

VOLVO BUS CORPORATION

ELECTRIC BUSES IN DIFFERDANGE

Laurent Bravetti



@Claude Piscitelli

Agenda

- Our Technology
- The Differdange project
- The E-Bus Competence Center by Volvo Bus



Agenda

- **Our Technology**
- The Differdange project
- The E-Bus Competence Center by Volvo Bus



VOLVO BUSES

PART OF THE VOLVO GROUP

The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment, marine and industrial engines

The Volvo Group employs about 95,000 people, has production facilities in 18 countries and sales of products in more than 190 markets with a turnover of 30 billions €.



Volvo **Electrified buses**

- A complete product offer

HYBRID BUSES



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

ELECTRIC HYBRID BUSES



- 75% fuel & 60% energy reduction
- Electrical drive 70% of route = silent
- 75% CO₂ reduction*
- Charging 3-6 min at end stations

FULL ELECTRIC BUSES



- 80% energy reduction
- Electrical drive 100% of route = silent
- No local exhaust emissions
- 99% CO₂ reduction*
- Charging 3-6 min at end stations

PRESENT

LONG-TERM

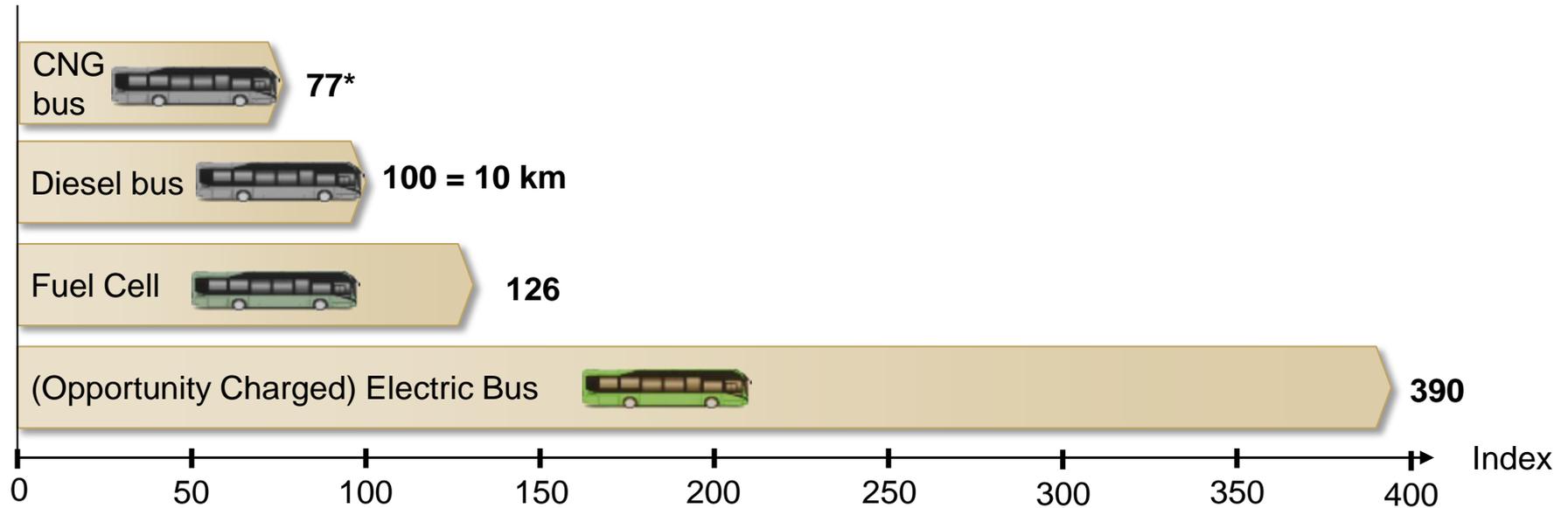
* With CO₂ neutral electricity



Why this Volvo Bus E-Mobility Strategy?

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

* Well to wheel comparison:

- 5l diesel
- 5 Nm³ CNG
- 50 kWh of electricity



Comparing models



HYBRID

20% Electric Time.
5% Electric Distance.

No Charging.

 4 kWh



ELECTRIC HYBRID

90% Electric Time.
75% Electric Distance.

Can run also
without charging.

Charging at terminals.
6min/150 kW.

 19 kWh



ELECTRIC

100% Electric Time.
100% Electric Distance.

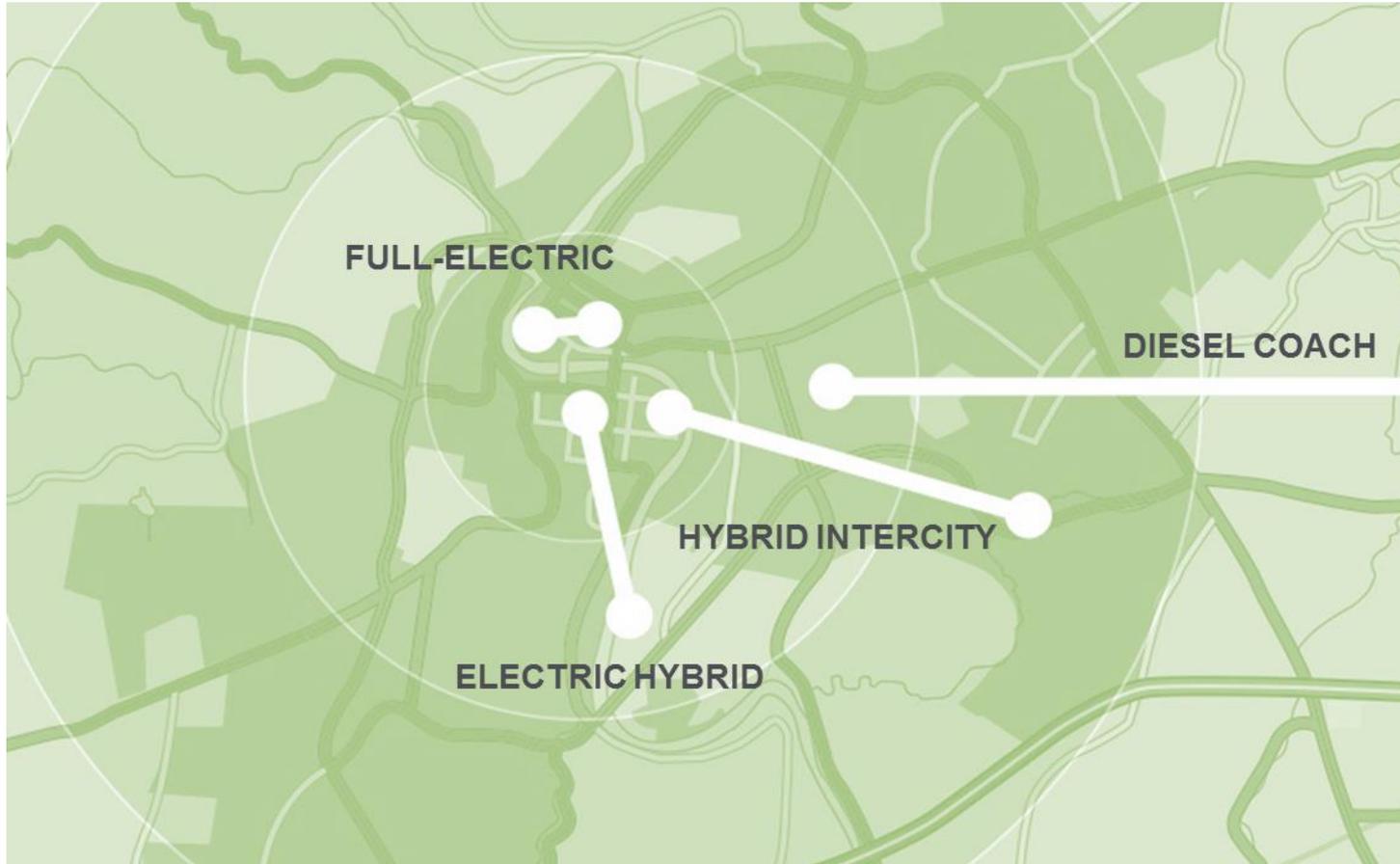
Charging at terminals.
6min/300 kW.

 76 kWh



Levels of electrification in the city

- From full electric to hybrid solutions



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



Open interface – OppCharge

- One open and standardized interface for charging infrastructure
- Enable buses from other suppliers
- Driving standardization together with Siemens & ABB & Heliox
- OppCharge follows the recommendations from automotive association ACEA



The future is electric – offering of complete transport solutions



Zone management



Traffic management



Opportunity charging

Indoor bus stops

Zero-emission zone

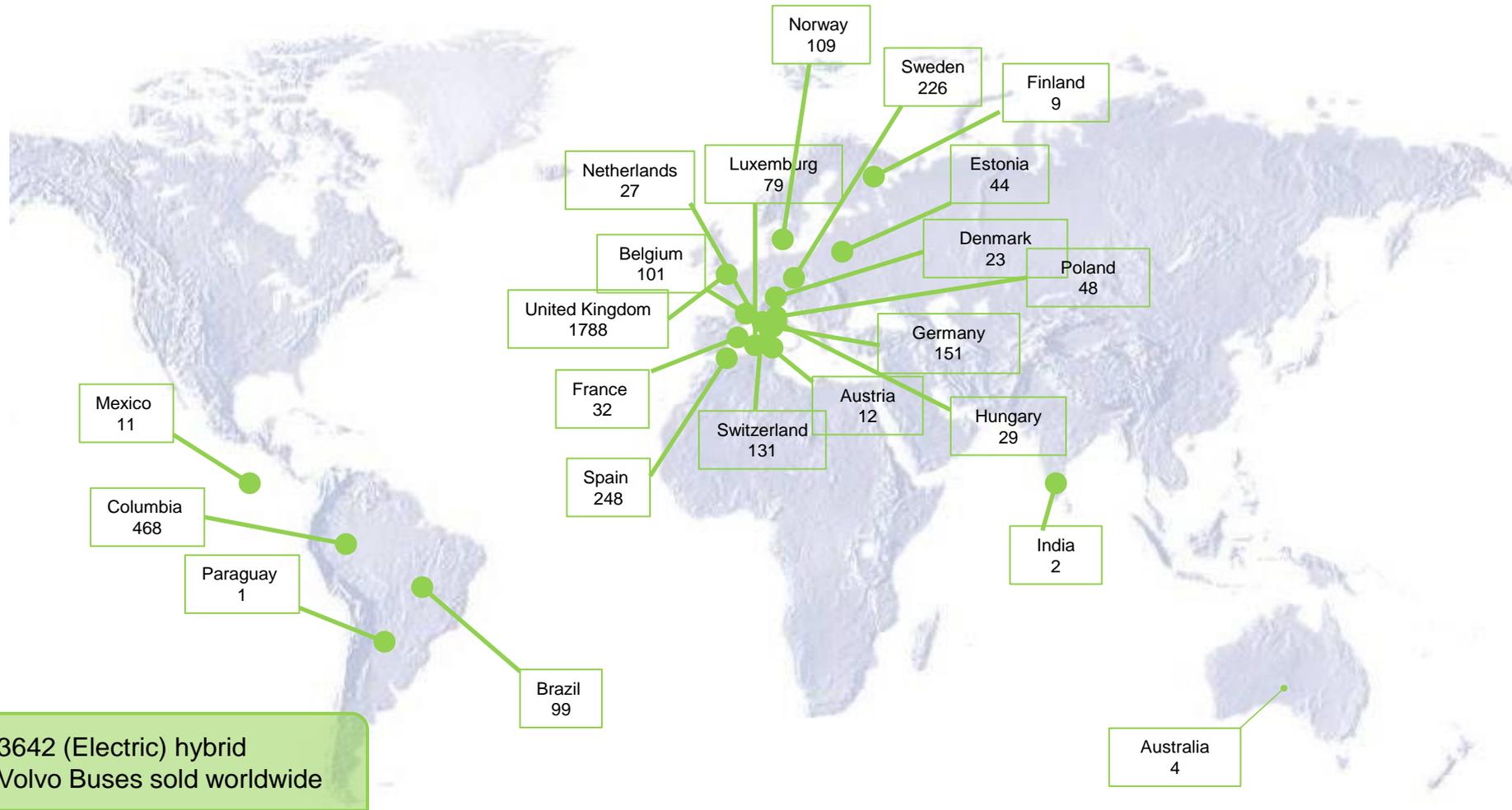
Silent zone

Low-speed zone

Safety zone



Volvo Hybrid Buses Global Footprint



Agenda

- Our Technology
- **The Differdange project**
- The E-Bus Competence Center by Volvo Bus



PROJECT DESCRIPTION



heliox



Call of tender to electrify 4 lines in the city



Order 4 electric buses -
Diffbus

Order 3 charging
stations (2 Differdange
– 1 workshop)



heliox

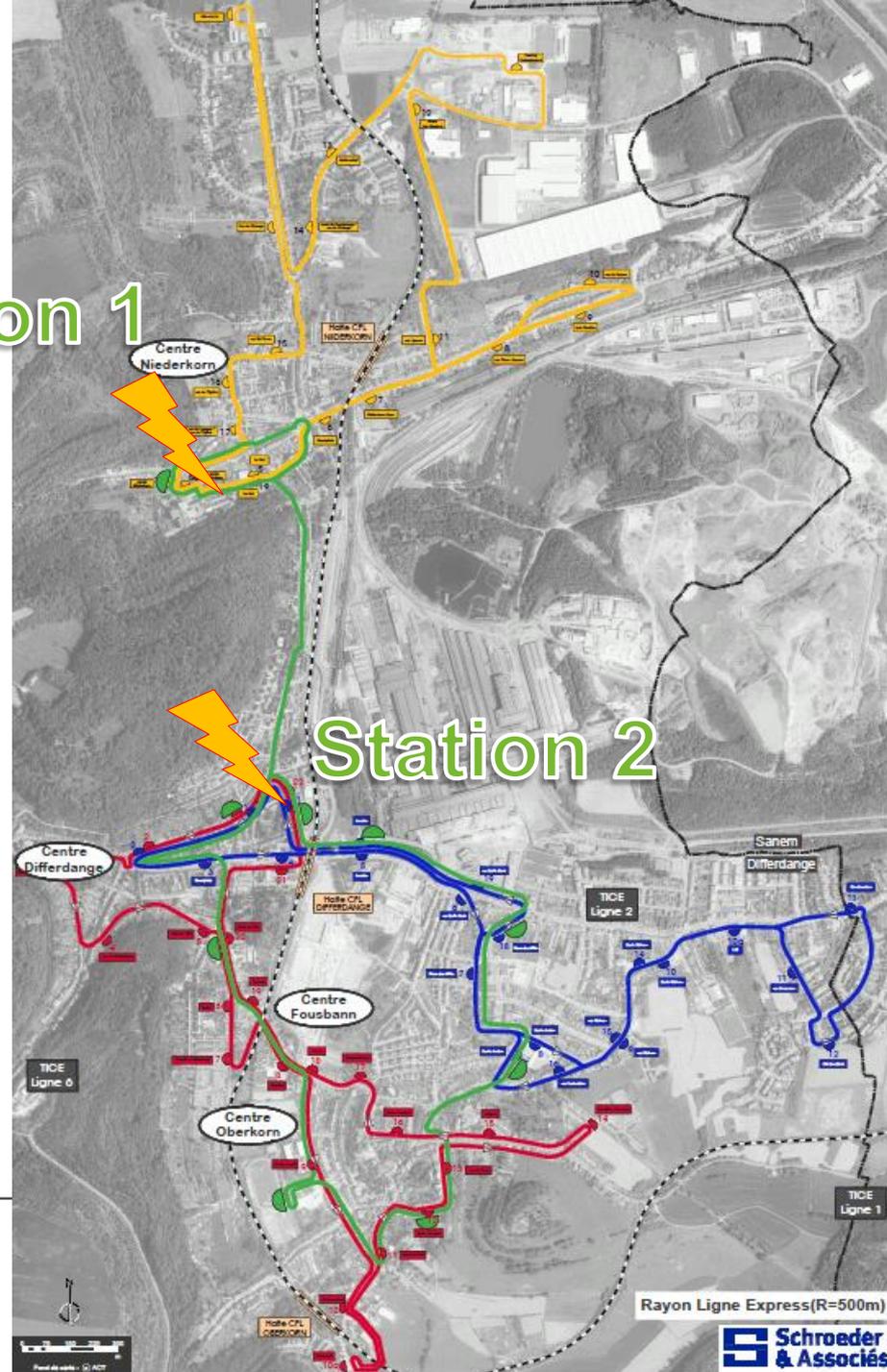


LINES

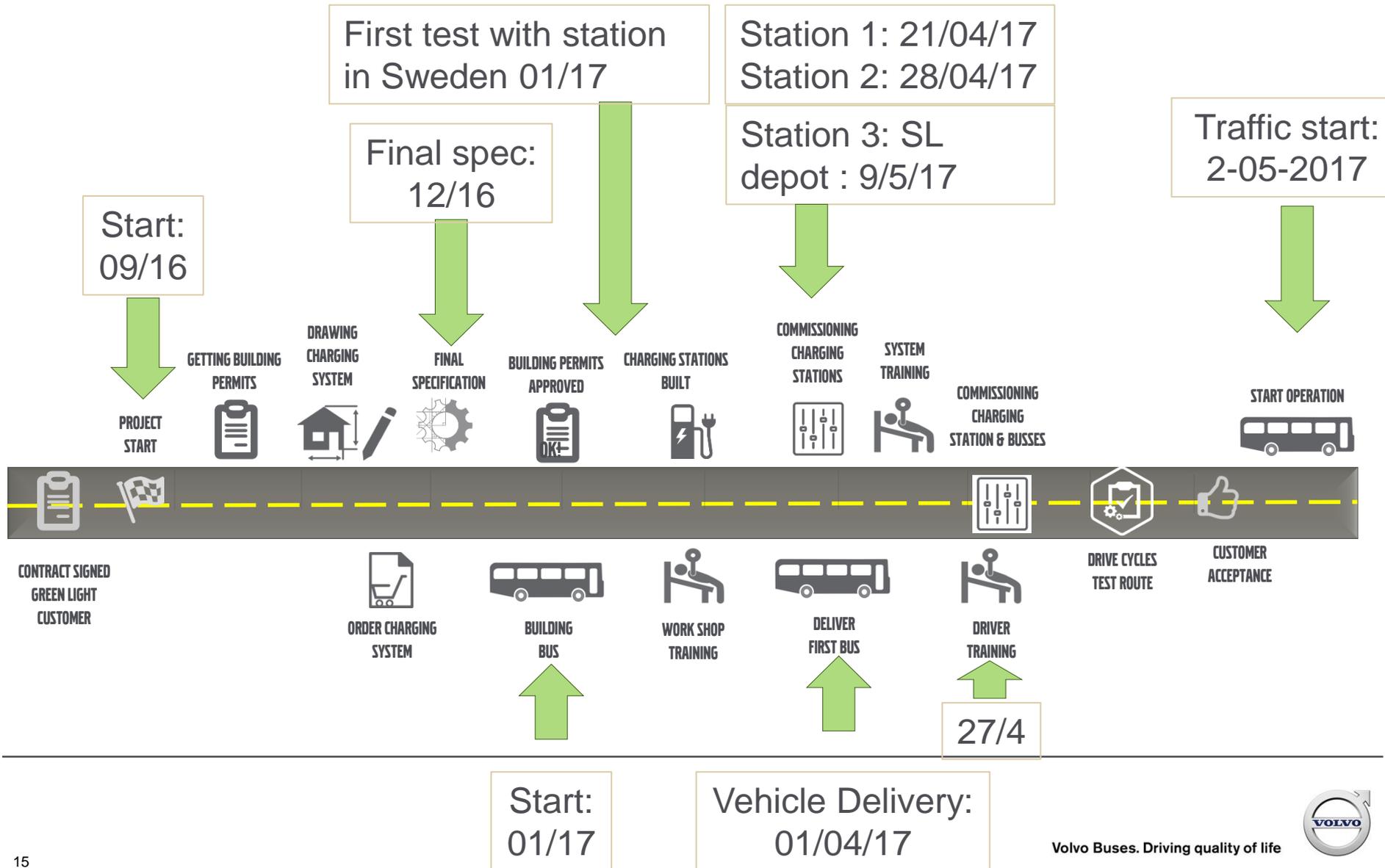
Station 1

- Existing lines will be rerouted
- 1 new line added
- Yellow and green: 1 station (near hospital Niederkorn)
- Blue and red: 1 station (centre of Differdange)

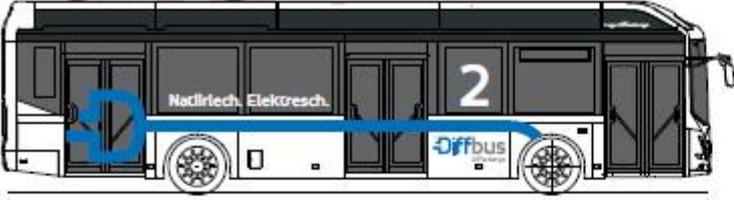
Station 2



PROJECT TIME LINE



VEHICLES



VEHICLES



@Claude Piscitelli



THE INAUGURATION : VIDEO



Feedback

- Traffic start 2-05-2017
- High engagement of drivers!
- Passengers proud and satisfied
- Today 67.393 km



They visited Differdange!

HANSEA (B) – June 2017



JOURNALISTS DELEGATION (NL) – July 2017



TRANZIT (NZ) – June 2017



Agenda

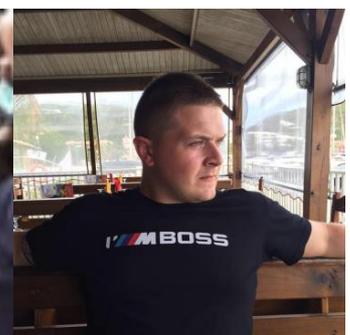
- Our Technology
- The Differdange project
- **The E-Bus Competence Center by Volvo Bus**



The E-Bus Competence Center



- Officially launched the 1st of August 2016
- Located in Livange, Luxemburg
- New building extension ready end 2017
- Staff:
 - Laurent Bravetti, Electro Mobility Project Leader
 - Marcin Seredynski, ITS & Telematics Expert
 - Joël Vrolix, Electromobility Trainer & Service Support
 - 2 technical support and development employees



The E-Bus Competence Center Objectives

Luxembourg as Volvo Buses European Electro Mobility Showroom

- Support local and foreign **markets** in:
 - Project management
 - Business development & stakeholders management
 - ITS: Telematics / Zone management
 - Electro Mobility Training & Service Support to dealers and customers
 - R&D for innovative e-mobility services/test bed support



The E-Bus Competence Center

Projects : Luxembourg and Belgium

