



## Hydrogen, Fuel Cells and Electromobility at German Airports

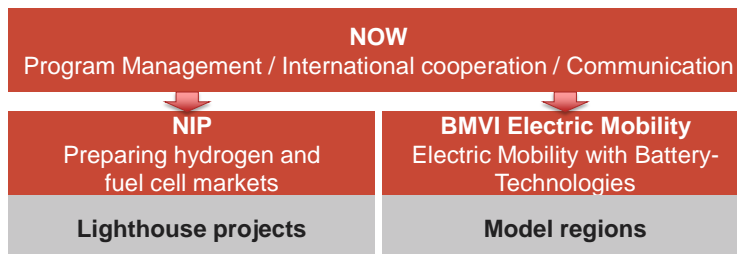
16.09.15 Lampoldshausen

NOW GmbH

Wolfgang Axthammer | Managing Director and Programm Manager Special Markets

### NOW GmbH National Organization Hydrogen and Fuel Cell Technology

- Government-owned company (100 %); founded in 2008
- Supervisory board: BMVI (Chair), BMWi, BMBF, BMUB
- Advisory board: strategic controlling and development of the programmes



**Both programmes address the market preparation**



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## Some time ago - Aviation industry began thinking green





- Sustainable air-mobility
- Objectives of aviation associations





**Reducing CO2-footprint . Growing CO2-neutral**  
**Improving Energy-Efficiency . Energy-Supply-Independency**



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## Green international activities (what and where?)

Hydrogen and Fuel Cell Projects – in the **past**

### USA, 2010

San Francisco International Airport is planning a Hydrogen Refueling Station (HRS)

### England, Februar 2010

DHL und London Stansted Airport sign contract for **Hydrogen On Site Trials (HOST)**.

### Canada, April 2009

Diverse Hydrogen applications (HRS, Bus, baggage tow car) at **Pierre Elliott Trudeau and Vancouver International airport**

### Netherland, Nov. 2009

Trial with baggage tow car of with KLM Equipment Service (KES) at **Amsterdam Schiphol Airport**

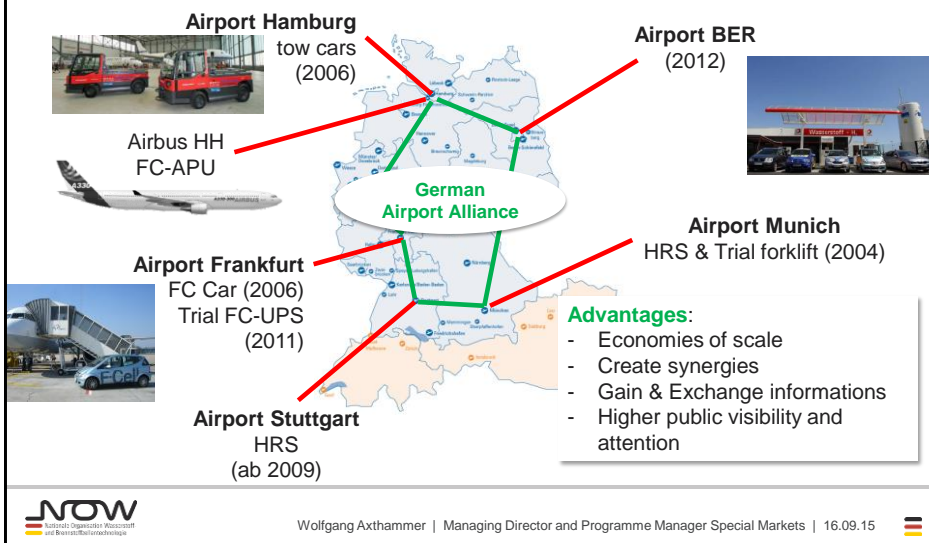
### Japan

HRS at **JHFC Kansai Airport**



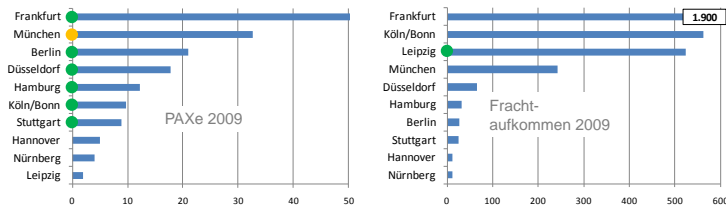
## Green national activities (what, where and how?)

Hydrogen and Fuel Cell Projects: **the past** – **the future**



## German Airport Alliance for Hydrogen and Fuel Cells

gathering partners for cooperation



## WG Hydrogen, Fuel Cells, E-Mobility at German Airports

### 5 years anniversary & external advantages

15th meeting on 17th Sept. 2015

17.09.15

12.08.10

#### Technology deployment:

- 16.09.2015 Joint Clean Sky FCH JU Workshop on FCH Technologies in Lampoldshausen
- 11.03.2015 Visit of a chinese Delegation at NOW in Berlin
- 22.01.2014 Visit of a chinese Delegation at NOW in Berlin
- 13.06.2013 Aerospace Alternative Fuels and Associated Environmental Impacts Symposium in Brussels
- 11.04.2012 Grove Fuel Cell Symposium in Berlin
- 25.11.2011 representatives of Oslo Airport in Berlin
- Working Group introduced



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## WG Hydrogen, Fuel Cells, E-Mobility at German Airports

### 5 years anniversary & internal advantages

33 Guest Speakers  
(Supplier Presentations)

For the exchange of  
experience and knowledge

17.09.15

12.08.10



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## WG Hydrogen, Fuel Cells, E-Mobility at German Airports

### Latest news



### Working Group „Hydrogen, Fuel Cells and Elektromobility at airports “

... Working Scope opened for Electromobility

... Ground Power Unit with Fuel Cell at FRA, HAM and STR was in discussion

... new WG members



... Airport Munich gets actively involved



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## Hydrogen, Fuel Cells, E-Mobility at German Airports

Potential project-segments for Fuel Cell applications

**Ground Power Unit**



**Passenger transport**



**Uninterrupted Power Supply**



**Ground Handling**



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## Project example: NIP-Project 03BV116

Antares H3 – emission free fuel cell propulsion



### Projectdata:

- Project consortium: Lange Aviation, DLR
- Funding budget 4,5 Mio. €
- 01.03.10 - 28.02.14

### DLR H2 – Gen 2

#### Technical specifications

Max speed:	>200km/h
Range:	> 750km
Hydrogen storage:	5kg (at 350bar)
Max. power fuel cell system:	ca. 33kW
Fuel cell system efficiency:	max.52%



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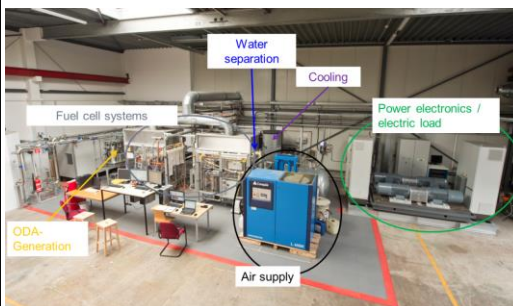
## Project example: NIP-Project 03BV113

Multi Functional Fuel Cell System (MFFCS)



### Projectdata:

- Funding budget 7,15 Mio. €
- January 2010 – December 2013



### Project consortium:

Airbus, EADS Deutschland, Apparatebau Gauting, Berner & Mattner Systemtechnik, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Diehl Aerospace



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## Project example: Vienna Airport

Noise measuring with Fuel Cell Power Supply



EFOY PRO 2400 DUO (Watt in 24h =>100W/h)



- Unbegrenzte Messdauer
- Kanistertausch bei Bedarf (etwa 10L/3Wochen, 1L=1.1kWh= € 4.-)
- Lebensdauer-Stack 6.000h
- LiFePO4-Batterie (60Ah, 3.000 Zyklen, schnell-ladefähig)



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## Project example: Stuttgart Airport

eFleet



### Projectdata:

- March 2013 - February 2016
- Projectbudget 2.3 Mio. €



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## Project example: Airport Frankfurt

### E-PORT AN: Catering, Plane-towing and taxiing



#### LSG eLift:

Development of Catering-Car on the base of emissionfree Elektromobility

- January 2013 - June 2016
- Projectbudget 2.9 Mio. €

[www.e-port-an.de](http://www.e-port-an.de)

#### TaxiBOT:

- Certifying, Trial and Integration of Pilot driven towings
- January 2013 - June 2016
- Projectbudget 2.5 Mio. €
- (first demonstrator in 2008)



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## Thank you for your attention.

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