



# Alternative Drives in Public Transport

**NOW**  
National Organisation  
Hydrogen and Fuel Cell Technology



## Fuel Cell Buses

For longer lines, hydrogen-powered buses are a good alternative to battery-powered buses. In about ten minutes, the buses refuel enough hydrogen for 300-400 kilometers of driving. Fuel cell buses therefore offer a flexibility comparable to that of a diesel bus and can be easily integrated into the operational processes of transport companies. Alternatively, a battery-powered bus can be equipped with a fuel cell as a range extender. Here the two drive technologies complement each other: a battery supplies energy for the drive, absorbs it during braking and is recharged during breaks or in the depot. While the vehicle is in operation, the battery is recharged by a smaller fuel cell.

Nitrogen dioxide and carbon dioxide emissions, noise, fine dust - the energy turnaround in transport sets challenging tasks, also for the local public transport on roads and railways. Some transport companies are getting ready for the future and are now embarking on the conversion of their fleets to vehicles with alternative drives. In the focus here - batteries and fuel cells which are becoming particularly efficient when electricity or hydrogen from renewable energies are used.

## **City Buses: A Question of Drive**

Buses travel 200-400 km per day. They brake and accelerate much more often than cars. With a scheduled service life of 12 years and 750,000 kilometers driven, the vehicles must be robust and at the same time as comfortable as possible. More than ten million test kilometers from pilot projects show that it is technically possible to operate the majority of buses electrically by 2030. Various drive technologies are currently available for operation.

### **Battery Buses**

For many bus operators, to start with the conversion of entire lines to battery buses, a secured range of 200 km is sufficient. Some vehicles now available on the market already achieve these daily mileages thus allowing uninterrupted operation, with reloading happening at night in the depot. Charging is also possible during operation. In this case, the bus charges via inductive or conductive quick charging at stops and reversing points or via a partial overhead contact line. This not only significantly reduces the required battery capacity but also service time.

## Instead of Diesel: Batteries and Fuel Cells in Rail Transport

Wherever the German rail network is not electrified, low-emission alternatives to diesel locomotives are possible - this concerns about 40 % of the routes. Which drive technology suits a section or network best depends on local conditions and operational requirements.

Several companies are now working on the development of electric multiple units for regional traffic. A Talent 3 electric multiple unit equipped with traction batteries is currently being tested in real traffic on non-electrified or partially-electrified lines. Two prototypes of the Coradia iLint fuel cell train are already in the test phase. On the Cuxhaven – Bremerhaven – Bremervörde – Buxtehude line, 14 of the Coradia-iLint trains are to go into service by autumn 2021.





Further hydrogen trains are planned for routes in Hesse and Brandenburg. A diesel-electric hybrid drive is already marketable and is to be used by Deutsche Bahn. A small series with twelve vehicles is planned for the Erzgebirgsbahn until 2021. Other transport companies will in future use electric multiple units - with batteries, fuel cells or hybrids - in regional transport. Several corresponding public procurement procedures are currently underway nationwide.

The use of alternative drives in public transport is politically supported and promoted by the Federal Ministry of Transport and Digital Infrastructure (BMVI). Funds for research and development, procurement and the development of electromobility concepts are available via the „Electromobility On Site“ programme and the National Innovation Programme Hydrogen and Fuel Cell Technology. The programs are coordinated by NOW GmbH National Organisation Hydrogen and Fuel Cell Technology.

Contact: Hydrogen/Fuel Cell:

**Elena Hof**

Program Manager NIP

Telefon: +49-(0)30-311 61 16-39

E-Mail: [elena.hof@now-gmbh.de](mailto:elena.hof@now-gmbh.de)

Battery-electric:

**Oliver Hoch**

Program Manager Electromobility

Telefon: +49-(0)30-311 61 16-38

E-Mail: [oliver.hoch@now-gmbh.de](mailto:oliver.hoch@now-gmbh.de)

Funded by:



Federal Ministry  
of Transport and  
Digital Infrastructure

Coordinated by:

**NOW**

National Organisation  
Hydrogen and Fuel Cell Technology