

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





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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% CO<sub>2</sub> 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% CO<sub>2</sub> reduction\*
- Charging 3-6 min at end stations

PRESENT

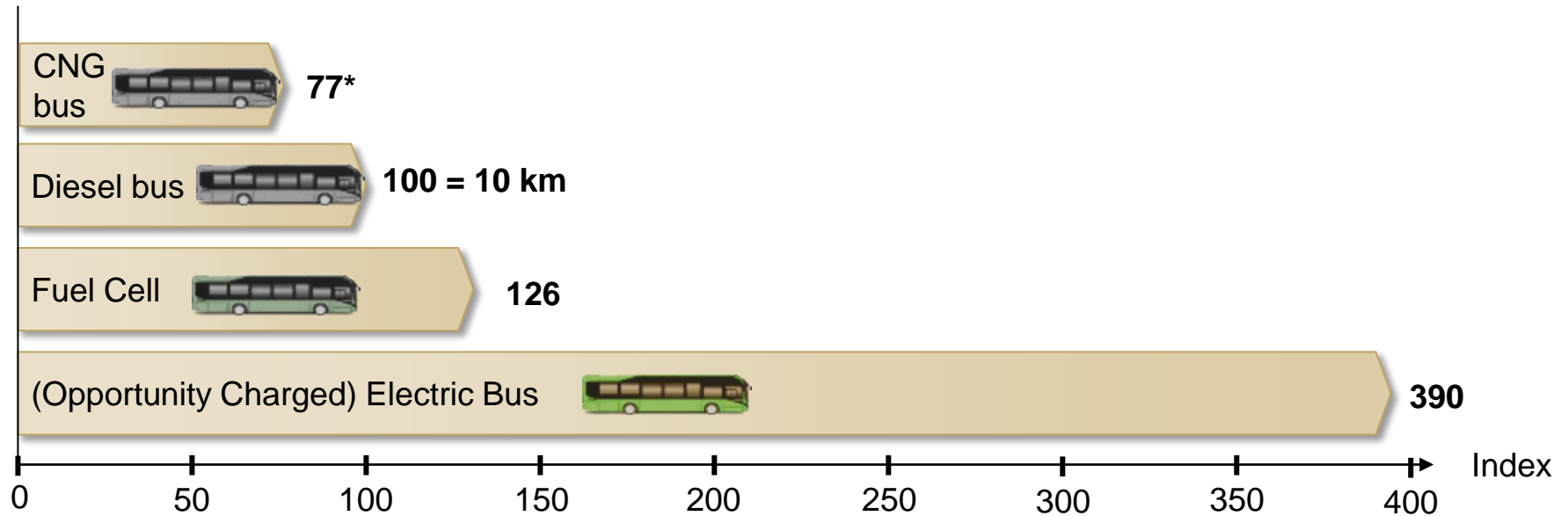
LONG-TERM

\* With CO<sub>2</sub> 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 Nm<sup>3</sup> 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.

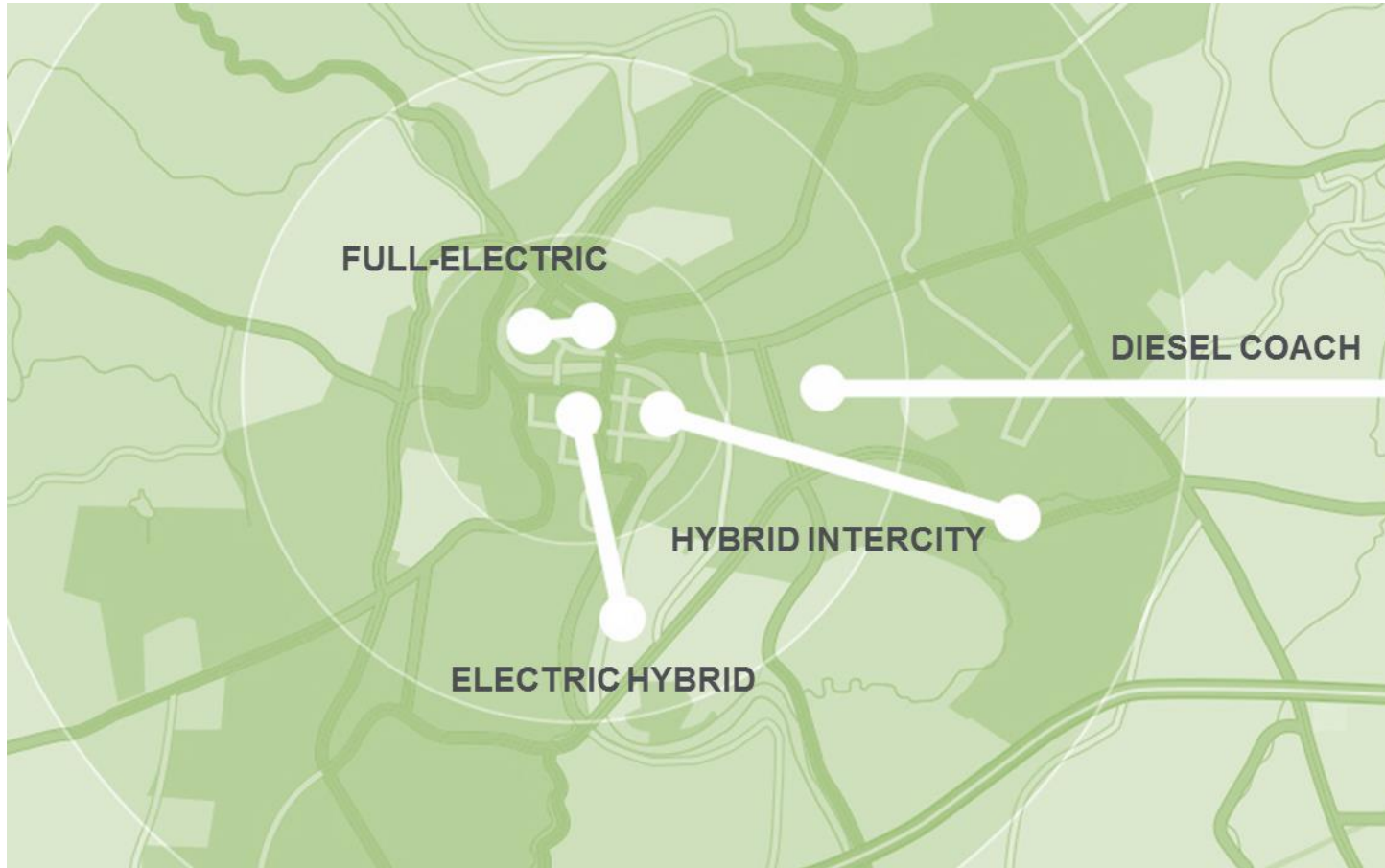
**Charging at terminals.**  
6min/300 kW.

 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

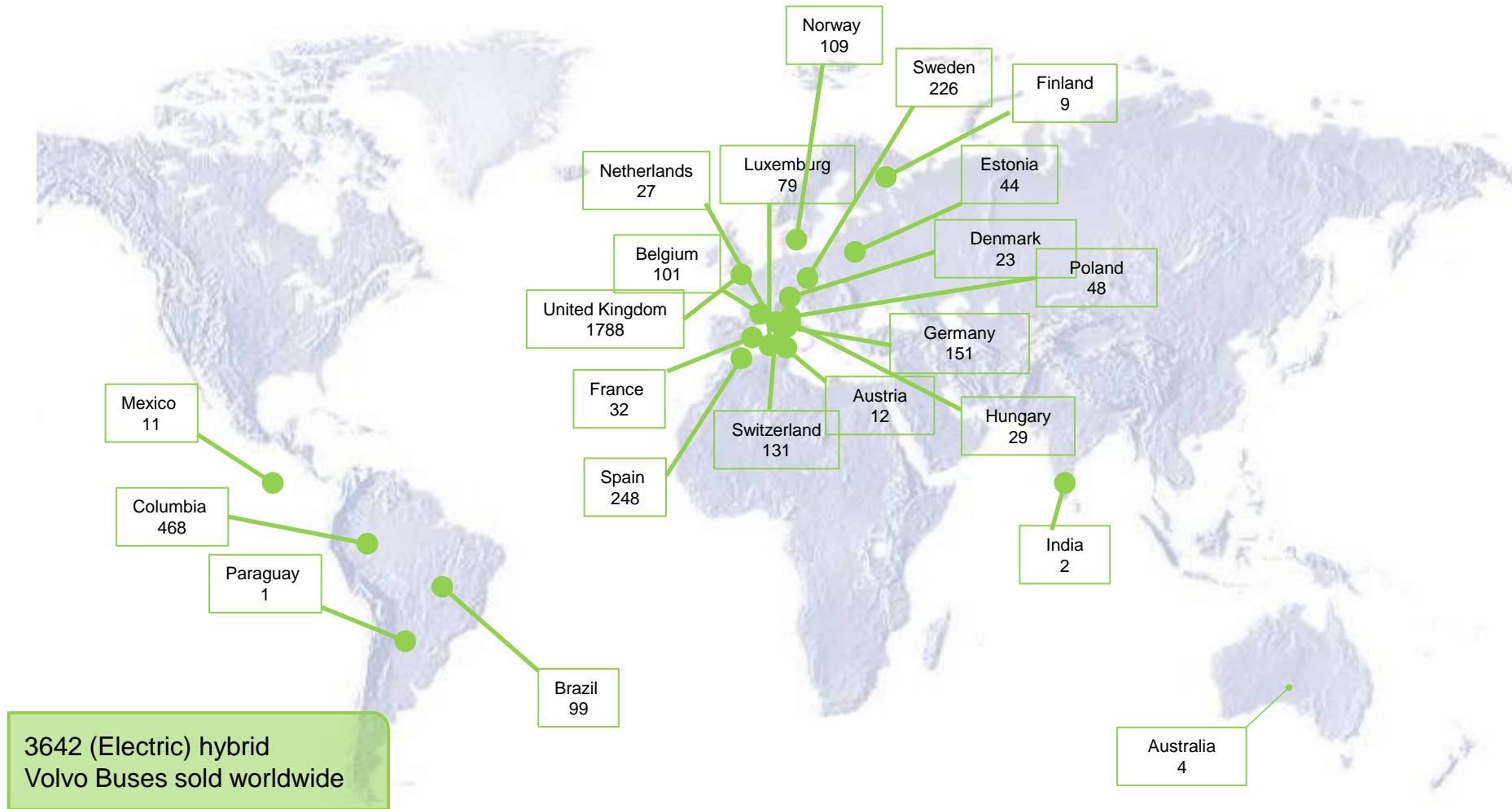
Zero-emission zone

Silent zone

Low-speed zone

Safety zone

# Volvo Hybrid Buses Global Footprint





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# PROJECT DESCRIPTION



Call of tender to electrify 4 lines in the city



Order 4 electric buses -  
Diffbus

Order 3 charging  
stations (2 Differdange  
– 1 workshop)



heliox

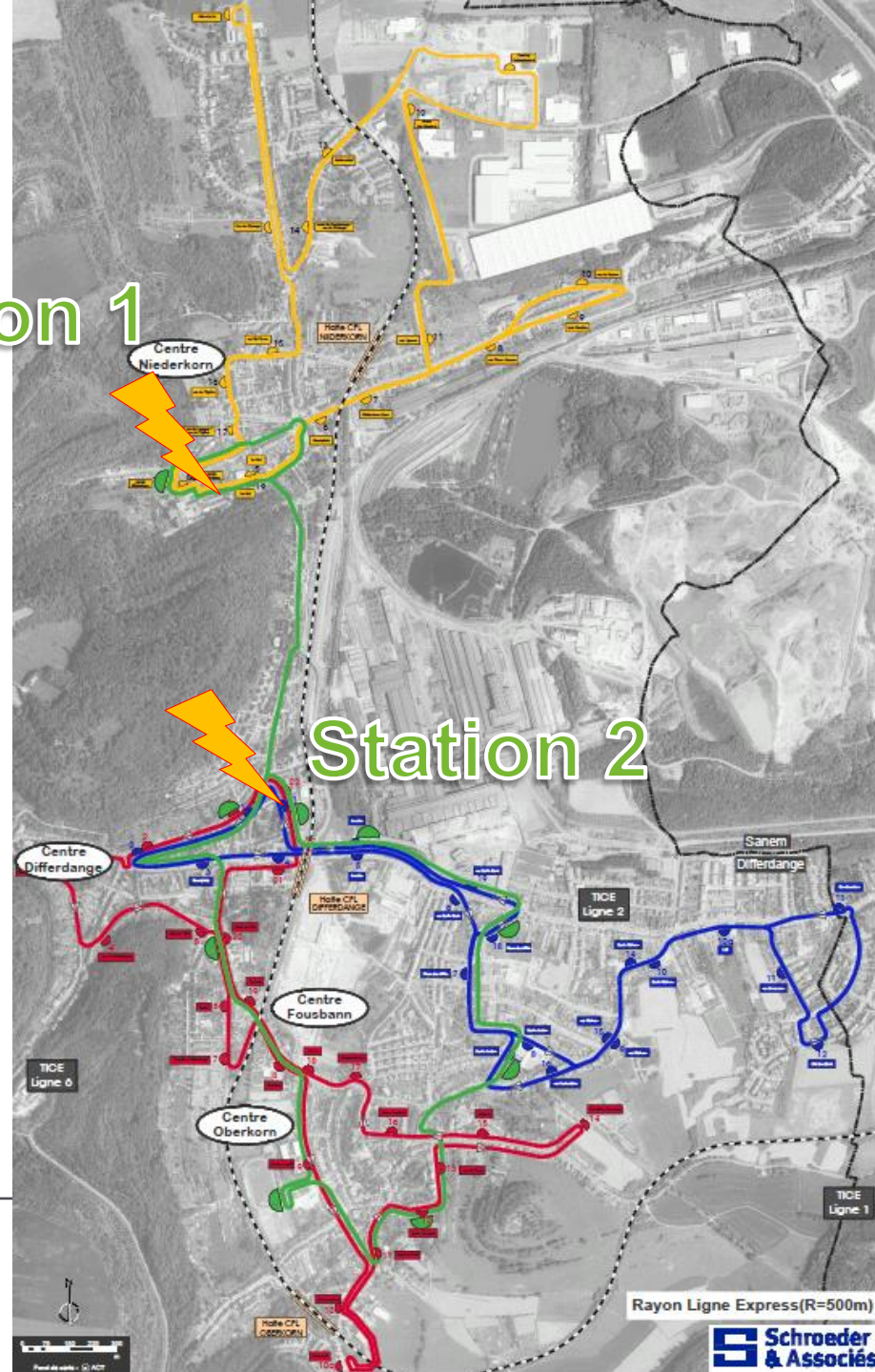


# LINES

## Station 1

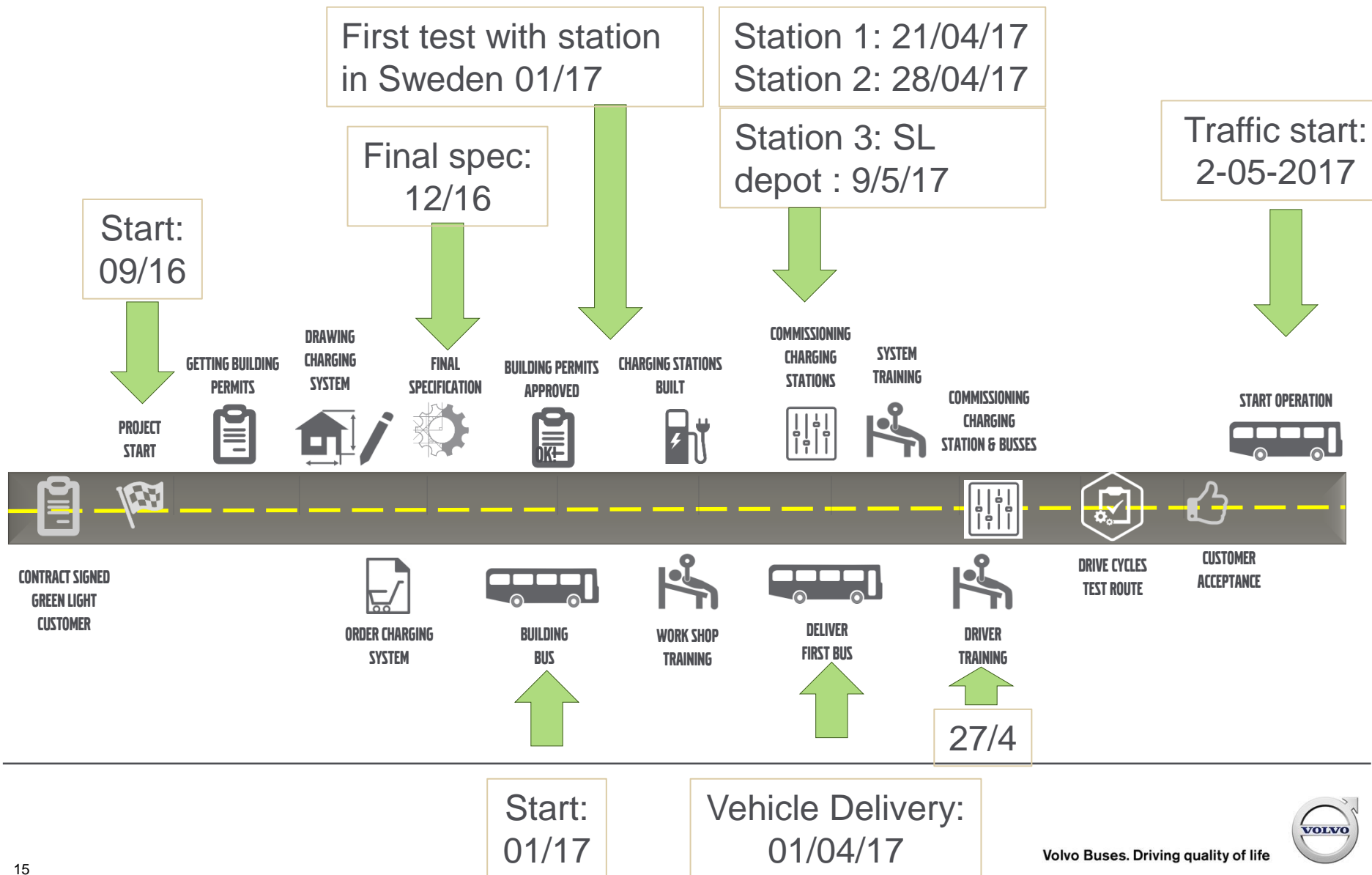
- Existing lines will be rerouted
- 1 new line added
- Yellow and green: 1 station (near hospital Niederkorn)
- Blue and red: 1 station (centre of Differdange)

## 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



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# The E-Bus Competence Center



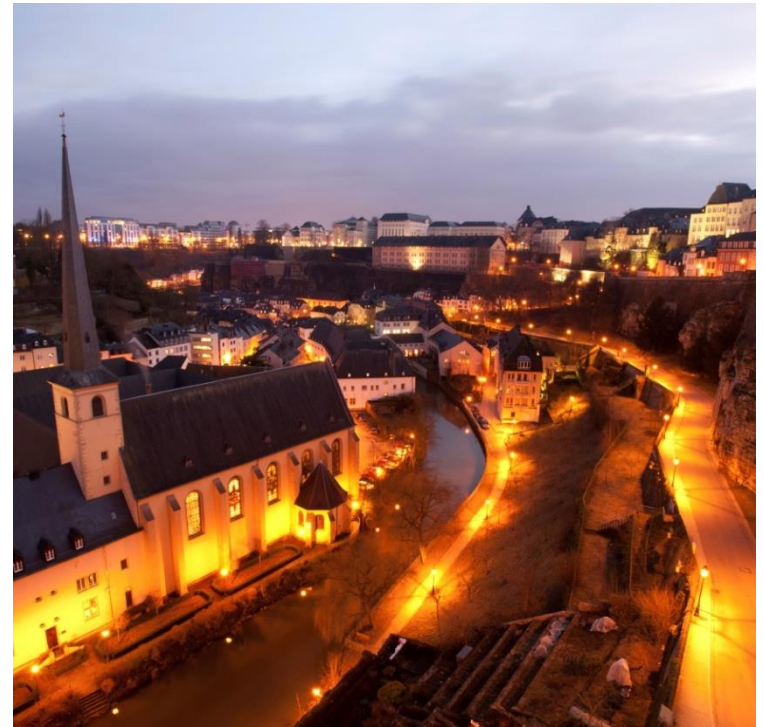
- Officially launched the 1<sup>st</sup> of August 2016
- Located in Livange, Luxemburg
- New building extension ready end 2017
- Staff:
  - Laurent Bravetti, Electro Mobility Project Leader
  - Marcin Seredynski, ITS &Telecmatics Expert
  - Joël Vrolix, Electromobility Trainer & Service Support
  - 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

