ELECTROMOBILITY VOLVO BUSES

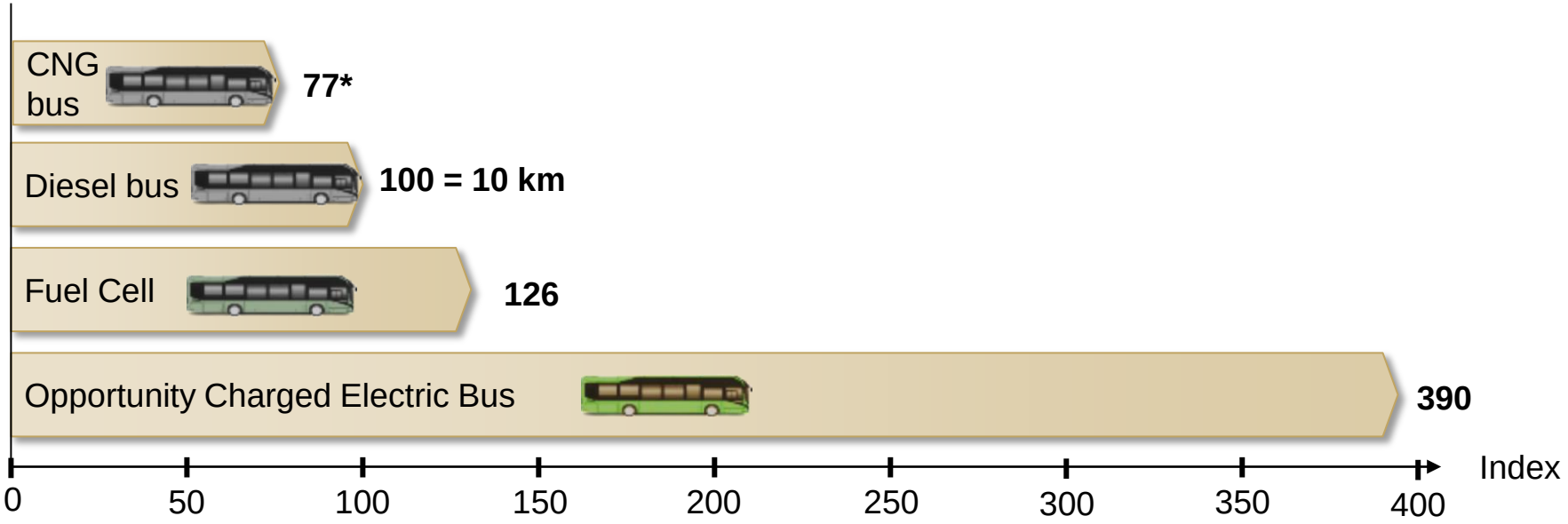
ACROSS INSTEAD OF AROUND

Citizens choose public transport –
it’s simply the best

Sustainable Safe
Reliable Accessible

Electric buses have superior energy efficiency

How far does 180 MJ of energy take you in a City bus?*



SOURCE: FCH JU , International Energy Agency 2011

* Well to wheel comparison:
- 5l diesel
- 5 Nm3 CNG
- 50 kWh of electricity

Electric buses – moderate growth of electricity consumption

Lillgrund Windfarm, Sweden

1 windmill

Energy for 250 electric buses*

* 1 Windmill @ 5 MW and 4.000 h/yr => 20 000 MWh/yr
1 Bus á 60.000 km/yr och 1,2 kWh/km = 250 busses/windmill

Volvo Electrified buses – A complete product offer

HYBRID BUSES

- 30-40% Fuel reduction
- Silent take-off
- 40% lower on road emissions

ELECTRIC HYBRID BUSES

- 75% fuel & 60% energy reduction
- Electrical drive 70% of route
- Silent
- 75% CO_2 reduction*
- Charging 3-6 min at end stations

FULL ELECTRIC BUSES

- 80% energy reduction
- Electrical drive 100% of route
- Silent
- Minimum local emissions
- 100% CO_2 reduction*
- Charging 3-6 min at end stations

PRESENT → LONG-TERM

* With CO_2 neutral electricity

Three cornerstones of Volvo Buses' e-mobility strategy

Product portfolio

The future will be a mix of:

- Hybrid
- Electric Hybrid
- Electric

Complete system offering

- Buses, infrastructure & services
- Battery charged by km
- Competitive Life Cycle Cost vs Diesel

SIEMENS ABB OPPcharge

Open interfaces

- One open and standardized interface for charging infrastructure
- Enable buses from other suppliers
- Driving standardisation together with Siemens & ABB

GO ELECTRIC VOLVO BUSES
Turn-key

Turn-key solution

- Cost per km
- Vehicles
- Project management
- Driver training
- Reporting of fleet performance
- Maintenance, repair and vehicle monitoring
- Battery Management
- Zone management

Suppliers declaring inter-operability

Press communication on March 15 2016

OPPcharge

ABB Power and productivity for a better world™

heliox

Irizar

SIEMENS

SOLARIS

VDL BUS & COACH

VOLVO

… and more companies joining

Creating new opportunities for urban planning

- Bringing **buses closer to passengers**. Opening up possibilities for bus routes in new areas
- **Silent** mode of public **transport improving quality of life and increasing real estate values,** eliminating noise from diesel or rail solutions
- **Enabling indoor bus stops** in shopping centers, hospitals and living houses, **improving passenger comfort and safety**

Indoor bus stop with cafeteria, Gothenburg

Bus stop in real library during Volvo Ocean Race

Sch, här stannar den nya elbussen.
Shhh, the new electric bus stops here.
västtrafik
CHALMERS
Unga
Barn

Increased value

Opportunity charging – Cost efficient charging of highly utilized bus systems

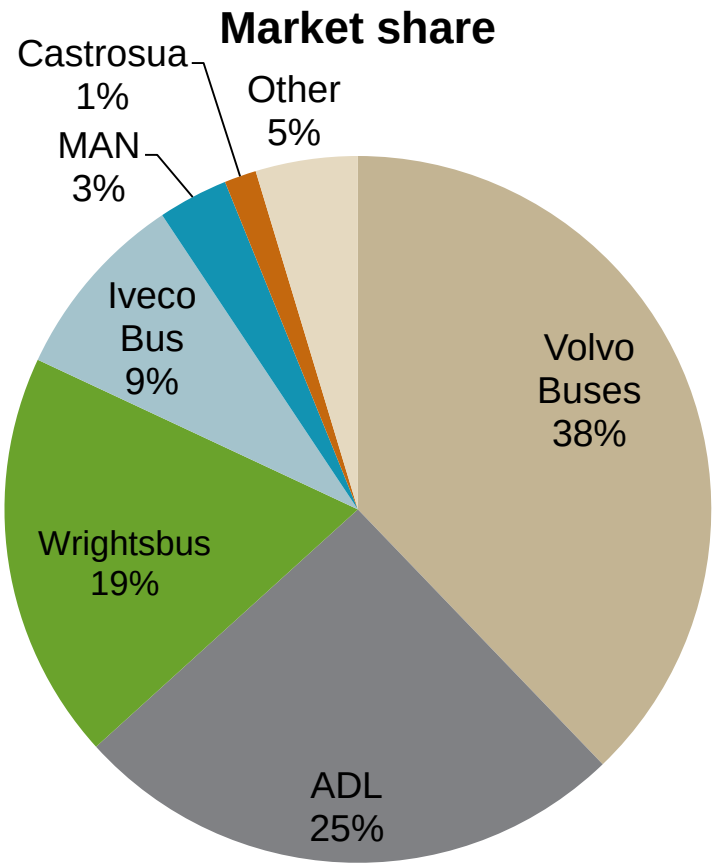
- **No range limit** for bus utilization in traffic. Utilizing natural charging opportunities at terminal stations
- **High utilization of charging infrastructure**. Same charger and pantograph used by many buses
- **Optimized system performance**. Pantograph placed in mast to save vehicle weight
- **Electricity** consumption **distributed over day and night**
- Electric **power outtake** from power system **distributed geographically**

Increased utilisation of infrastructure

Volvo has delivered 40% of all hybrid buses in Europe

Hybrid Buses in Europe, UITP Survey

- Volvo is the market leader
- The study was conducted 2014
- Since then, Volvo has increased sales even more
- Leading arguments for choosing Volvo:
  - Reliability
  - Delivery on fuel savings



UITP Fuel&Traction Systems Observatory, June 2015

Volvo has delivered 7,700 electromobility buses all over the world

Transports people every day

- Passengers and drivers love the experience
- Operators are impressed by the uptime
- Fuel savings are as expected or better