Germanys Strategy for Sustainable Rail Transport
Projects and Political Initiatives

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NATIONAL ORGANISATION HYDROGEN AND FUEL CELL TECHNOLOGY
GOVERNMENTAL PARTNER FOR SUSTAINABLE MOBILITY

National Innovation-Programme Hydrogen and Fuel Cell Technology
- Research and Development
- Market activation

Charging Infrastructure
- Nationwide buildup
  - Normal charging
  - Fast charging

Battery Electric Mobility
- Research and Development
- Communal mobility concepts
- Vehicle procurement

Mobility and Fuels Strategy
- Alternative fuels (efficient, emission-free)
- LNG as a marine fuel
- Pilot projects

Export Initiative Environmental Technology
- German-Japanese cooperation for P2G
- Development cooperation for H2/FC technologies
- Cooperation with the GIZ

Programme coordination and implementation, strategy development, networking and contribution to visibility

Elena Hof
National Innovation Programme Hydrogen and Fuel Cell Technology 2016-2026 (€ 1.4 bn)

Measures of the Federal Ministry of Transport and Digital Infrastructure within the framework of NIP II (€ 250 million until 2019)

Funding Guidelines within the framework of NIP II

- Funding guideline for measures of research, development and innovation
  Release date 29/09/2016
  Term: until 31/12/2019

- Funding guideline for measures of the market activation
  Release date 18/10/2017
  Term: until 31/12/2019
STRUCTURE OF THE NATIONAL INNOVATION PROGRAMME

NIP II

€ 250 million until 2019

For measures of research, development and innovation
Release date: 29/09/2016
Term: until 31/12/2019

Funding guideline R&D&I

Federal Ministry of Transport and Digital Infrastructure

For measures of the market activation
Release date 18/10/2017
Term: until 31/12/2019

Funding guideline MA
> 40% of the German rail grid is not electrified

> 20% of the German rail traffic is currently operated through diesel trains

Due to low utilization electrification is not economically feasible for certain sections
„For rail transport we intend to establish a comprehensive funding program, which covers both the electrification of tracks and the acquisition of vehicles and the respective charging/refueling infrastructure. Furthermore, regional rail transport is intended to be supported through investment grants for fuel-cell-hybrid-railcars including facilities & depot modifications as well as the construction and operation of hydrogen refueling stations.“

– translated from the coalition agreement between CDU, CSU & SPD, 2018
TIMELINE
FROM R&D…

Letter of intent for the use of hydrogen trains in the federal states of Lower Saxony, Hesse, Baden-Württemberg and North Rhine-Westphalia

September 2014

Federal financial funding amounting to 7.9 million € for the project BetHy by Alstom for the development of the hydrogen train Coradia iLint

November 2014

Publication of the study „Hydrogen Infrastructure for Rail Transport“ through the federal ministry for transport

2016

Federal funding of 1.14 million € for the project BetHy 2 for the development, validation & authorization of the Coradia iLint

October 2017

Federal funding of the Siemens project X-EMU for the development & validation of a fuel cell drive for hybrid-EMU-trains with 11.7 million €

December 2017
Deadline of the first funding call for the acquisition of hydrogen trains (including fuel stations and onsite electrolyzers)
→ Proposals from 6 federal states for more than 160 trains in total

March 2018

First press tour with the Coradia iLint from Wiesbaden to Frankfurt-Höchst

April 2018

Alstom receives the GreenTec Award 2018 in the category „Mobility“ for the Coradia iLint

May 2018

Start of the trial operation of the Coradia iLint on the route Cuxhaven – Bremerhaven – Bremervörde – Buxtehude in Lower Saxony

Summer 2018

Regular operation from 2021 on:
14 Coradia iLint in Lower Saxony
28 Coradia iLint in Hesse
...

Elena Hof
R&D - BETHY & BETHY 2
DEVELOPMENT OF THE CORADIA ILINT BY ALSTOM

Technical Data:
• Based on the diesel train Coradia Lint 54
• 2 fuel cell stacks
• 2 hydrogen tanks (each 130 kg)
• 2 x 272 kW power at the wheel
• Up to 1000 km range
• Maximum speed of 140 km/h
• Approximately 119 t total weight
• Approximately 55 m length
Project Goal:

- Integration of a fuel cell stack in a modular traction system
- Development of a **hardware-in-the-loop** for the integration, development and evaluation of real components and models
- Integration in the Siemens platform „Mireo“

→ Modular combination of battery and fuel cell system, adoptable to different conditions and customer demands
LOWER SAXONY – START OF OPERATION IN 12/2021
BUXTEHUDE – BREMERVÖRDE – BREMERHAVEN - CUXHAVEN

**Track:**
- Single-track branch line
- 123 km
- 21 stations
- Average distance between stations 9 km
- Current operator: EVB

**Trains:**
- 12+2 Coradia iLint
- 156 seats per train

**Refueling station:**
- One station and maintenance in Bremervörde
- Maximum of 12 refueling processes per day
- 15 minutes per train
- Two trains in parallel
Track:
• Yearly mileage of 2.1 million km

Trains:
• 28 Coradia iLint (including reserve)
• 160 seats per train

Refueling station:
• One station – most likely in Frankfurt-Höchst
• Hydrogen production at the industrial park Frankfurt-Höchst
BATTERY-ELECTRIC-TRAINS
R&D PROJECTS

- **Primove Tram**
  - Period: 2010
  - Partners: Bombardier Transportation, Stadtwerke (municipal utilities) Augsburg Verkehrs GmbH
  - Goal: *Demonstration of a tram with an inductive charging system under real-life conditions*

- **Westfrankenbahn**
  - Period: 03/2010 – 12/2013
  - Partners: MTU Friedrichshafen + DB RegioNetz
  - Goal: *Demonstration of a hybrid train and verification of the respective technological suitability for daily use*

- **EcoTrain**
  - Period: 09/2013 – 06/2017
  - Partners: DB RegioNetz, Fraunhofer IVI, TU Chemnitz, TU Dresden
  - Goal: *Development of a modular, series mature drive and accumulator technology*

- **BEMU**
  - Period: 09/2016 – 06/2020
  - Partners: Bombardier Transportation, TU Berlin, SWEG, Nahverkehrsgesellschaft Baden-Württemberg
  - Goal: *Development of a battery train for non- or only partially electrified tracks*
FURTHER EXPRESSIONS OF INTEREST

Present Calls for tender open to zero-emission technologies:
- Baden-Württemberg: Grid “Ortenau”, 15-20 trains
- Schleswig-Holstein: three rail grids, approximately 50 trains

Press releases stating a specific interest in the utilization of fuel cell trains:
- Brandenburg: Section “Heidekrautbahn”, 4-5 trains
- Central eastern Germany: feasibility study for the utilization of hydrogen trains performed

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Thank you very much for your attention!

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