

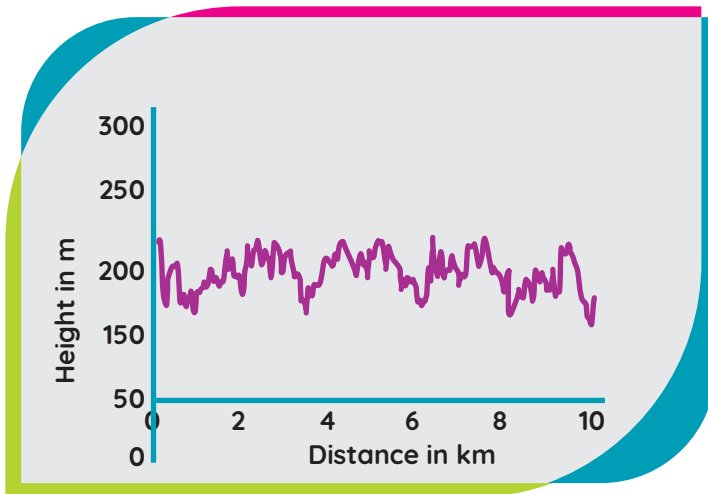
WARSAW (PL)

DESCRIPTION

MZA purchased 10 Solaris Urbino U12 e-buses as the first phase in electrifying city centre transport. Currently, the buses operate on line 222, which passes through the congested centre as well as the historic part of the city. The entire line is operated solely with e-buses. Passengers appreciate the comfort and driving dynamics, despite the fact it can sometimes be crowded (for obvious reasons). An efficient HVAC system completes the positive overall opinion of the vehicle.



Solaris Urbino 12 electric in service



Elevation map of the line route

DEMO IN BRIEF

Vehicle technology:

10 x Full Electric

Brand and model:

Solaris Urbino 12 electric

Bus length: 12m

Capacity: 70 passengers

Charging technology:

Plug in at depot, pantograph at terminal

Duration:

Since June 2015 to present

OPERATIONAL CONDITIONS

Line number: 222

Typology: City centre

Topography: flat

Length: 13.75km

Average commercial speed: 12km/h

Total daily hours of operation: 16h

Total km driven/vehicle/day: 160km

Av. no. of passengers/day: 581

SORT type: SORT 1

DEMO TIMELINE •

- **Dec 2016** - Pantograph charger was built on the terminus of line 222 (fed from commercial energy provider)
- **Dec 2016** - All e-buses equipped with roof pantographs
- **June 2015** - Start of operations begun
- **Dec 2014** - first bus operational
- **Nov 2013** - start of project

KEY TOPIC •

The objective of the Warsaw project has been to demonstrate that electric buses are fully substitutable for their diesel counterparts on the same route. The environmental benefits have been realised through using electric buses with the ability to charging either in the depot or at the end of the line (terminus).

The MZA Warszawa has an impact on the environment through diesel fuel savings and reducing CO2 emissions, GHG emissions, SO2 emissions as well as other pollutants. Noise pollution is also reduced.



Opportunity charging at the end of the line

FUTURE PLANS •

In 2018 MZA will operate a total of thirty 12-meter electric buses.

Between 2019 and 2020, MZA intends to purchase further 130 articulated e-buses.

RESULTS AND LESSONS LEARNED •

- Charging at the bus end (instead of in the depot) allows better use of electric buses - maximizes operational time
- Construction of the charging infrastructure is time-consuming (obtaining the right to dispose of land, permissions, arrangements with the energy supplier) and therefore needs to be planned in advance - at least 1.5 years
- Driver education is also essential for working with new technology. Training should be carried out in advance so that the drivers are ready when the project launches

www.zeeus.eu



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