

Eindhoven (NL)

DESCRIPTION

The Zuid-Oost-Brabant concession covers a region with 750,000 inhabitants. Its main cities are Eindhoven and Helmond.

The 43 electric buses of Transdev fleet form part of a fleet of 215 in this concession. All 43 electric buses were included in the ZeEUS demo in order to test different pre-heating strategies as from December 2016.



The electric bus in the centre of Eindhoven



Elevation map of the lines 400-407

OPERATIONAL CONDITIONS

Line number: 400, 401, 402, 403, 404, 405, 406 and 407

Typology: City centre and suburban

Topography: Flat

Length: 4.4 - 12.3km

Average commercial speed: 18.5 - 27.5km/h

Total daily hours of operation: 20h

Total km driven/vehicle/day:
av. 200km - max 300km

Av. no. of passengers/day:
11.500 passengers per line

SORT type: E-SORT

DEMO IN BRIEF

Vehicle technology:
43 x Full Electric

Brand and model:
VDL Citea SLFA-E181

Bus length: 18.15m

Capacity: 136 passengers

Charging technology:
Combination of opportunity (40 min.) and overnight charging at the bus depot (4-5h)

Duration:
Dec 2016 - Sept 2017

KEY TOPIC

Eindhoven is the ZeEUS demo for smart pre-heating of electric bus interiors and batteries.

The e-buses are scheduled to drive 71,000 km per vehicle per year.

Opportunity charging is through roof-mounted pantographs and fast chargers within the bus depot during the day. There are 22 slow chargers of 30kW and 10 fast chargers of 300kW available at the bus depot in Eindhoven, situated only 1km from the bus transit station.

During the contract period (2016-2026), the remaining diesel buses will be replaced with electric buses (12m - 13m and midis).

DEMO TIMELINE

- Dec 2017 – 3,000,000km driven
- April 2017 – 1,000,000km driven
- Dec 2016 – start of operations
- Nov 2016 – training of 560 drivers



The buses during the charging and pre-heating of the battery

FIGURES FOR THE EINDHOVEN DEMO FROM DECEMBER 2016 TO JANUARY 2018



1,298,586 litres¹

The amount of diesel fuel saved by the ZeEUS bus project

¹ Assuming 38l/100 km



3,417,331 km

The distance travelled by ZeEUS buses running in pure electric mode



1,167,054 kg²

The amount of carbon dioxide emissions prevented by the ZeEUS bus project

² ISO 16258 factor for Diesel and GaBi factor for EU electricity grid mix (2014)

RESULTS AND LESSONS LEARNED

- Battery temperature is an important parameter when choosing fast-charging and air-cooled batteries
- Training drivers in e-bus operations is an important feature in extending the limited range
- The bus is so quiet that there is a (tram)bell installed to warn pedestrians and prevent accidents
- Choosing the best charging strategies demands developing new mindsets
- New heating strategies are being developed to improve the quality of fast-charging sessions

“Our drivers did well. Lots of things could have gone wrong, because driving an e-bus is completely different. I am proud of our enthusiastic team of drivers.”

Juul Van Hout, Managing Director, Hermes

FUTURE PLANS

- Development of phase 2: adding the next 65 e-buses during the period 2019-2021
- Development of phase 3: adding of the next 65 e-buses during the period 2022-2024
- Upgrading the chargers and expanding charging facilities to further locations or other depots

www.zeeus.eu



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