ADVICE

advancing user acceptance of general purpose hybridized vehicles by improved cost and efficiency

Dr. Alois Steiner, ECO-MOBILITY 2020, 19.11.2020

European Commission
Horizon 2020
European Union funding
for Research & Innovation

EU-Call: Green Vehicles 2016 – System and cost optimized hybridisation of road vehicles

Start of the project: April 2017

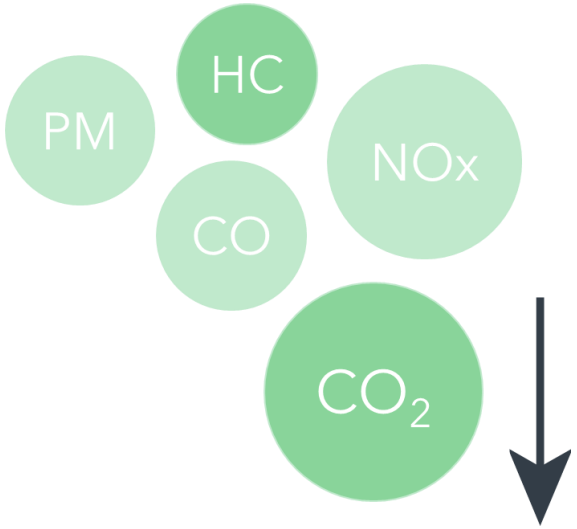
End of the project: November 2020

Funding: 10 Mio. € (H2020)

Number of Partners: 20

OVERALL INFORMATION

- ADVICE aims at **increasing the number** of **hybrid vehicles** on the road up to **10%** by **improved cost & efficiency**
- This leads to…
  - **Reduction** of **CO_2-emissions** in WLTP of **20%**
  - **Increase** of **electric driving range** of **25%**



KEY TARGETS

- These targets were achieved by…
  - Modular **hybrid powertrain solutions**
  - Advanced **predictive control strategies**
  - Newly developed **high-temperature electronics**, enabling **novel strategies** and approaches for **energy- and thermal management**
  - **Multi-core processor architectures**, enabling **sophisticated control strategies** and models processed on-board the vehicles

KEY TARGETS

Project objectives were assessed along 3 demonstrator vehicles:

Volvo S90

gasoline hybrid with a high performance battery

Alfa Romeo Giulia

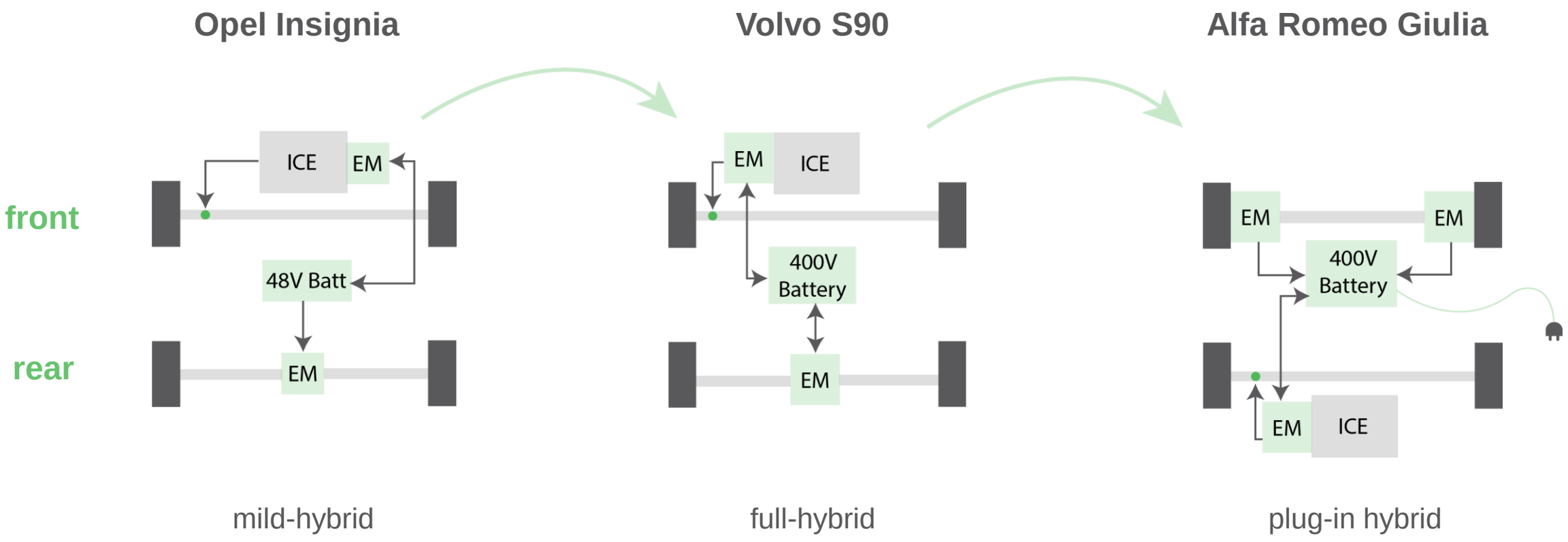
gasoline plug-in hybrid with e-motors integrated into the transmission and front axle

Opel Insignia

diesel with a belt driven starter generator and a 48V e-Motor at the rear axle

KEY RESULTS

ADVICE covers the whole range of hybridization concepts:

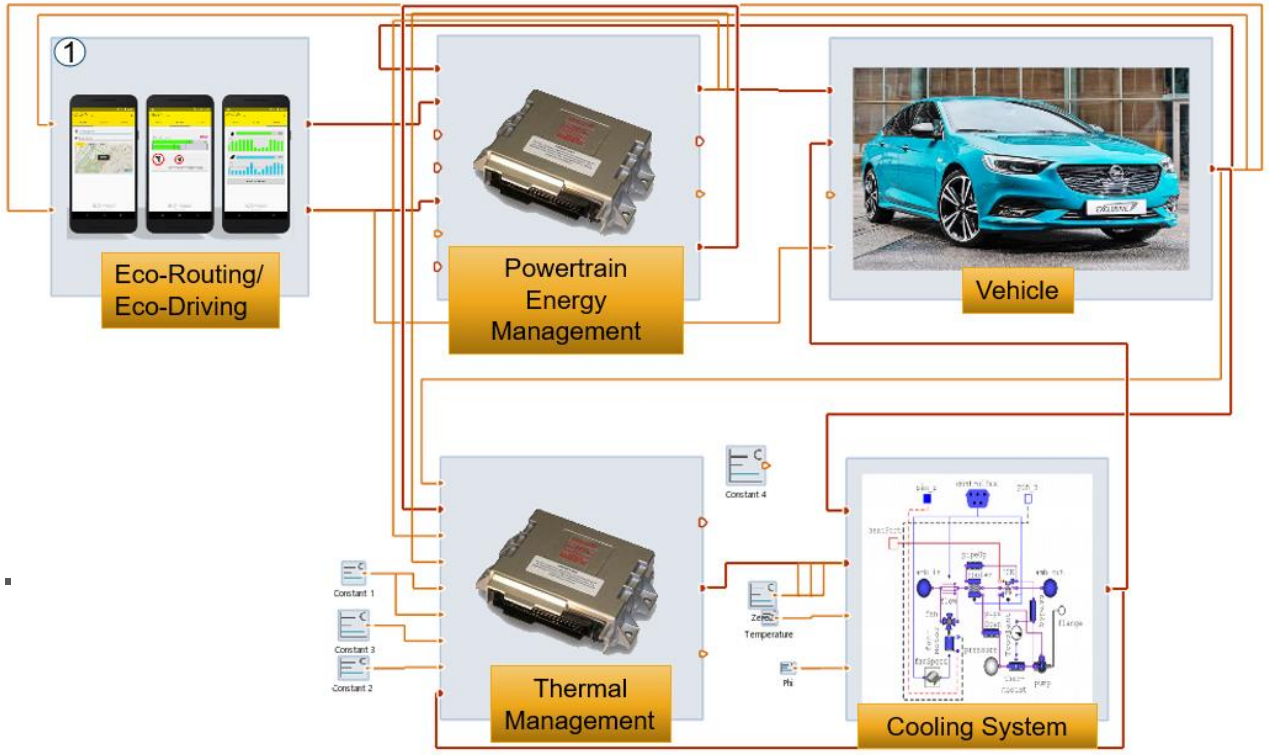


KEY RESULTS

Co-Simulation Setup for advanced investigations:

Predictive Thermal Management considers:

- Route Info (traffic, max speed,…)
- Estimated losses (heat input)
- Estimated power consumption of aux.



Integrated components, systems and architectures for efficient adaption and conversion of commercial vehicle platforms to 3rd generation BEVs for future CO2-free city logistics

SYS2WHEEL – Electric powertrain for commercial vehicles

Dr. Alois Steiner, ECO-MOBILITY 2020, 19.11.2020

Overall information

EU-Call: Green Vehicles 2018 – Integrated, brand-independent architectures, components and systems for next generation EV

Start of the project: January 2019

End of the project: December 2021

Funding: 4.8 Mio. € (H2020)

Number of Partners: 12

Motivation

- Diesel is the typical fuel for commercial vehicles
- Diesel vehicles are responsible for …

  ~ 25 % of CO_2 emissions

  ~ 33 % of NOx emissions

  ~ 50 % of the PM

… generated by the road transport in large cities

Project objectives

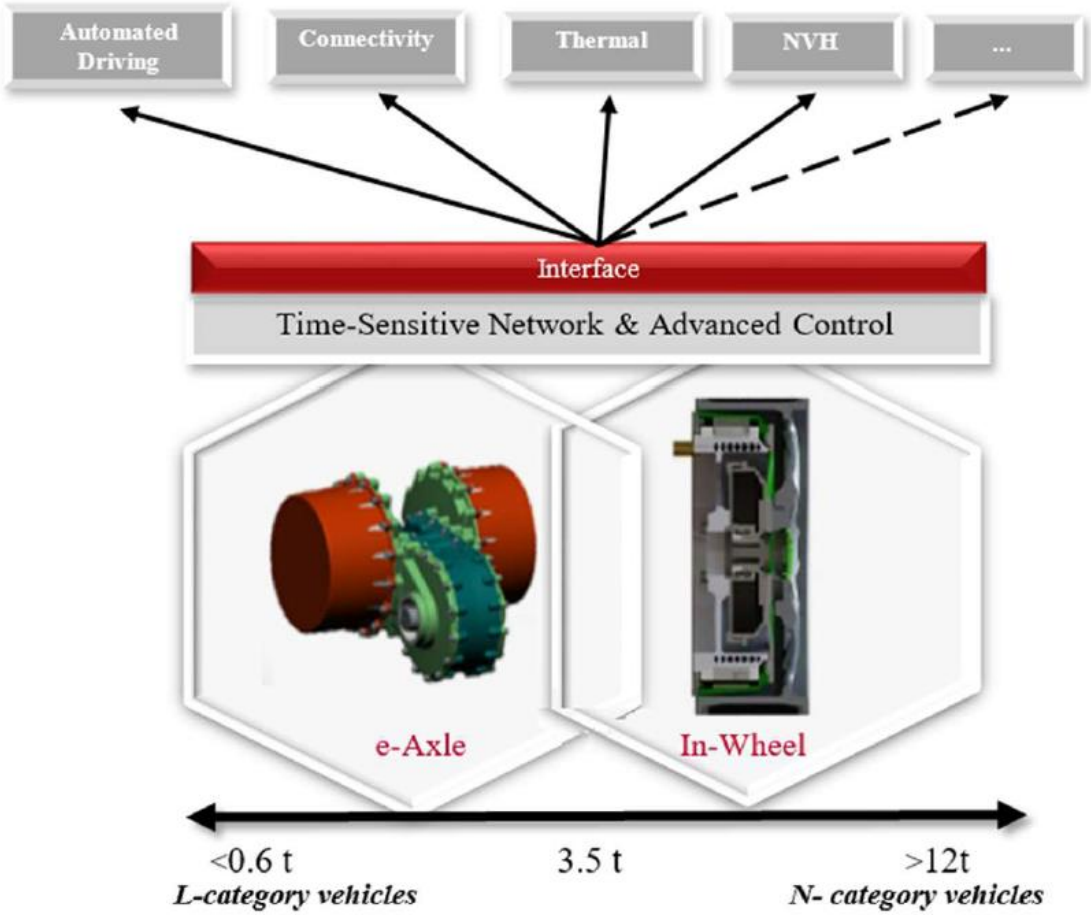
- **Objective 1:** Reduce costs in mass production for integrated 3rd generation electrified solutions (both in wheel and e-axle systems) for commercial vehicles by at least 20%

- **Objective 2:** Significantly increase powertrain efficiency and range demonstrated with 2 commercial demonstrator vehicles
  - 10% efficiency increase for in-wheel system
  - 9% efficiency increase for e-axle system
  - Increase range by at least 15%

- **Objective 3:** Show affordability and user-friendliness for a wide range of commercial vehicles

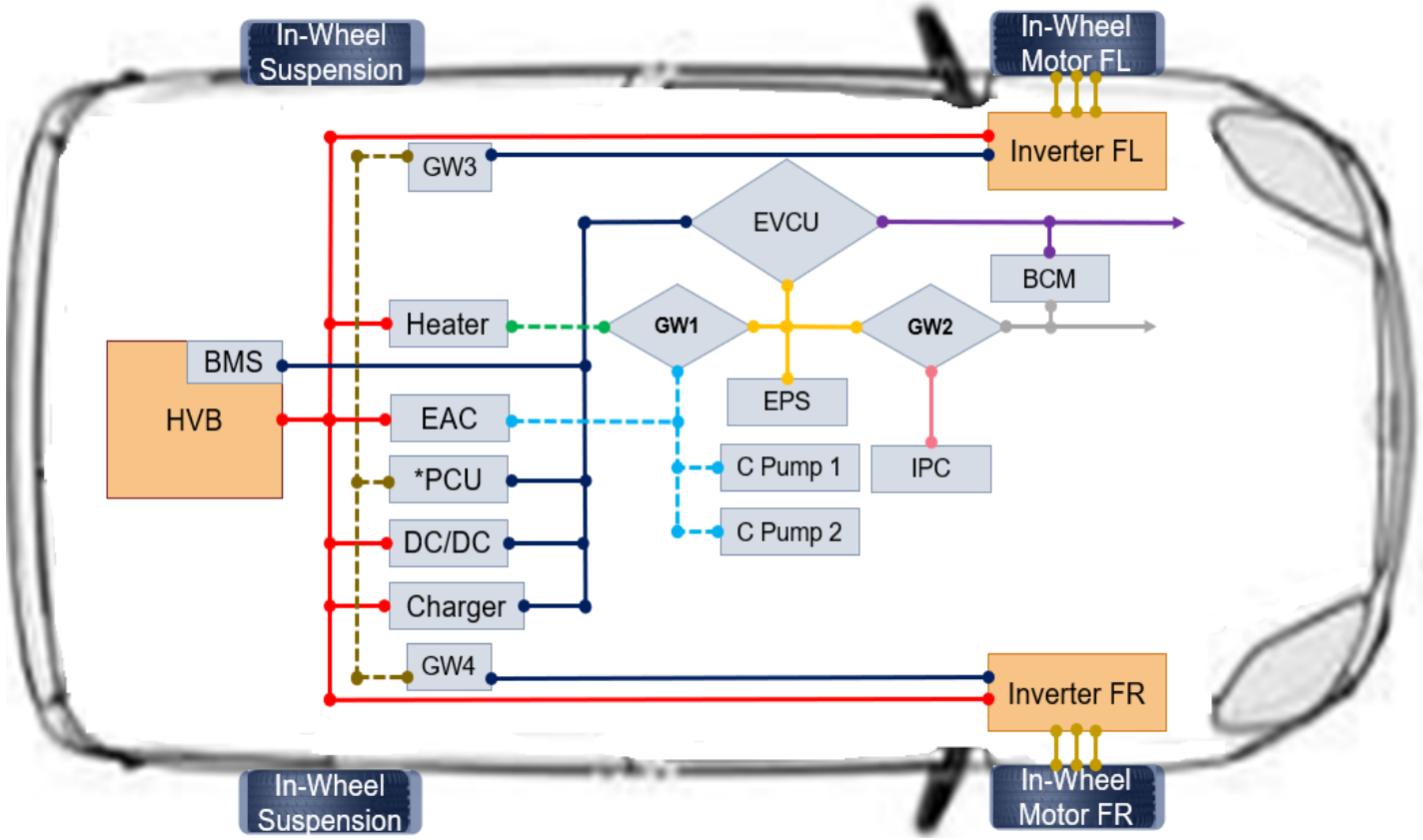
Sys2Wheel concept

- Cost efficient, scalable electric drivetrain
  for commercial vehicles consisting of…
  - Electric axle
  - In wheel-motors
  - Advanced control strategies
    (e.g. model predictive control)



Demonstrator vehicles

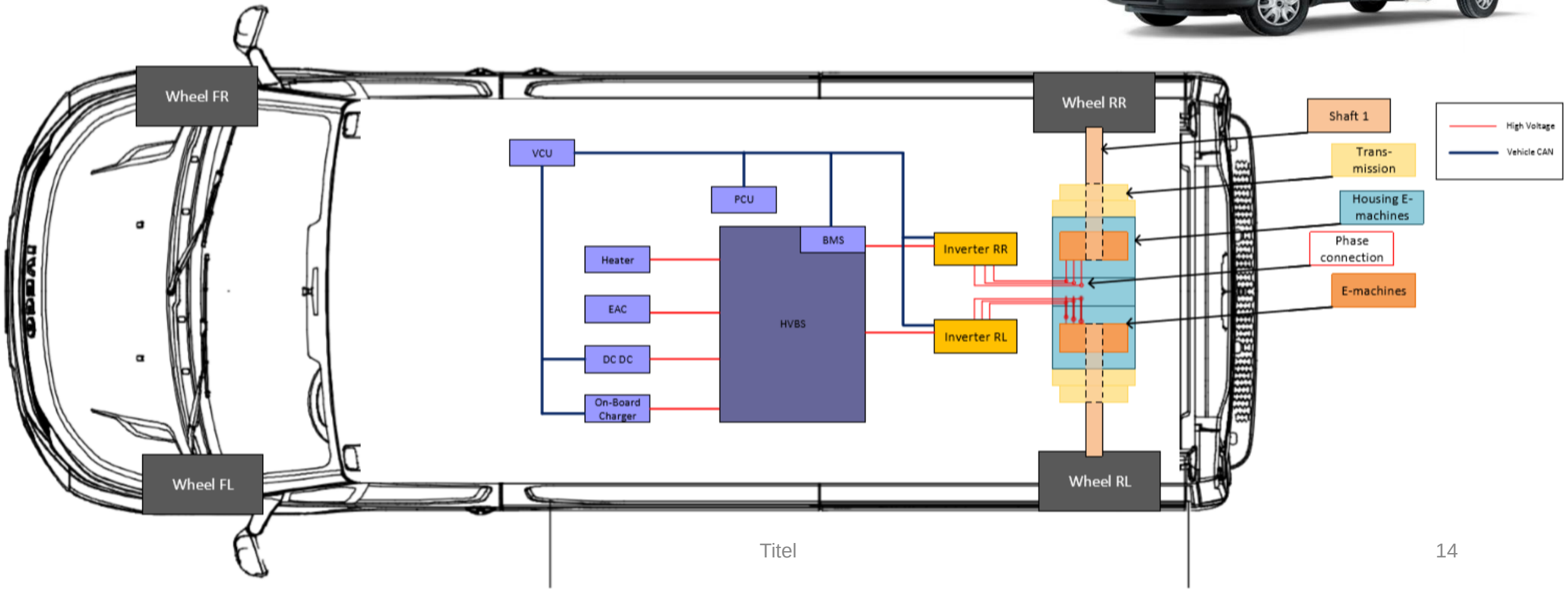
- **Fiat Doblo** (Category N1 demonstrator (< 3.5t)):
  - In-wheel motors
  - In-wheel suspension
  - Advanced control strategies (torque vectoring, regenerative braking)



Abbreviations:
HVB: High Voltage Battery
EVCU: Electric Vehicle Control Unit
EAC: Electric Air Compressor
***PCU:** Propulsion Control Unit
C Pump: Circulation Pump
BMS: Battery Management System
FL: Front Left
FR: Front Right
GW: Gateway
BCM: Body Computer Module
IPC: Instrument Panel Cluster
EPS: Electric Power Steering

Demonstrator vehicles

- **IVECO 7t MCV** (Category N2 demonstrator (> 3.5t and < 12t)):
  - Electric axle
  - Advanced control strategies



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sys2WHEEL co2 free city logistics

Integrated components, systems and architectures for efficient adaption and conversion of commercial vehicle platforms to 3rd generation BEVs for future CO2-free city logistics

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THANK YOU!

Thank you!