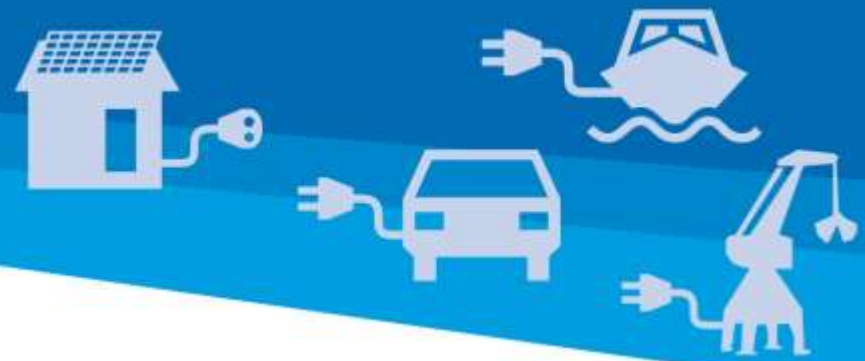
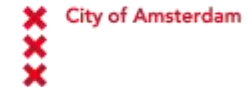
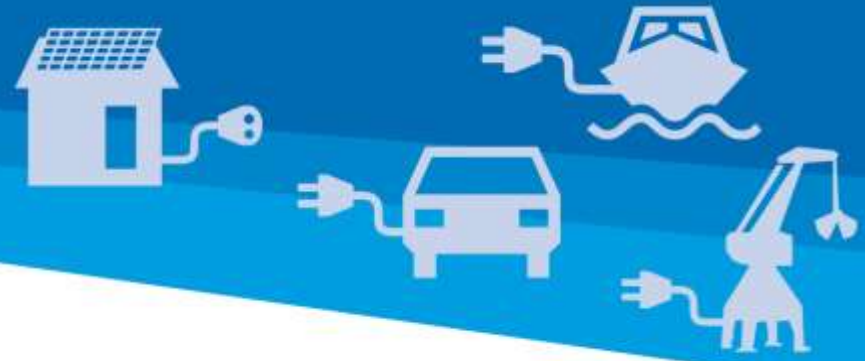


e-harbours  
electric



# Siemens' eHighway Concept





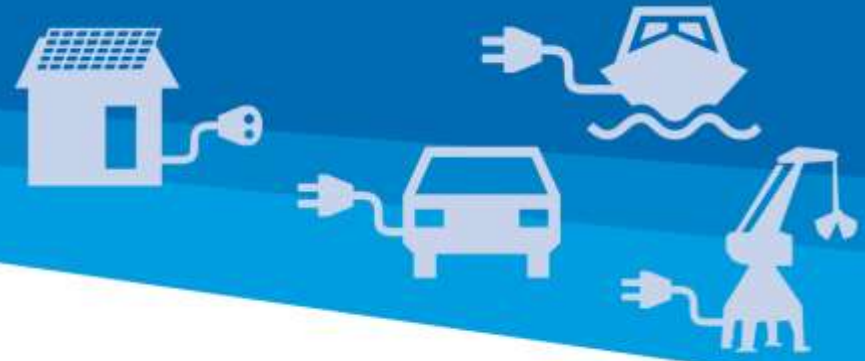
## eHighway - electric-driven freight transport

- Diesel-electric hybrid technology
- Under normal operation - Power supply via catenary (overhead) lines and regenerative braking
- Intelligently controllable pantograph for energy transmission
- Can move 'off track' and use diesel engine



## Siemen's eHighway Concept





## Advantages

- Economical: electric motors are very durable and each vehicle not reliant on one expensive battery
- Cheaper and easier technology than inductive charging (i.e. Not 7M Euros/ kilometre)
- More environmentally friendly than diesel: no emission of CO<sub>2</sub>, nitrogen oxides, soot
- Efficient: vehicles can exchange energy via the catenary system (V2G possible)



## Something for the energy ‘techies’

The overhead wire is fed from a container substation. The substation used during testing is equipped with:

- Medium-voltage DC switching system
- Power transformer
- Rectifier 12-diode array
- Controlled inverter (for the feedback of the electric energy generated by the vehicles’ regenerative braking)



# Intelligent pantograph



## Intelligent pantograph

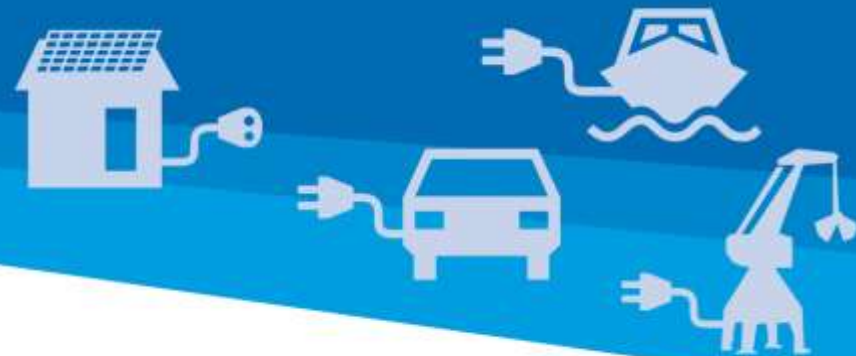
- (Translation from techy-speak: the bit of kit on the lorry that touches the overhead cable is quite smart)



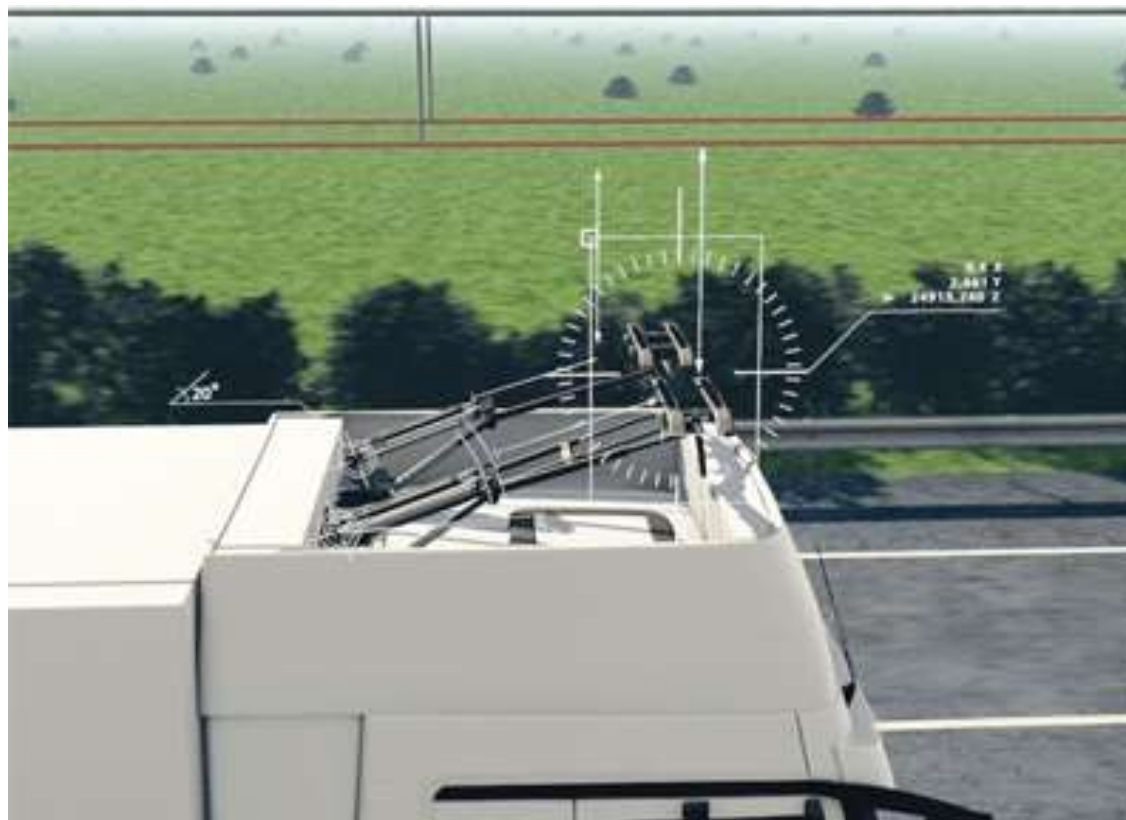
## Intelligent pantograph

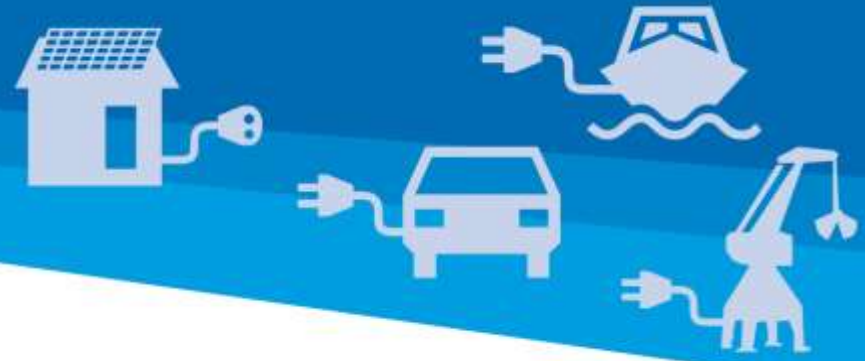
- Actively controllable pantograph can be easily connected to and disconnected from the overhead line - at speeds of up to 90 km/h.
- Connection is made either automatically or manually at the push of a button





## An Intelligent Pantograph





## Hybrid drive

Potential to use a variety of hybrid drive systems.  
Components of prototype were

- Generator
- Rectifier
- Buffer store
- Inverter
- Traction motor



## Siemens' eHighway Concept

- ...And now a short video on the eHighway concept