 mpg (diesel equiv.)
- Cold start capability -13° F
- Lithium-ion battery

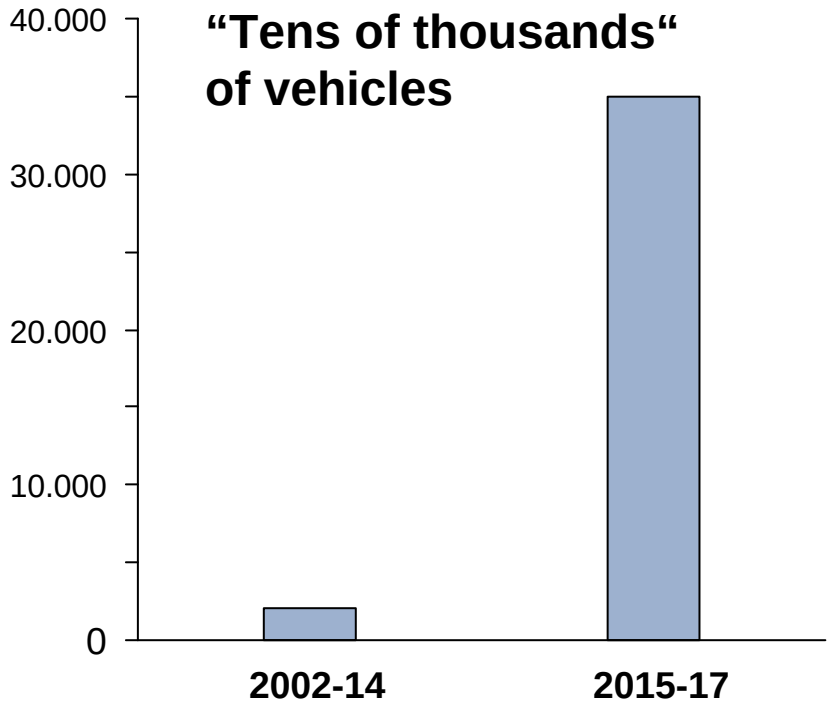
Department of Energy Objectives Achieved or Exceeded:

- ✓ Continuous data sharing with DoE/National Renewable Energy Lab (NREL)
- ✓ Overachieved DoE stack durability (**2000 hours**) and range goals (**250 miles**)
- ✓ Raised **awareness** of hydrogen technology through public education & outreach
- ✓ Developed codes and standards for rigorous safety processes through **5 years of vehicle testing** in diverse climates, temperatures and operating conditions
- ✓ Shaped standards and best practices

➢ **2009 DoE performance targets are proven - signal to enter transition to commercialization**

Joint Fuel Cell Action Plan USA





- **The order of magnitude presented above is in line with Daimler´s product strategy**

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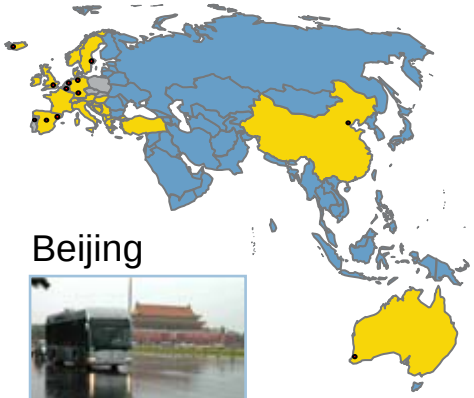
Daimler Worldwide Fleet Operation

60 F-Cell Vehicles in customer operation	36 Buses (Citaro) in Europe, Australia, China
	
~ 1.340.000 miles ~ 63.000 h	~ 1.325.000 miles ~ 139.000 h

Public Transportation - Zero Emission Mobility

12 Cities (Europe, Asia, Australia) – 36 Buses



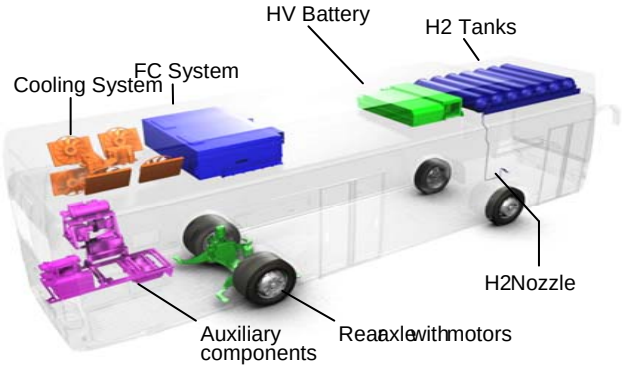
Europe

Beijing

Perth

Achievements (April 2009)

- More than **1,300,000 miles**
- More than **139,000 hours**
- Availability: **up to 96,1%**
- More than 8 **Mio. Passengers**
- Lifetime fuel cell system: up to **4000 hours**



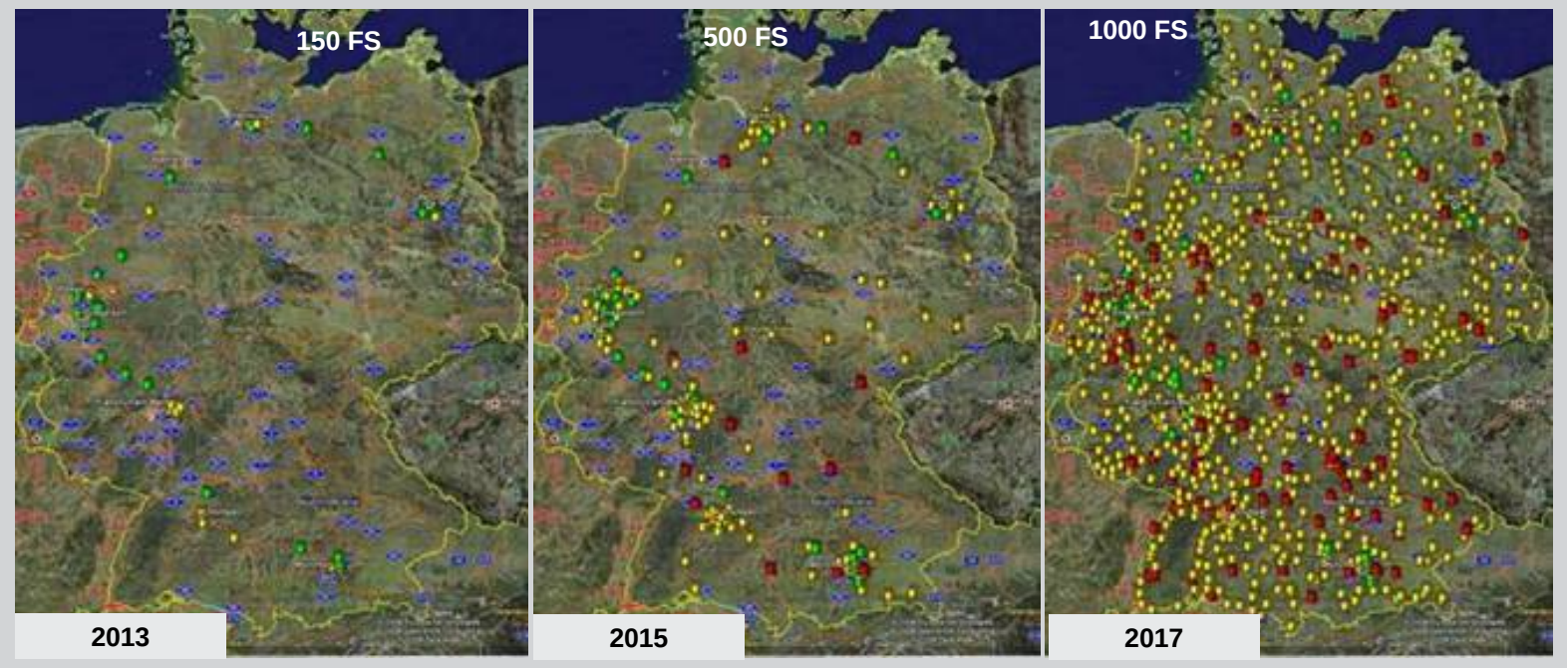
- **Fuel cell technology meets the requirements of public transportation**
- **Experiences integrated into new Fuel Cell-Hybrid bus concept:**
  - **Optimized fuel cell system and fuel cell operation**
  - **Integrated lithium-ion high voltage battery**
  - **Reduced weight**

Worldwide Publicly Funded Programs for Hydrogen Infrastructure and Fuel Cell Mobility

Relevant Programs

	Europe 	Germany 	Japan 
Funding projects	**EU-JTI** **Demo & R&D**	**NIP Demo & R&D**	**JHFC 1+2** **Demo & Validation**
Project contents	Vehicle and H2-Infrastructure (Lighthouse)	H2 + FC-Technologies	Vehicle and H2-Infrastructure Vehicle operation
Timeline	2007 – 2014	2007 – 2016	2003 – 2011
Funding for demonstration	30 - 40% manufacturing and operating costs	48% manufacturing and operating costs	$ US 46 M (mainly infrastructure)
Total funding H2 and FC	**US $ 1.4 Billion**	**US $ 1.4 Billion**	**US $ 2.5 Billion**

Build-up of a H2-infrastructure in Germany



Infrastructure

- Area-wide build-up of a public H_2-infrastructure until 2017 (1,000 filling stations in Germany)
- investment of $ 2 – 2.8 Billion (1,5 – 2 Billion €) for 1,000 filling stations until 2017

Target

- Determine variables for the hydrogen business case, e.g. untaxed subsidies for hydrogen and/or filling station operation
- Transfer business case to other markets

➢ **In 2013 already continuous driving from the north to the south of Germany will be possible**
– this equates to the distance between Washington DC and Chicago / Atlanta (635 mi)