
September 8-th, 2011
Berlin
Ewit Roos, Project Manager Strategic Area Smart Mobility, TU/e
Where
innovation
starts

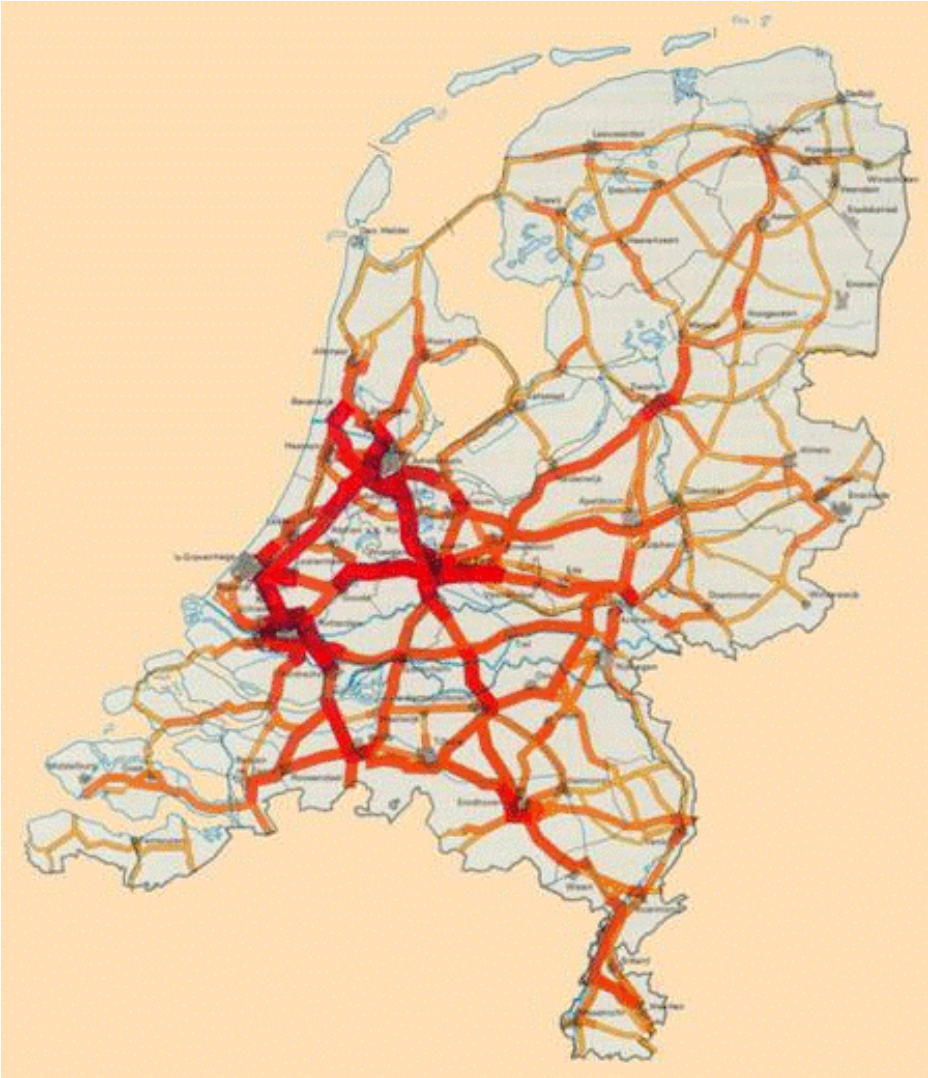
Dutch Automotive Industry

- 300 companies
- 45k employees
- 17.000 M€ revenue

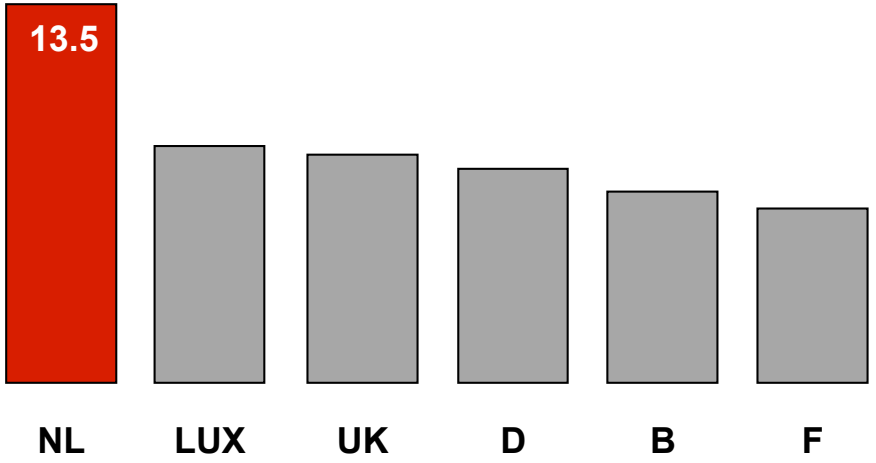
Focus areas:

- Vehicle efficiency
- Cooperative Mobility

… A lot of traffic…

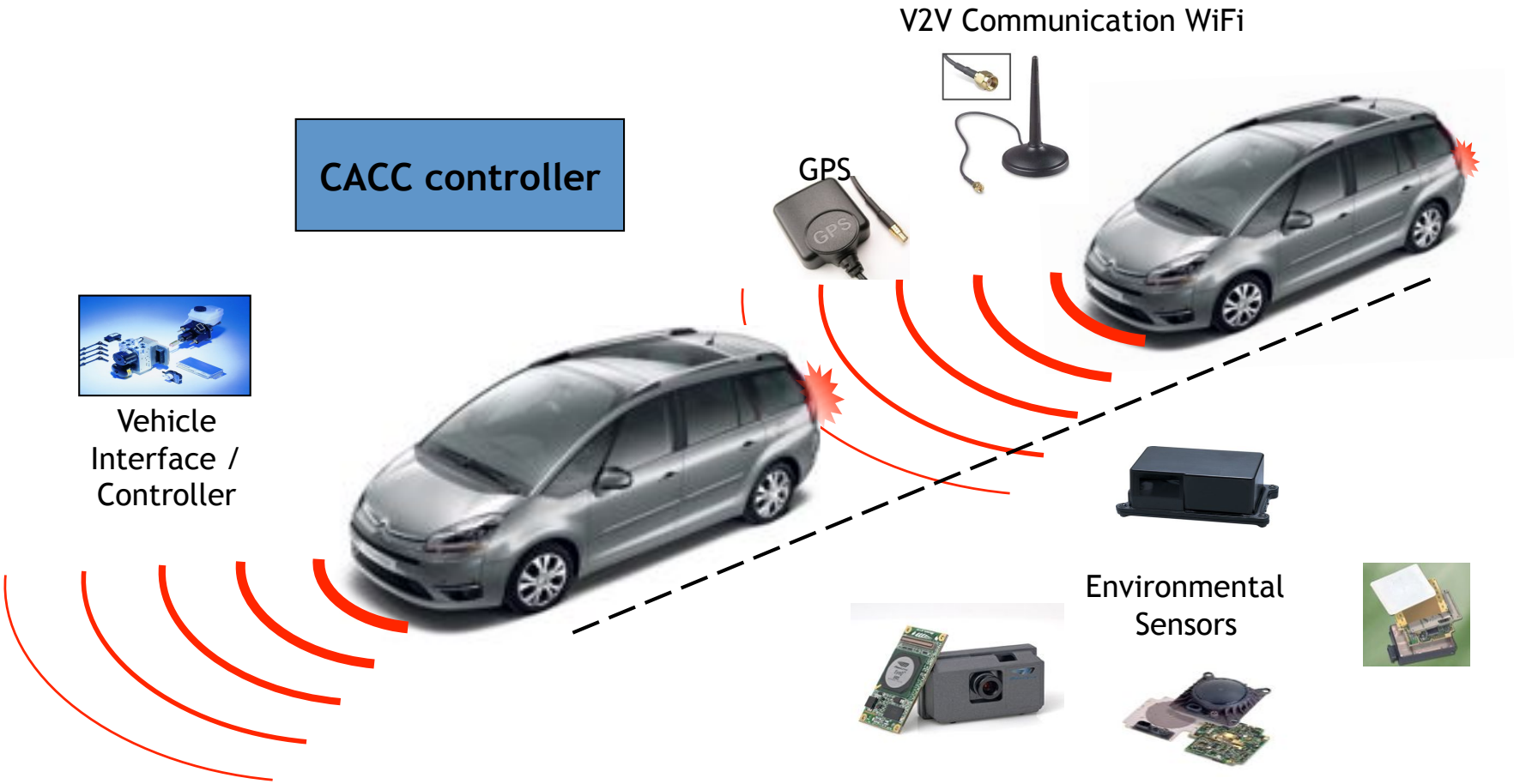


Average external costs of congestion 2000 [EUR/1 000 passenger-km]



Smart Mobility: look at the car to come with the solution

Car as Intelligent Machine
Coordinated Adaptive Cruise Control



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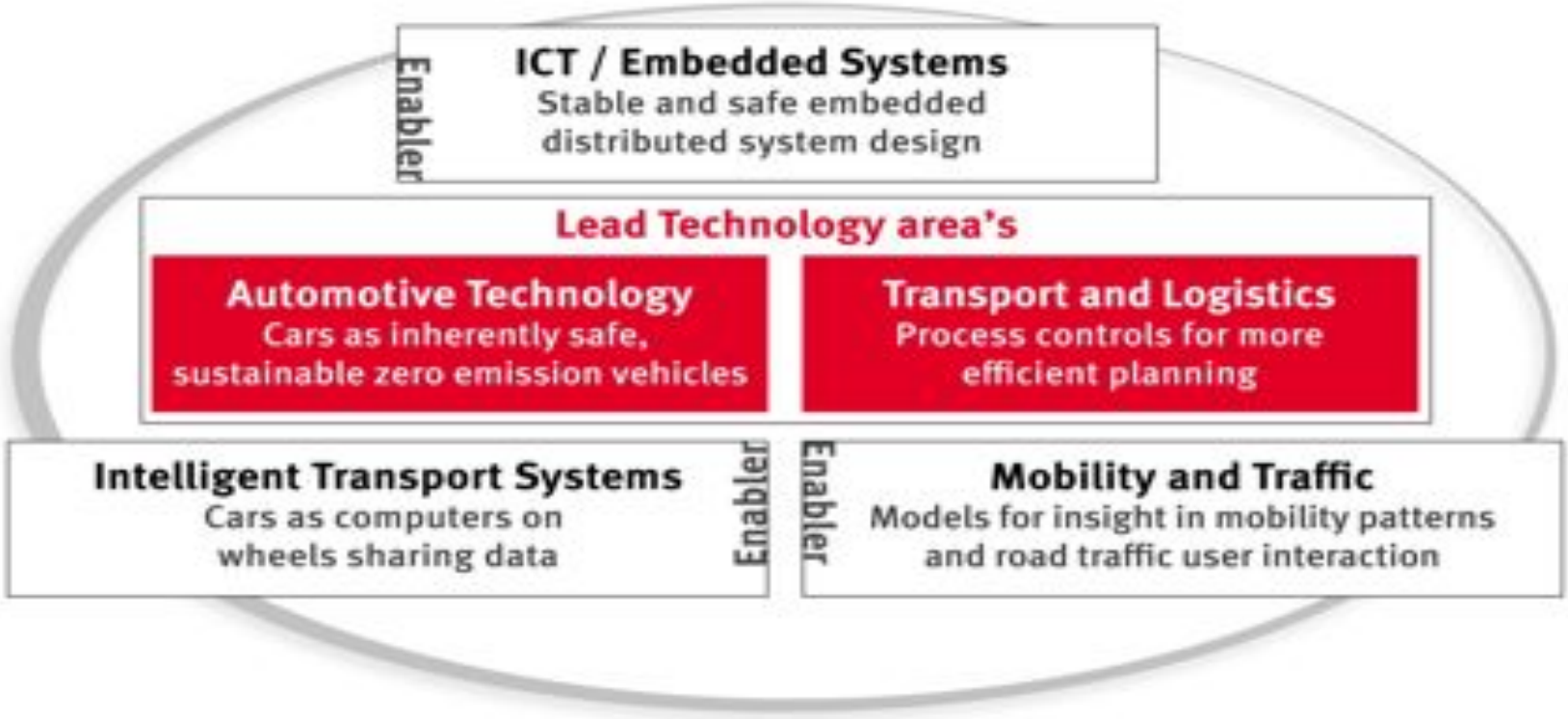
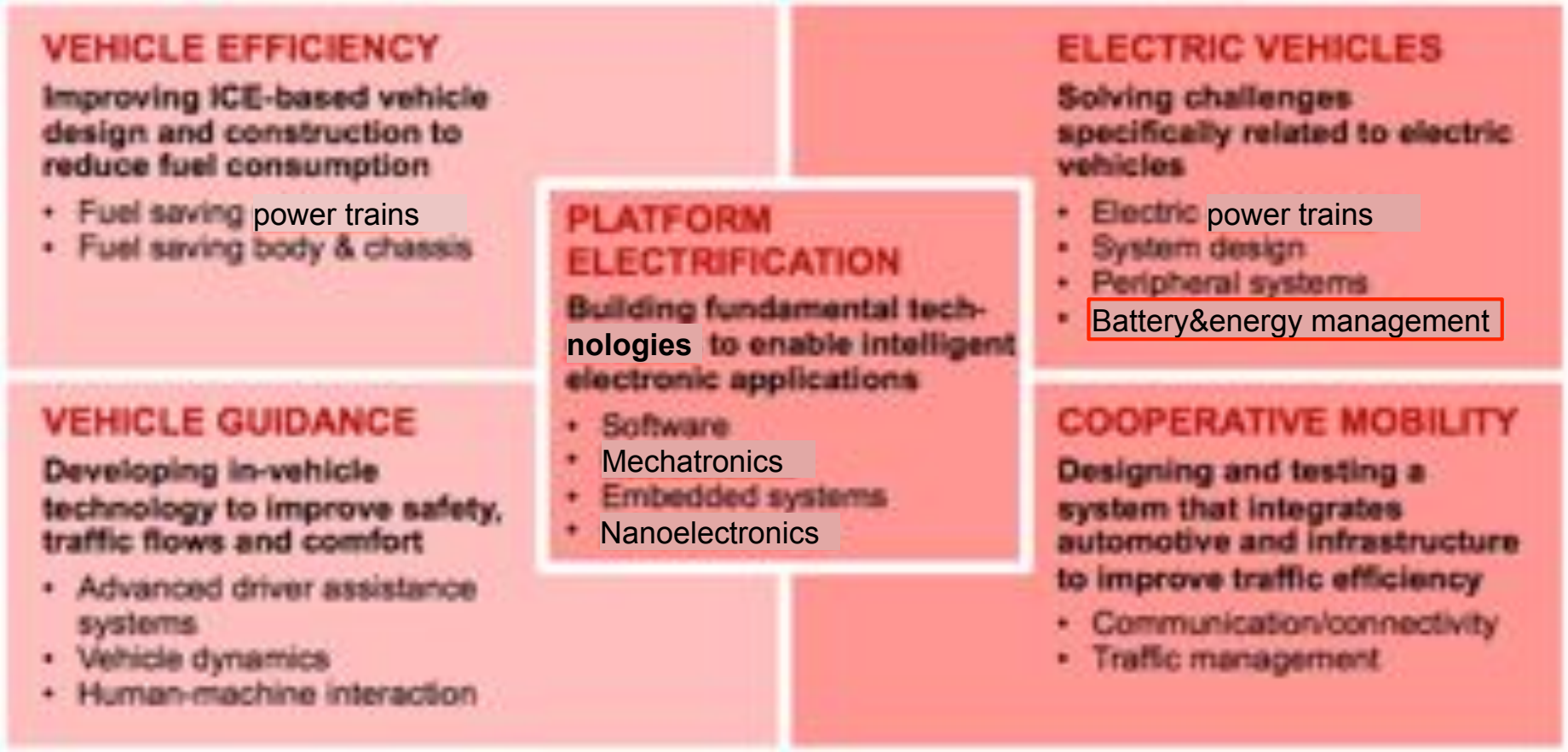
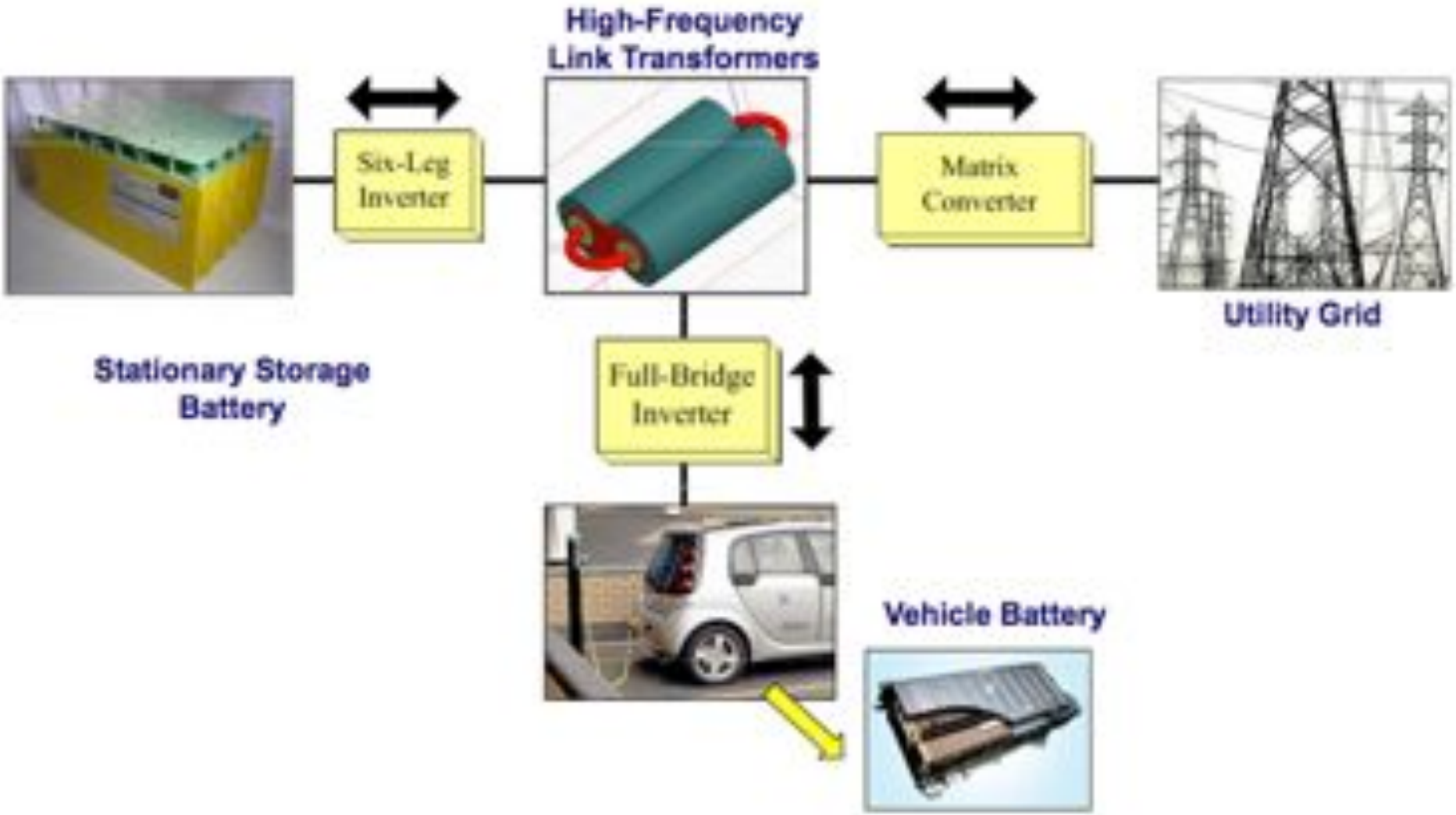
Research themes Smart Mobility



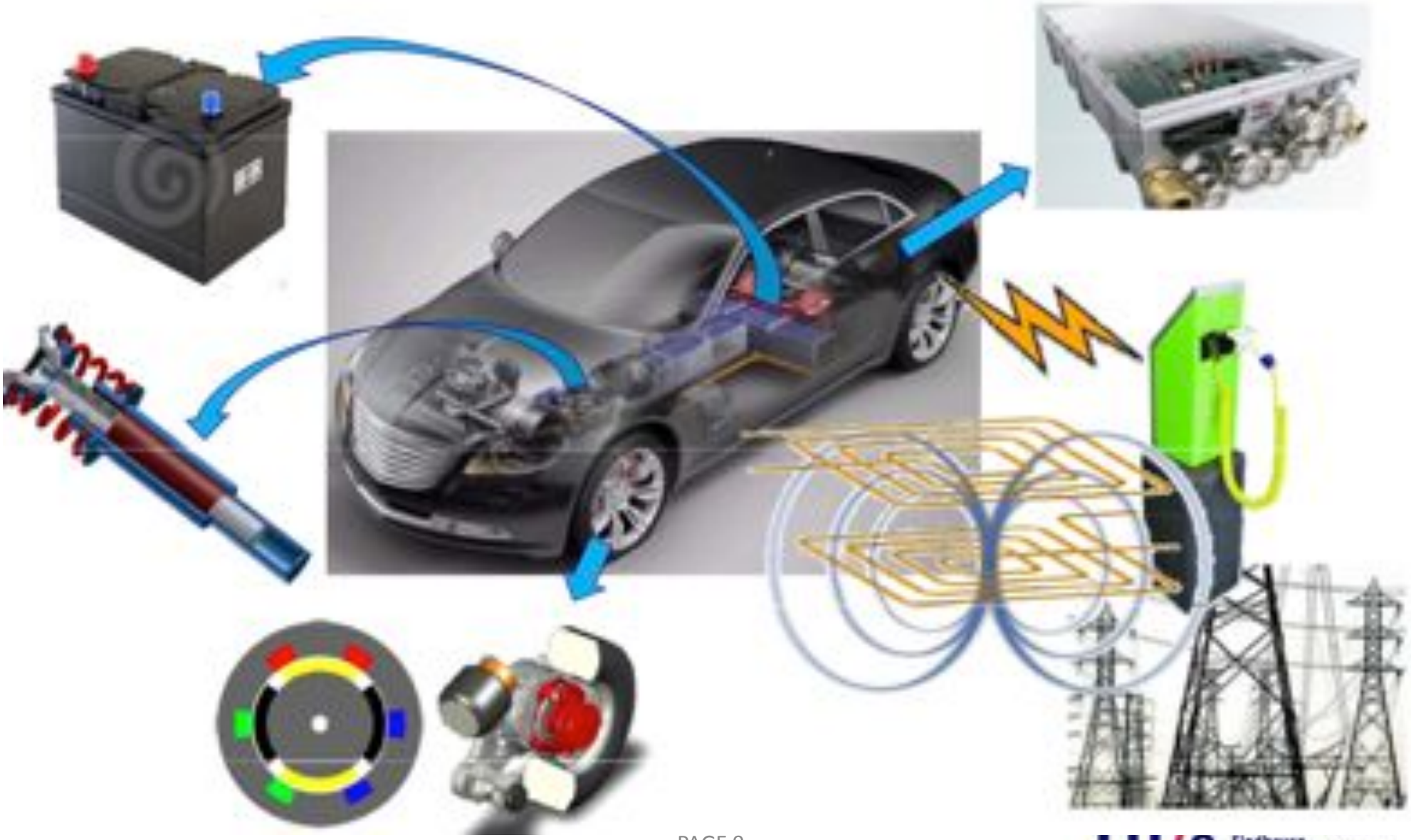
Key technology domains Smart Mobility



Design and development of energy charger infrastructure

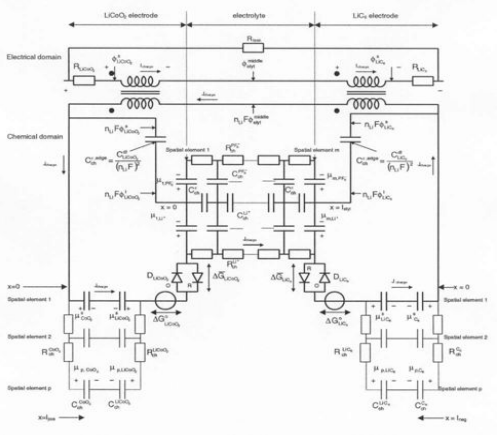


Modeling, Design and Integration of Systems and Sub-Systems for Hybrid (electrical) vehicles

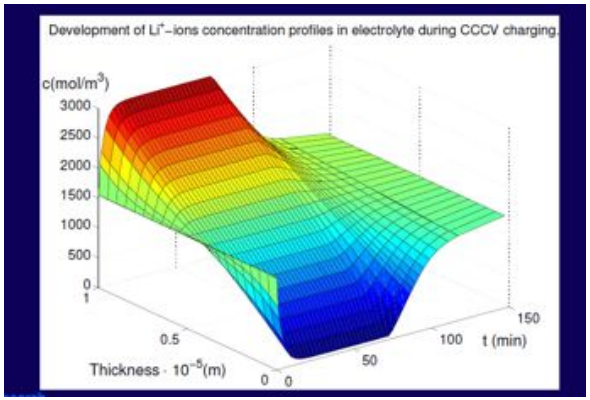


Battery modelling

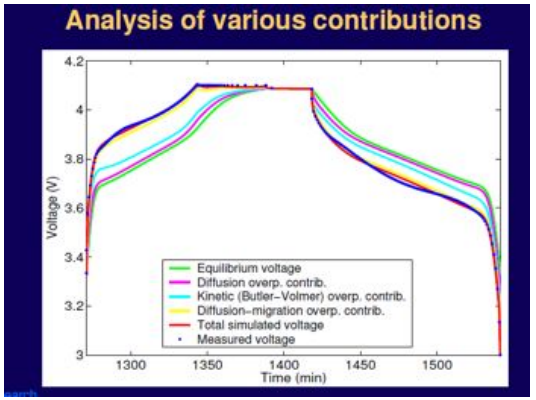
Physics-based electronic-network models, incl. electrical, chemical (incl. aging) and thermal behaviour



Network model Li-ion battery



Simulated concentration profiles



Simulated equilibrium and overpotentials

Ref. Bergveld, Kruijt, Notten, 'Battery Management Systems – Design by Modelling', Kluwer, 2002

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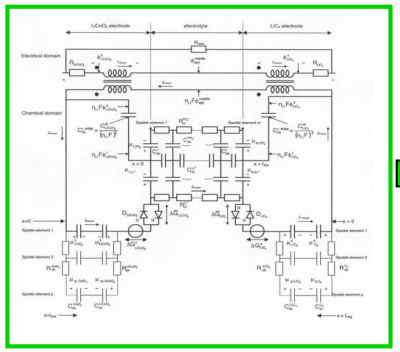
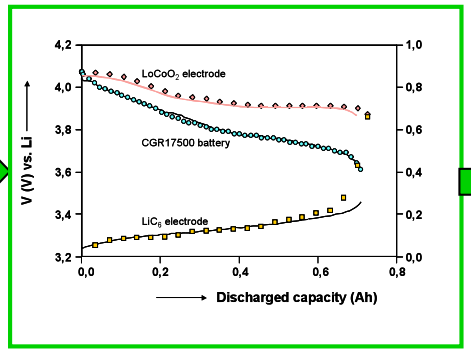
Model-based BMS design

Battery

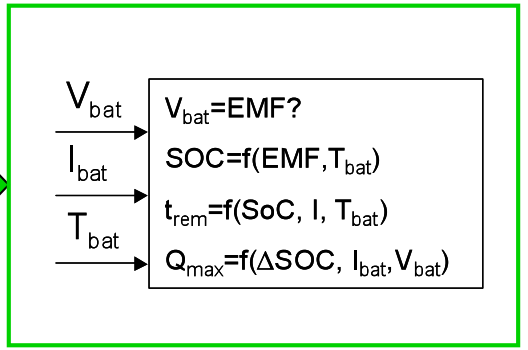
Network model



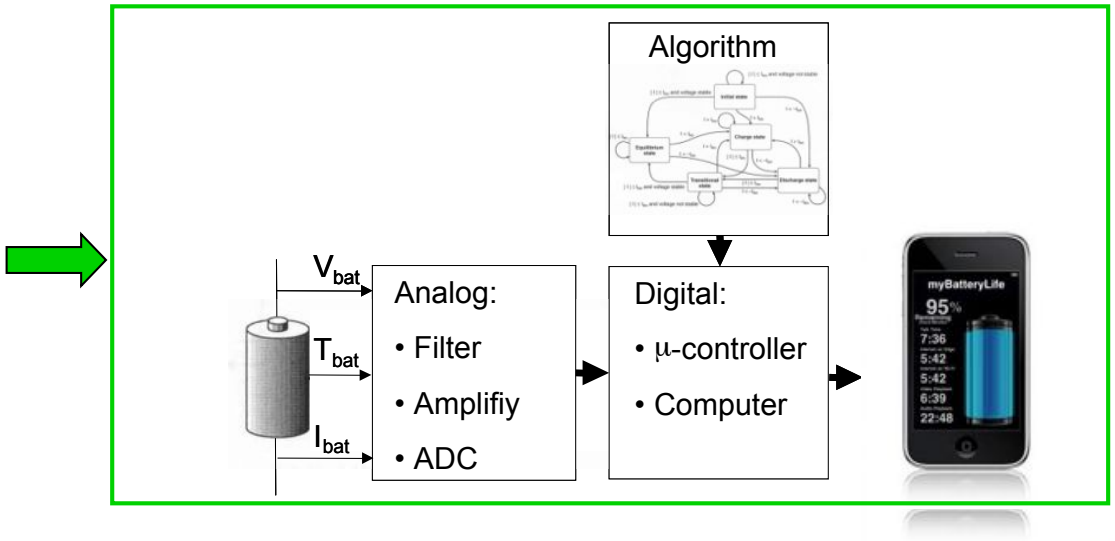
Simulations/measurements



Simple model



System development



Ref. Pop, Bergveld, Danilov, Regtien, Notten, 'Battery Management Systems – Accurate State-of-Charge Indication for Battery-Powered Applications', Springer, 2008

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Intelligent Battery Management Systems

A systems approach

1. Using battery models….

2. …and accurate measurements…

3. …to develop better BMS algorithms…

4. …to make optimum use of battery!

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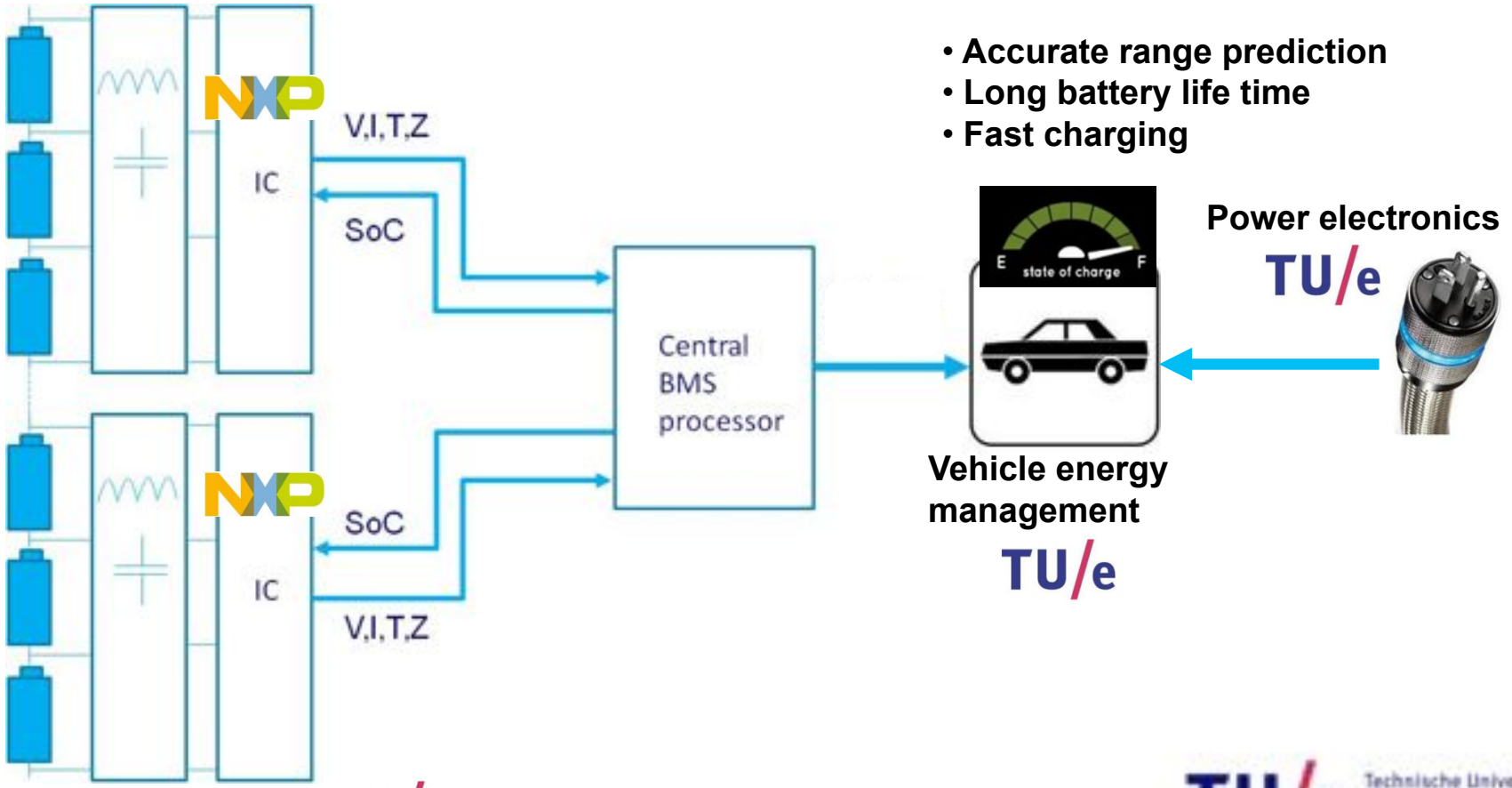

- **Accurate range prediction**
- **Long battery life time**
- **Fast charging**

Power electronics

TU/e

Vehicle energy management

TU/e

Power electronics TU/e

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TU/e is eager to …

- …join consortia, dealing with
  - ICT for FEV
  - Modeling and testing for safety of (F)EV
  - Optimization of range extenders
  - Infrastructures and EV services in the urban grid
  - Electrical Vehicle Management

- …and that are searching for our expertise on:
  - Battery Modeling and Management
  - Power Electronics
  - Electrical Power Trains
  - Electrical-vehicle energy management
  - ICT for FEV (software architecture, model driven engineering, productivity, reliability, safety)

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