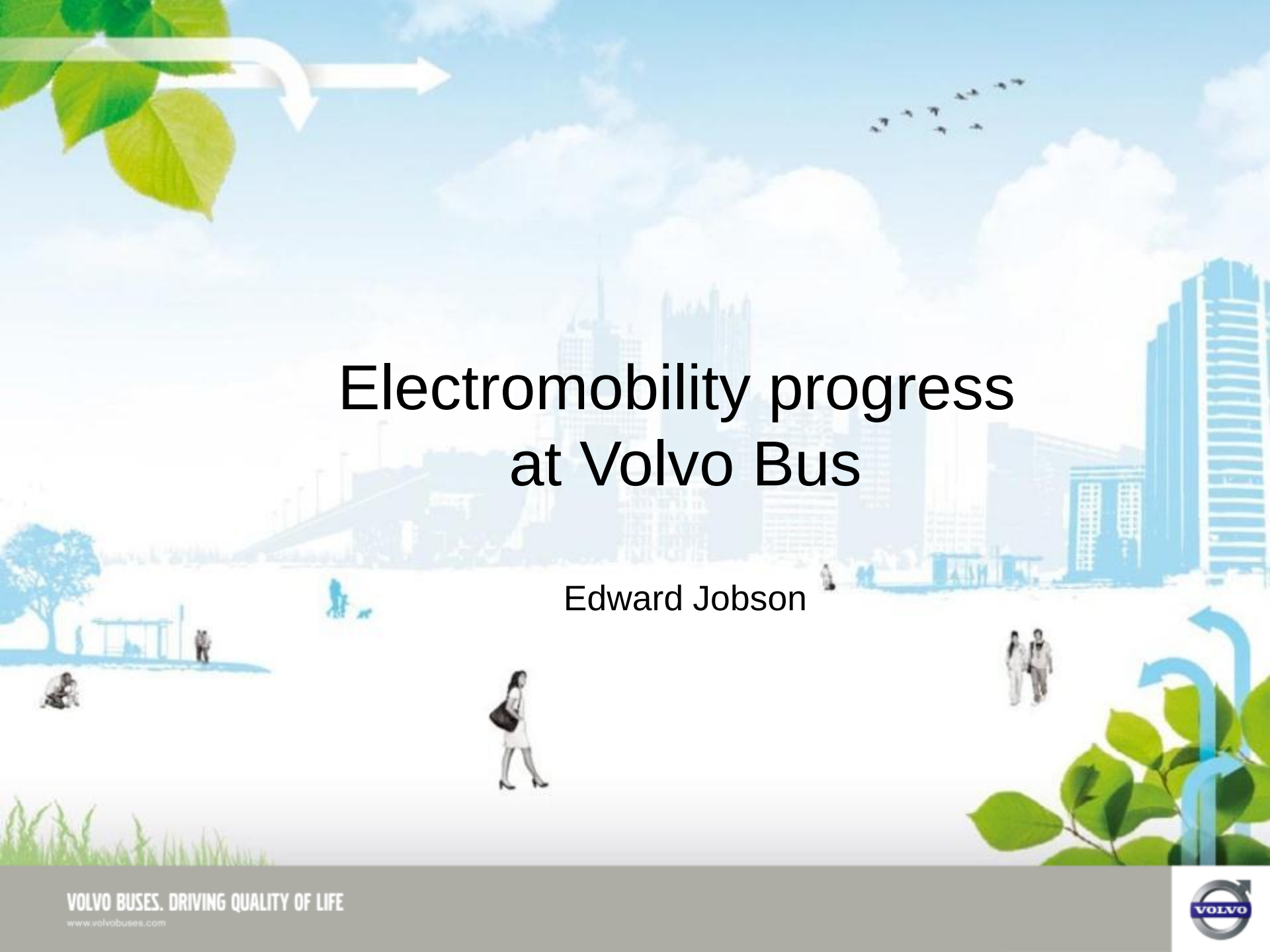




Electromobility progress at Volvo Bus

Edward Jobson

Corporate Core Values

Environmental Care

Safety

Quality

New standard/base offer -decides the future



1959 Seat belts
no longer optional



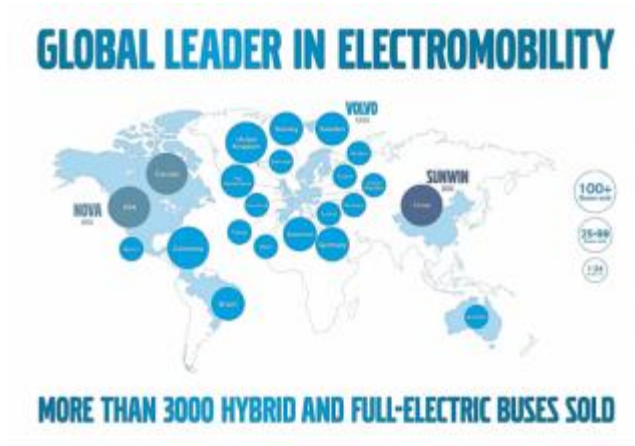
1976 Three way catalyst
no more optional



2014 Hybrid city buses
no more optional

To return to the past is no alternative.

Continuing where we ended last time



Global Mega Cities



World-leading Fuel Consumption



CITY SOLUTIONS



Bus system

- Electric Hybrid Buses
- High Power Charging
- High capacity and feeder
- Attractive design
- IT support systems
- Zone Management
- Depot Charger



Volvo -the first and only city mobility transformer

VOLVO 7900 ELECTRIC HYBRID

Energy-efficient:

- Up to 75% fuel saving
- Up to 60% total energy saving



VOLVO 7900 ELECTRIC HYBRID

No emissions – no noise:

- Up to 75% lower exhaust emissions
- Quiet and emission-free in electric mode
- Allows indoor bus stops and operation in sensitive residential/ city centre areas



VOLVO 7900 ELECTRIC HYBRID

Flexibility:

- Electric mode range: 7 km
- An electric hybrid bus will work as a hybrid if charging stations not available



Volvo Buses is currently running pilot projects with electric buses in close collaboration with five cities

Gothenburg

- Plug-in hybrids and full electric buses
- Interactive services and redesigned buses to increase attractiveness

Stockholm

- Plug-in hybrid buses on regular city route
- Part of EU-project supporting future public transportation solutions

Hamburg

- Plug-in-hybrid and full electric buses
- Done in collaboration with the operator and the ministry for environment

Luxemburg

- Plug-in-hybrid buses
- Test arena for new electromobility solutions
- Close collaboration with operator and government authorities

Montreal

- MoU signed Nov 2013

City Mobility - Hamburg

Project

- Hamburg project started in Jan 2013 in collaboration with Hamburg Hochbahn AG
- A high visibility route selected for operation
- From mid-December in use on Europe's first innovation line in Hamburg

Route characteristics

Length: ca. 9,3 km

Duration in Peak Hours: 37 min

Type of Vehicle: 3 PHEV, 12 m

Stations: at both end of the line

Route in Hamburg



Vehicle and Station



Stockholm

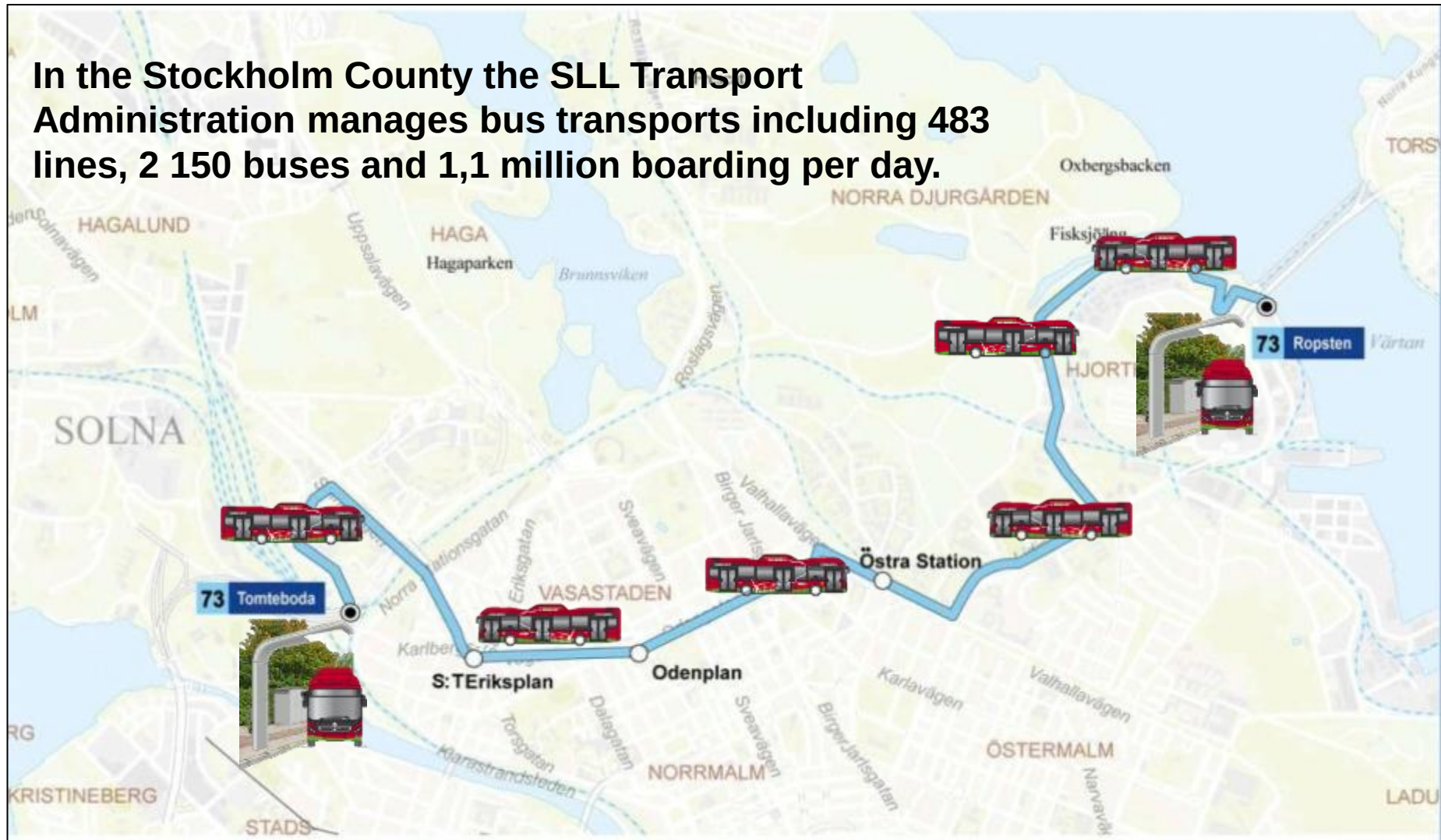
- Partners
 - SLL Trafikförvaltningen, Volvo and Vattenfall
 - Keolis will operate the buses
- Objectives
 - Prove the technology in full scale traffic conditions replacing existing gas powered buses on an established route with Electric hybrid buses
 - Prove that this system can be an important factor in the future public transport systems in the EU without big changes in the infrastructure



Stockholm

Route 73 Ropsten – Tomtebodas approx. 8,5 km

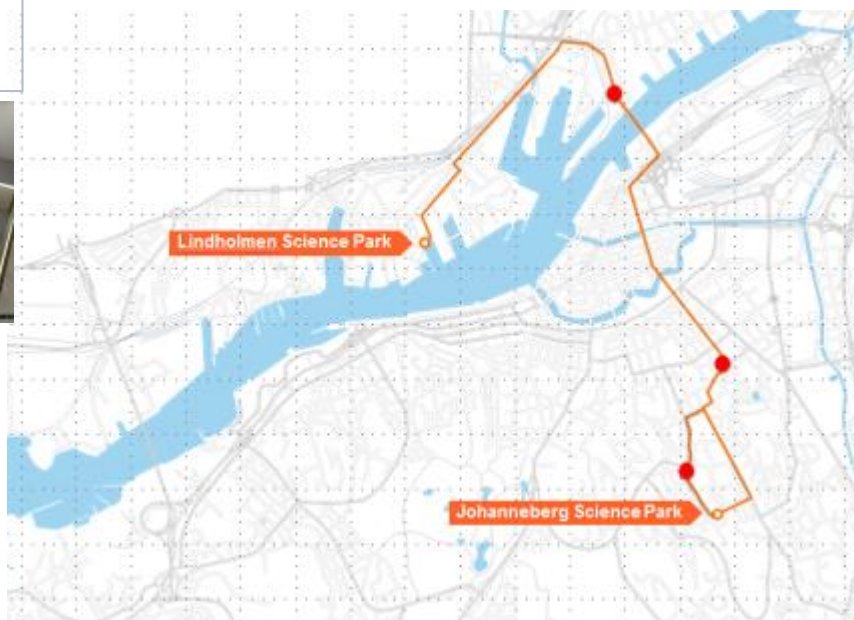
In the Stockholm County the SLL Transport Administration manages bus transports including 483 lines, 2 150 buses and 1,1 million boarding per day.



A visionary public transport system

A completely new bus route
From Chalmers Johanneberg to Lindholmen

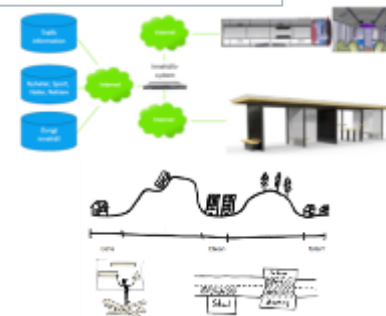
A new generation of
service centre and depot



Five new types of bus stops
one indoor



Customized zone
management



2 new busmodels:

- Electric Hybrid
- Electric opportunity charged

ELECTRICITY



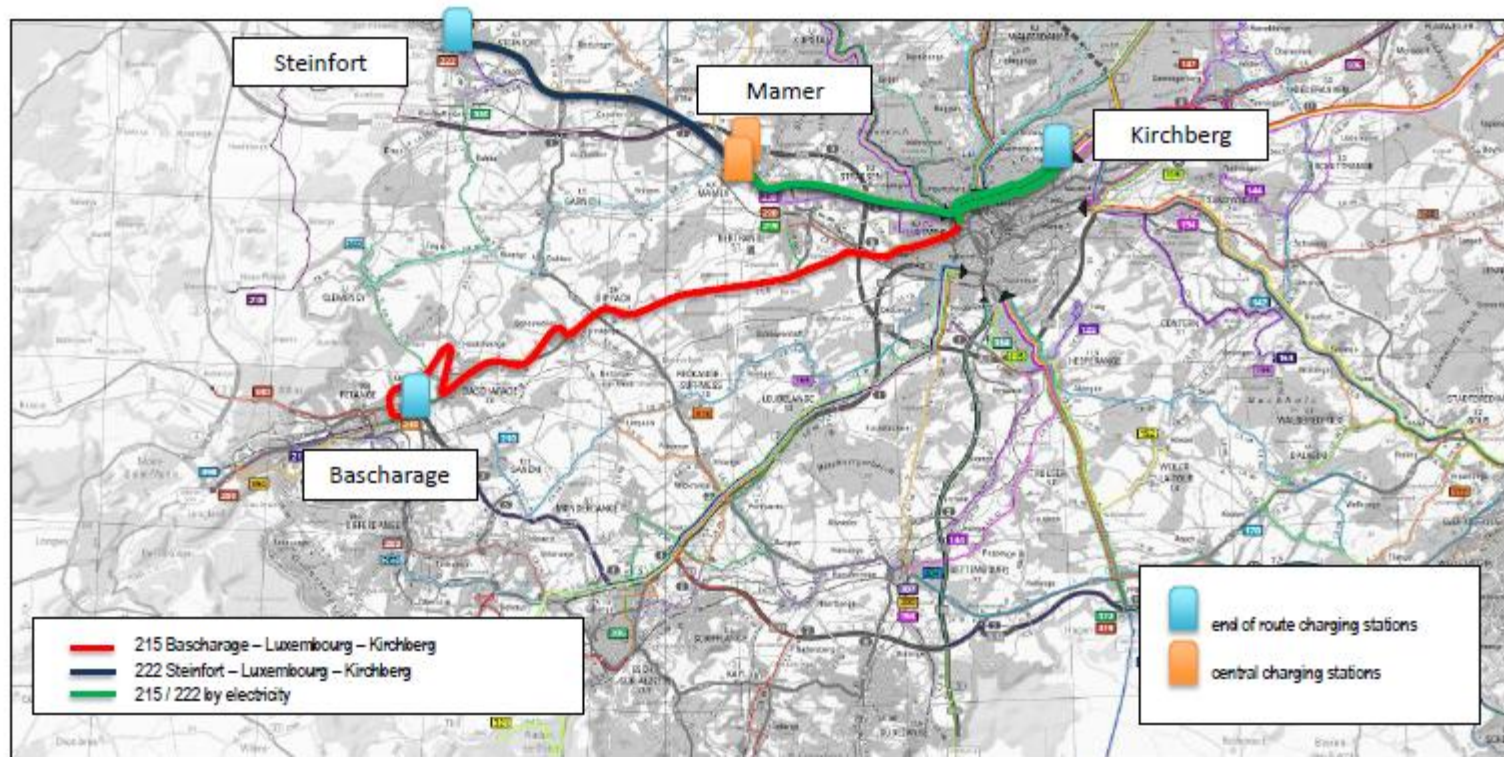
VOLVO Buses



Luxembourg Plug-In Hybrid Bus Project

3. Lines and charging stations

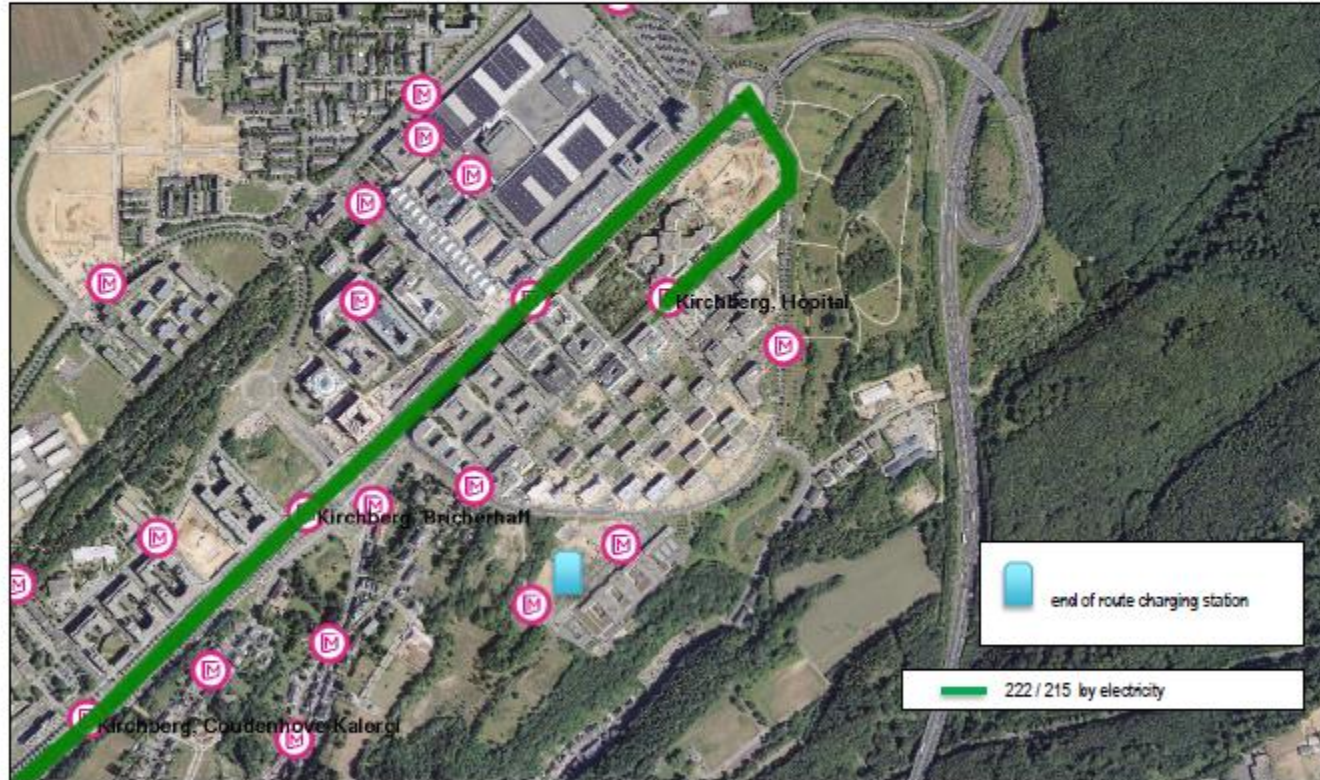
RGTR Bus line with Euro 6 Plug-In Hybrid Bus 2015



Luxembourg Plug-In Hybrid Bus Project

3. Lines and charging stations

End of route charging station 'Kirchberg, Hôpital'



Pour un monde durable



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Développement durable
et des Infrastructures

Zone management

- The bus behaviour can be controlled through GPS
 - Zero emissions
 - Silent zone
 - Safety zone



Silent zones

- Noise pollution is a growing problem in all urban areas and a major threat to perceived quality of life
- Noise level when driving in electric mode 65dBA, sound level equal to normal conversation
- Health benefits of noise reduction calculated to £0,36/km in dense city in Swedish study



ZERO-EMISSION ZONES

Zero emissions where its
mostly needed

Historical buildings, parks,
schools, hospitals and other
sensitive areas are being
increasingly protected from
harmful emissions



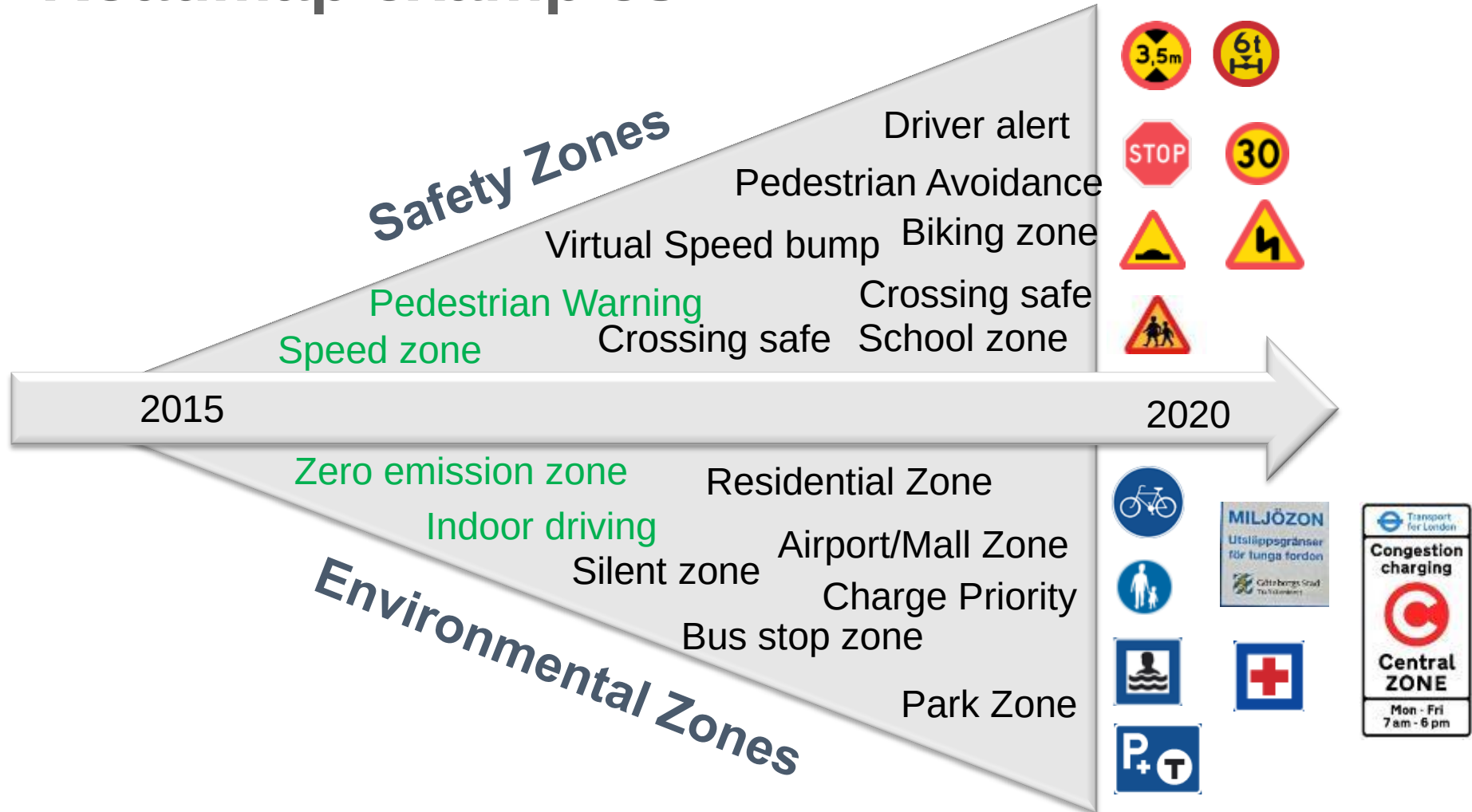
Safety zone

Prevents vehicle from speeding in areas where risk for people injury is high

- Schools
- Areas with many pedestrians crossing the road



Zone Management Roadmap examples



Conclusions

- Electromobility is the prioritized solution for new bus systems
- Many cities around the globe follow the trend
- The preferred bus technology will depend on the type on traffic conditions: Hybrid; Electric Hybrid; Electric
- Electric Hybrid Buses will:
 - electric when when you need environmental performance
 - Hybrids when you need power
- Zone management secures the properties each minutute at each place



THANK YOU!

VOLVO BUSES. DRIVING QUALITY OF LIFE

www.volvobuses.com

