

Münster (DE)

DESCRIPTION

The Münster demo consists of five full-battery electric buses built by manufacturer VDL. These use an opportunity fast-charging system at terminal stops and slow charging at the depot. With a battery capacity of 62.5kWh, the buses run as a full-day service on an urban line, serving the city centre and central railway station with the zoo and suburban districts.

Zero-emission vehicles, funded by the ZeEUS project, support the Münster clean air plan.



The electric buses pass through Münster's historic city centre

DEMO IN BRIEF

Vehicle technology:

5 x Full Electric

Brand and model:

VDL Citea SLF-120 electric

Bus length: 12m

Capacity: 80 passengers

Charging technology: Ultra-fast conductive via pantograph

Duration:

Sept 2015 – April 2017



Elevation map of the line route

OPERATIONAL CONDITIONS

Line number: 14

Typology: City centre and suburban

Topography: Flat

Length: 11km

Average commercial speed: 14km/h

Total daily hours of operation: 16h

Total km driven/vehicle/day: 150km

Av. no. of passengers/day: 5,000 passengers

SORT type: 2

KEY TOPIC

Clean air is a key component of healthy living. However, many German towns face high nitrogen oxide levels from road vehicles emissions. Although each diesel bus efficiently reduces air pollution by replacing up to 100 cars during rush hour, high demand remains for zero-emission public transport.

ZeEUS enabled local energy supplier and transportation company Stadtwerke Münster to operate electric buses at an early stage. This has provided a great deal of insight into bus, battery and charging infrastructure technologies. This expertise will help manage the transition from diesel to electric operations within the next years.

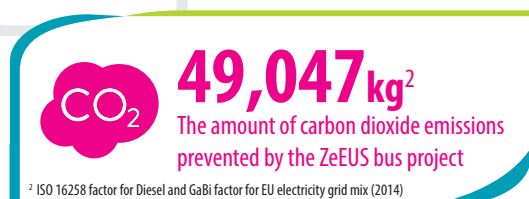
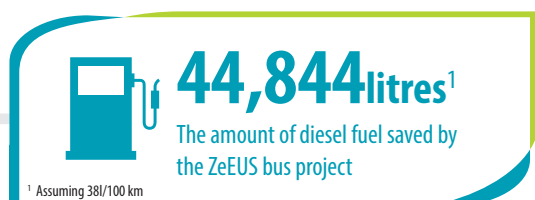
DEMO TIMELINE •

- **Since Sept 2016** – continuous operation
- **Sept 2016** – change of charging solution from side coupling to overhead pantograph system
- **Sept 2015** – extended operation with fast-charging side-coupling system at the terminal stations and slow charging at the depot
- **May 2015** – start of short-range operation until completion of fast charging stations



Charging by pantograph. The substation imitates an electric bus

FIGURES FOR THE MÜNSTER DEMO FROM NOVEMBER 2016 TO AUGUST 2017



RESULTS AND LESSONS LEARNED •

- Electric buses are perceived positively by passengers, residents and bus drivers
- The charging infrastructure is key to the reliability of the buses
- Many of the frequent technical failures related to operating errors or vehicle malfunctions rather than to the electrical propulsion technology
- On-board support from a trainer during real-world operation helps instil driver confidence in the vehicle technology
- Integrating e-buses into a diesel fleet takes time

“Electric buses represent the future of public transport. The ZeEUS projects gave us a head start, enabling us to support cities from near and far.”

Eckhard Schläfke, Public Transport Manager, Stadtwerke Münster

FUTURE PLANS •

Stadtwerke Münster will continue on the “zero emissions” path started with ZeEUS. Two hydrogen fuel cell and five additional VDL electric buses will operate in Münster from 2018. The latter will use the same charging infrastructure but their larger batteries offer greater flexibility, whilst the former have 400+ km range.

www.zeeus.eu



Stadtwerke Münster



BUS & COACH



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ADVANCING PUBLIC TRANSPORT