



SELECT

Findings, Challenges and Outlook

Jens Klauenberg
German Aerospace Center
Institute of Transport Research

 **SELECT**
Suitable ELeCtromobility
for Commercial Transport



Knowledge for Tomorrow



SELECT Framework and consortium

- ERA-NET Plus scheme **Electromobility+**
- 11 European countries and regions, 20 million EUR funding, 18 projects
- Aim: Creation of long-lasting conditions for the roll-out of electric mobility in Europe on the horizon of 2025
- Key Dimensions: Socio-economic Issues, Technological Strategies and Research & Development

- **SELECT consortium:**



Technical University of Denmark



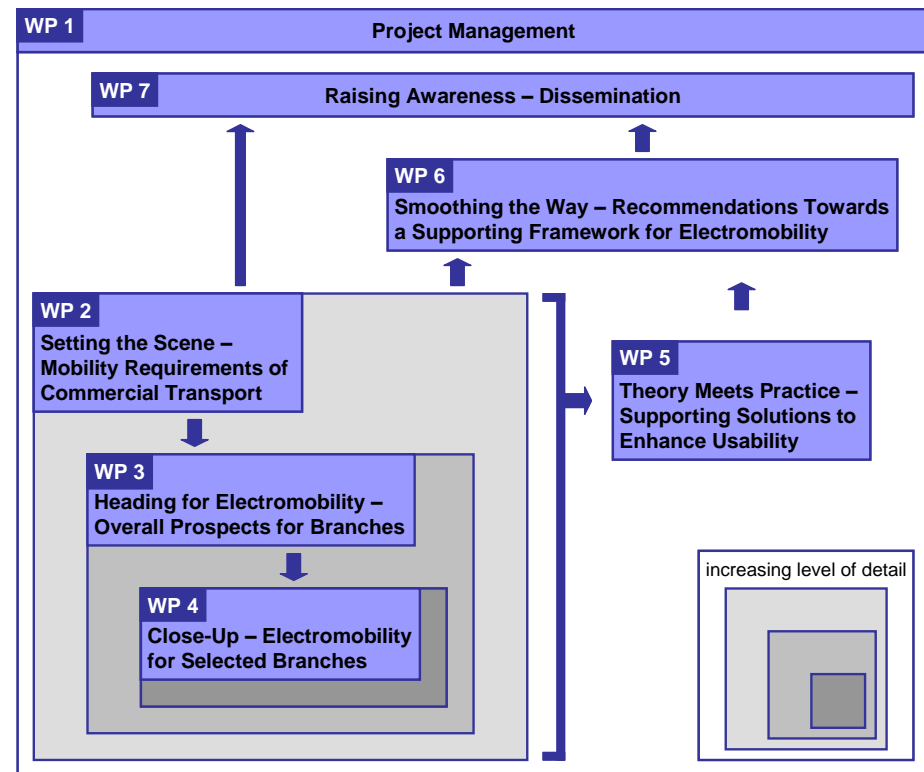
SELECT Goals, structure and scope

- **Goal:** To determine and to develop the potential of Electromobility in commercial transport.
- **Structure:** Three levels of analysis
 - General level: **Potential market shares** based on **usage patterns**
 - Mid-level: **Particular sectors**, survey and trip analysis (GPS)
 - Case study level: **EV integration** into fleets (**mixed fleet management**)
- **Scope:** Battery electric vehicle (BEV), Plug-in hybrid electric vehicles (PHEV), Range-extender electric vehicles (REEV)



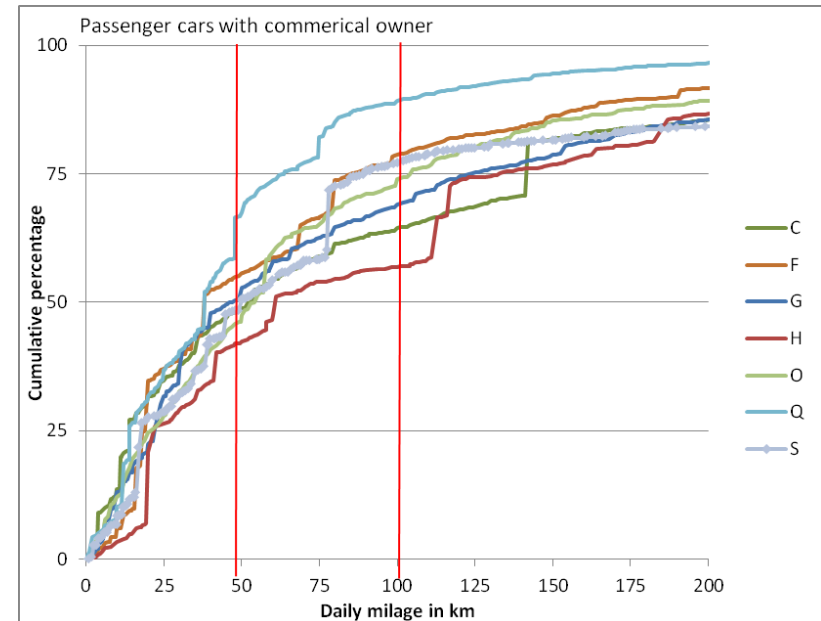
SELECT Findings: Phases of analysis

- Analysis of statistical data
- User survey on needs and attitudes
- GPS tracking of vehicles
- Methodological framework for fleet management
- Recommendations



SELECT Findings: Analysis of statistical data

- Determining the potential for the use of electric mobility in commercial transport:
 - Economic power, number of commercial vehicles, travel distances
- **Austria:**
 - Commercial vehicles up to 3.5 tons PMW, Production and Trading
- **Denmark:**
 - Vans, Construction, Wholesale and retail trade sector
- **Germany:**
 - Wholesale and retail trade sector, Transportation and storage, Human health



Cumulative distribution of daily mileage of passenger cars with commercial owner in Germany [Data: KiD 2010]



SELECT Findings: User survey

Current status

- High potential according to average daily mileage
- Few registered electric vehicles

Research question

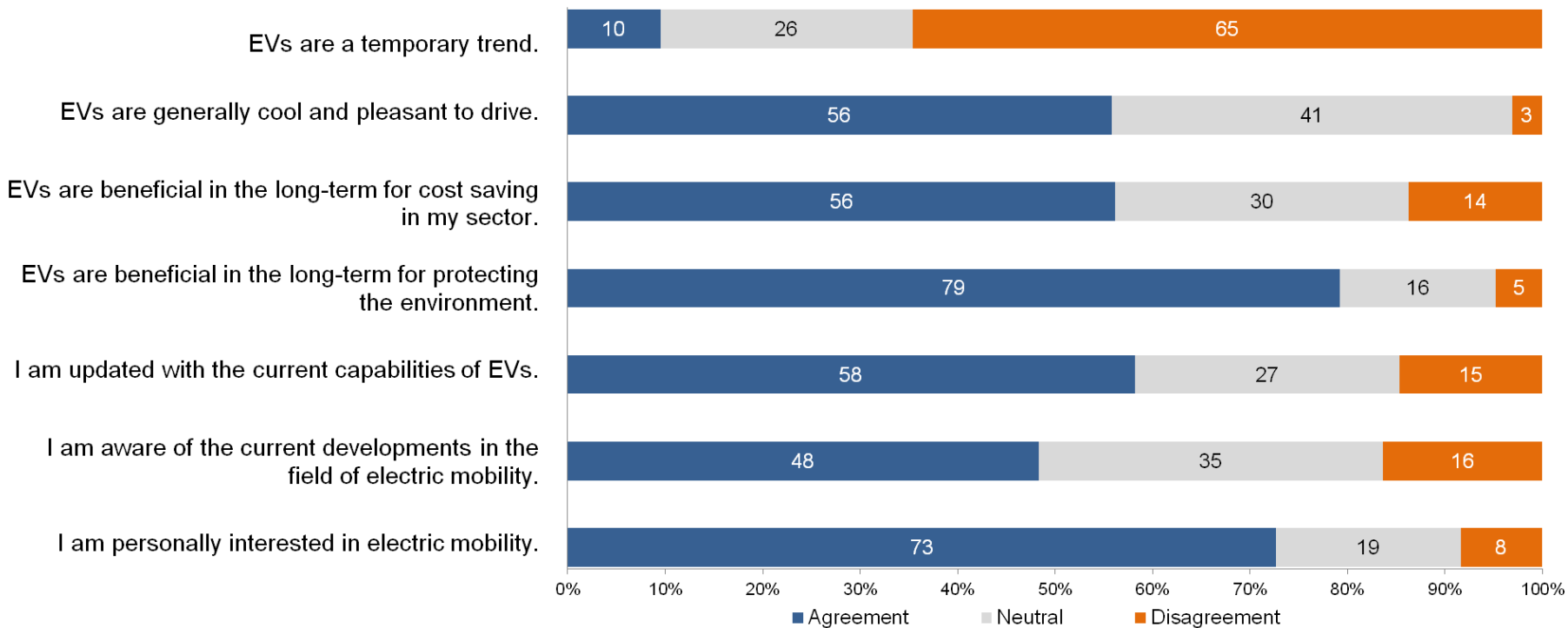
- What are the barriers to use electric vehicles in commercial transport?

Approach

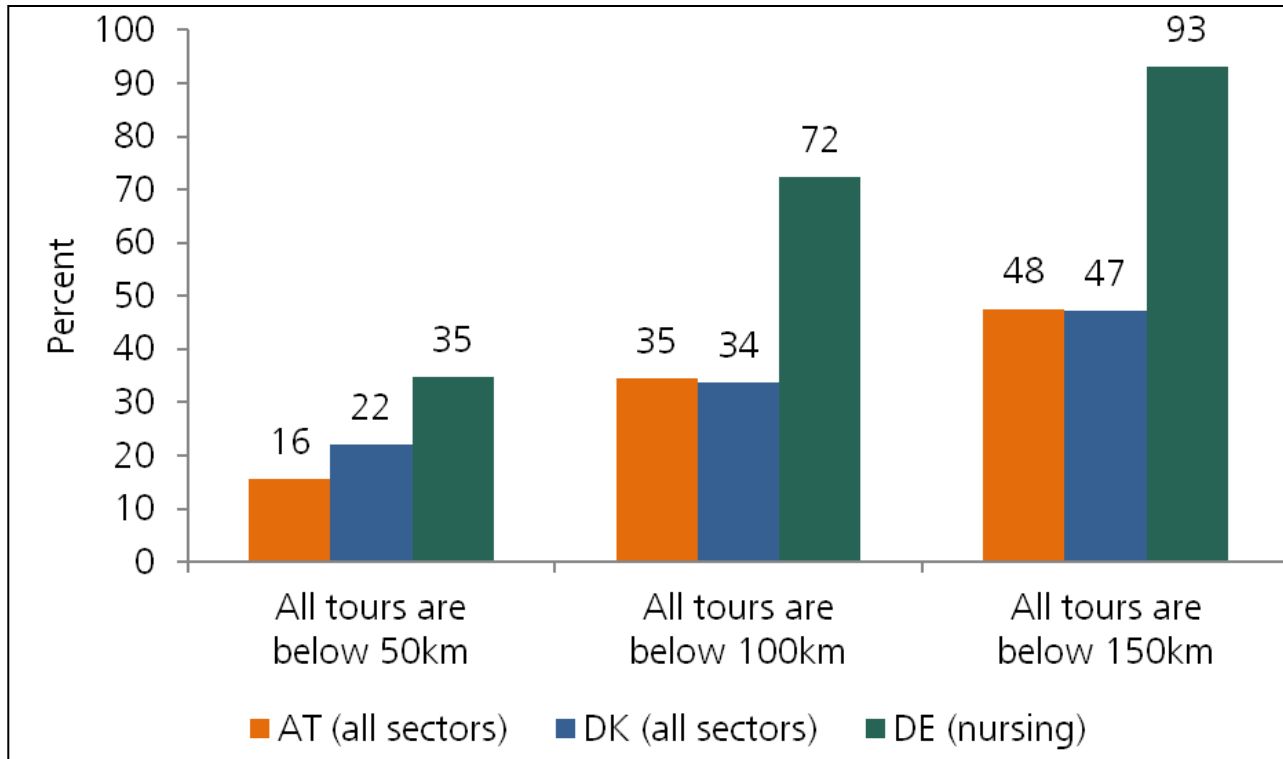
- Empirical survey in commercial sectors with high potential for electromobility
- Needs and attitudes of specific branches
- Target group in Germany: Mobile nursing / home care
- Austria and Denmark: broad range of companies were contacted
- Contacted companies: ~50,000; Responses: 1,200



SELECT Findings: User survey



SELECT Findings: User survey



- High potential for electric mobility in companies for nursing in home care
 - 64 % tours shorter than 50 km and constantly low daily mileages

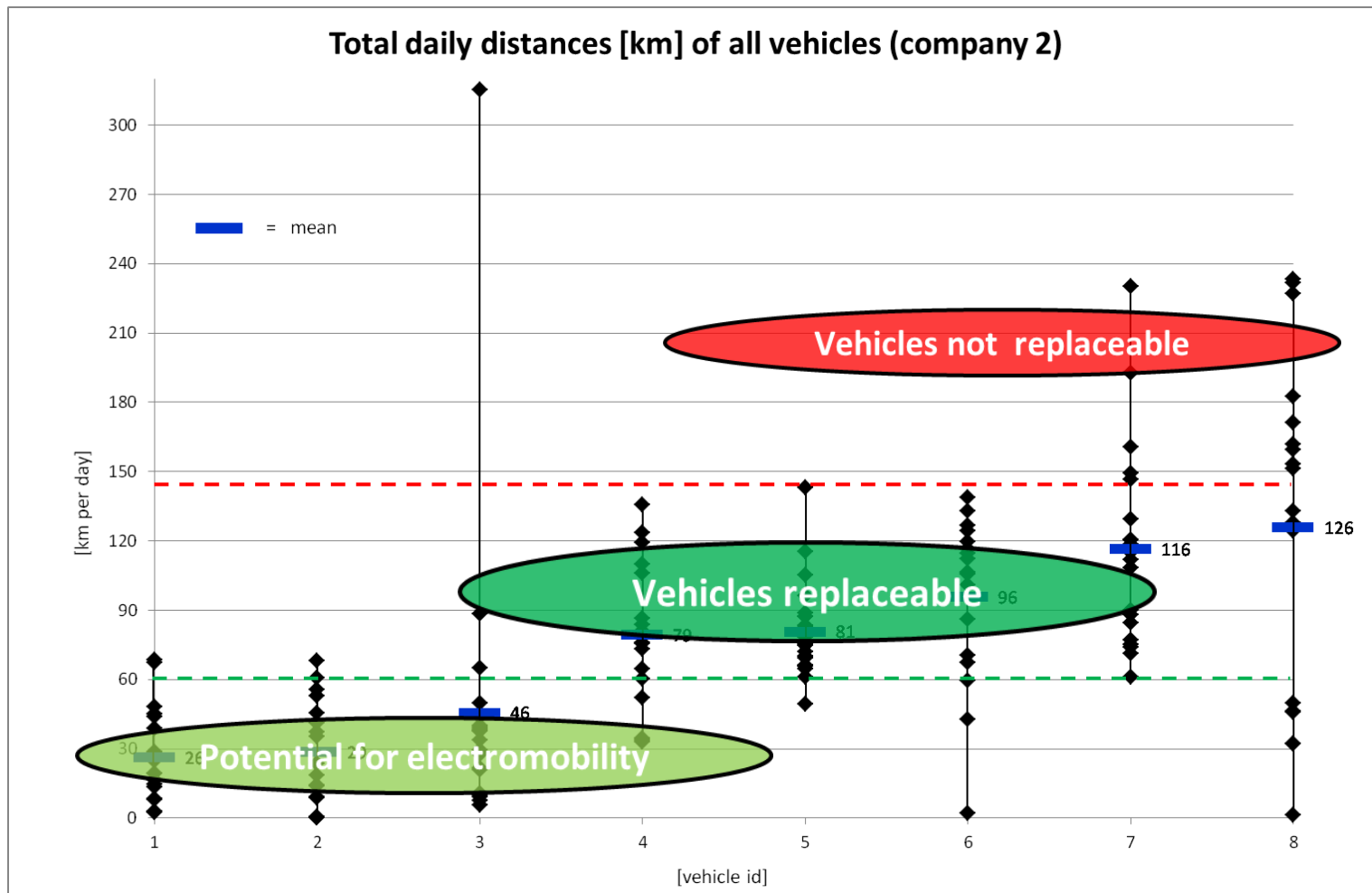


SELECT Findings: GPS tracking

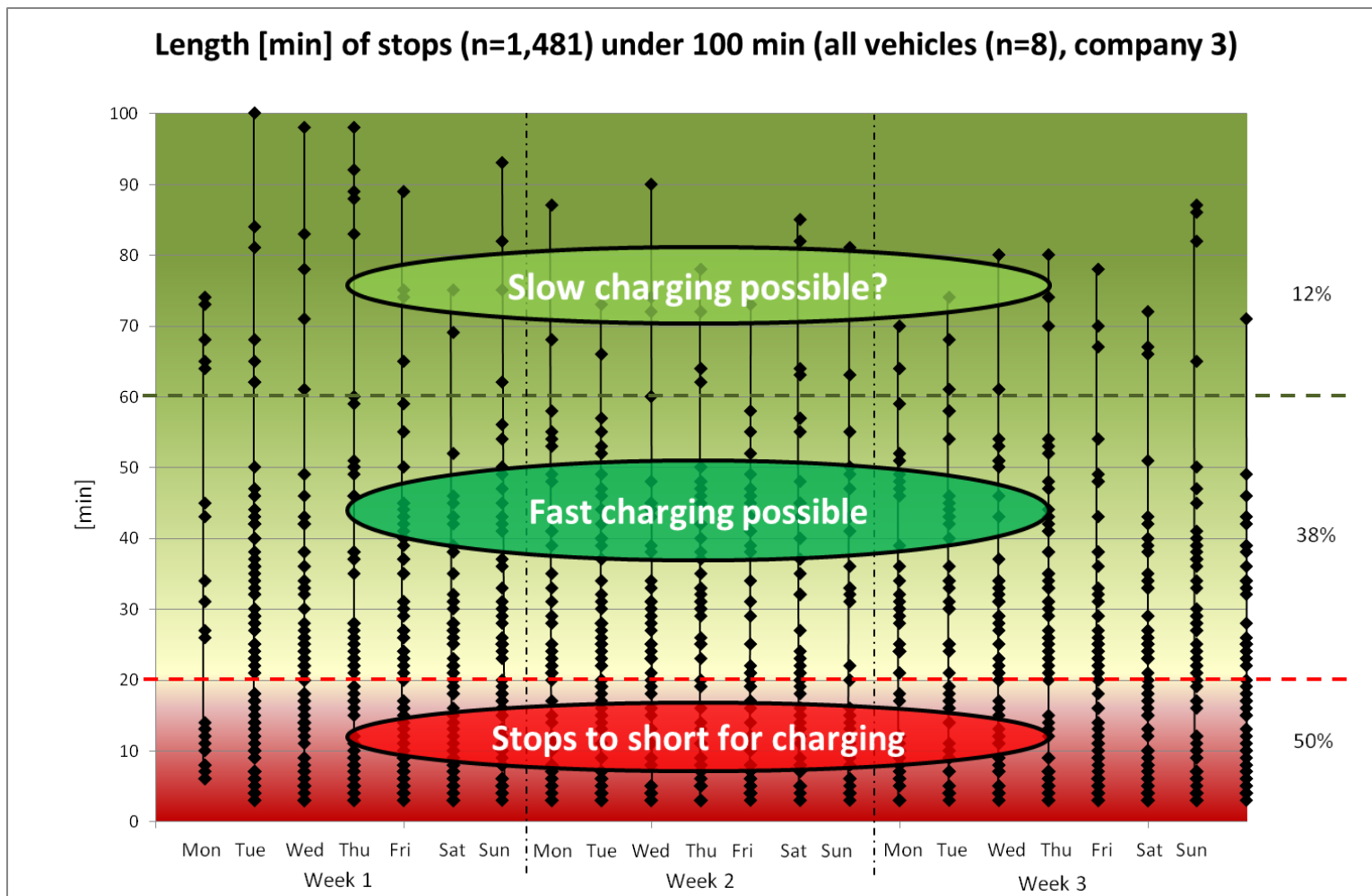
- Tracking of companies in selected economic sectors based on findings of analysis of statistical data
- **Austria**
 - Logistics company and retailer
- **Denmark**
 - Administrative service and retailer
- **Germany**
 - Mobile nursery service



SELECT Findings: GPS tracking



SELECT Findings: GPS tracking

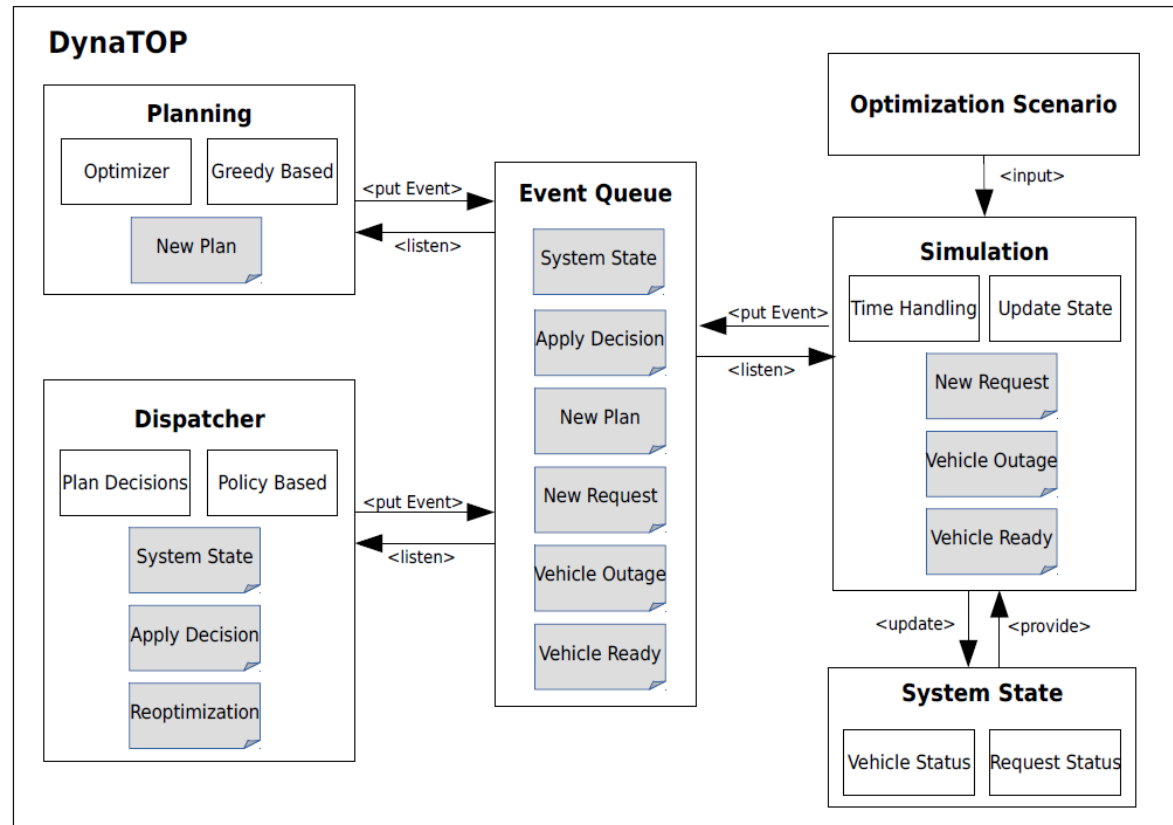


SELECT Findings: Methodological framework for fleet management

DynaTOP

Dynamic Transportation Optimization

- Dynamic vehicle routing problem with the requirements of electric vehicles and mixed commercial fleets
- Based on GPS-based vehicle tracking and charging status of vehicle batteries

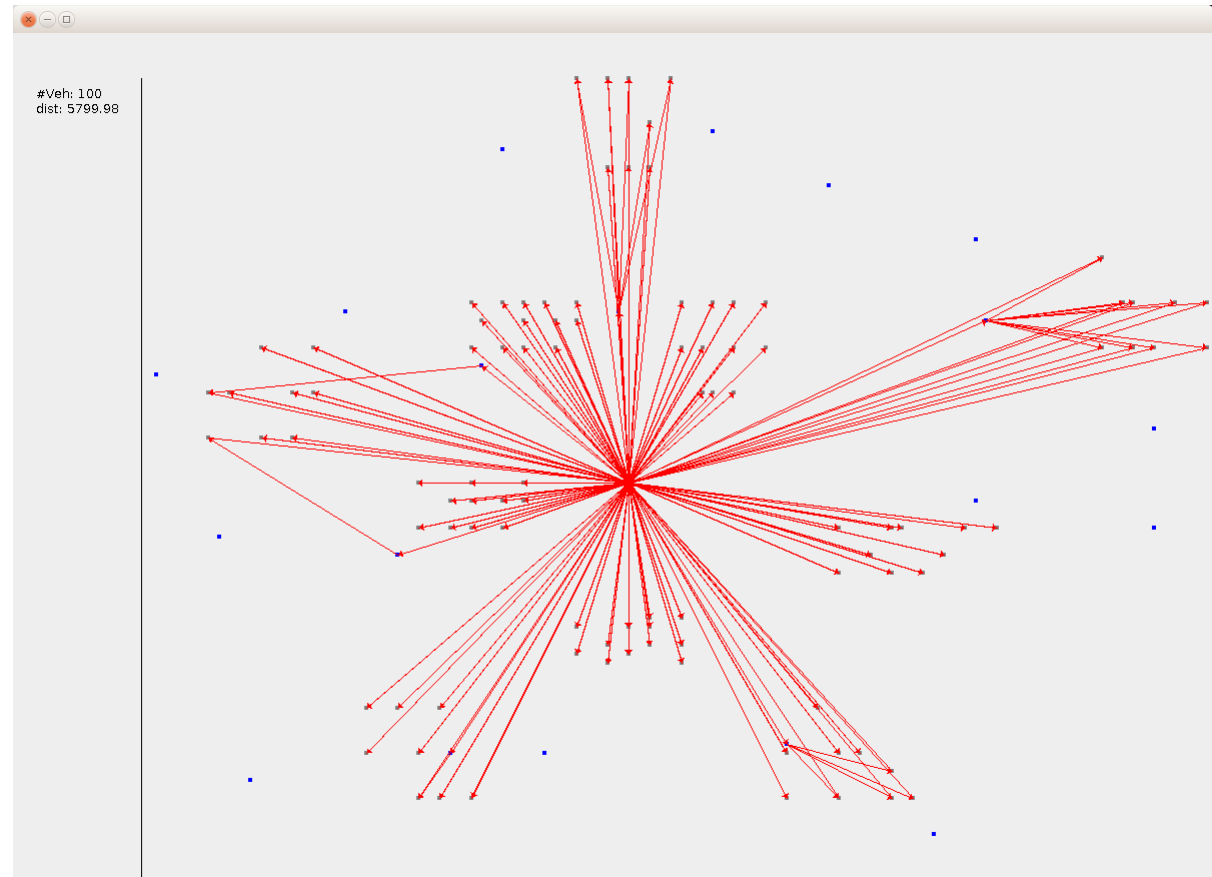


SELECT Findings: Methodological framework for fleet management

Classic EVRPTW (Electric Vehicle Routing Problem with Time Windows)

Exemplary
Implementation:

Initial solution

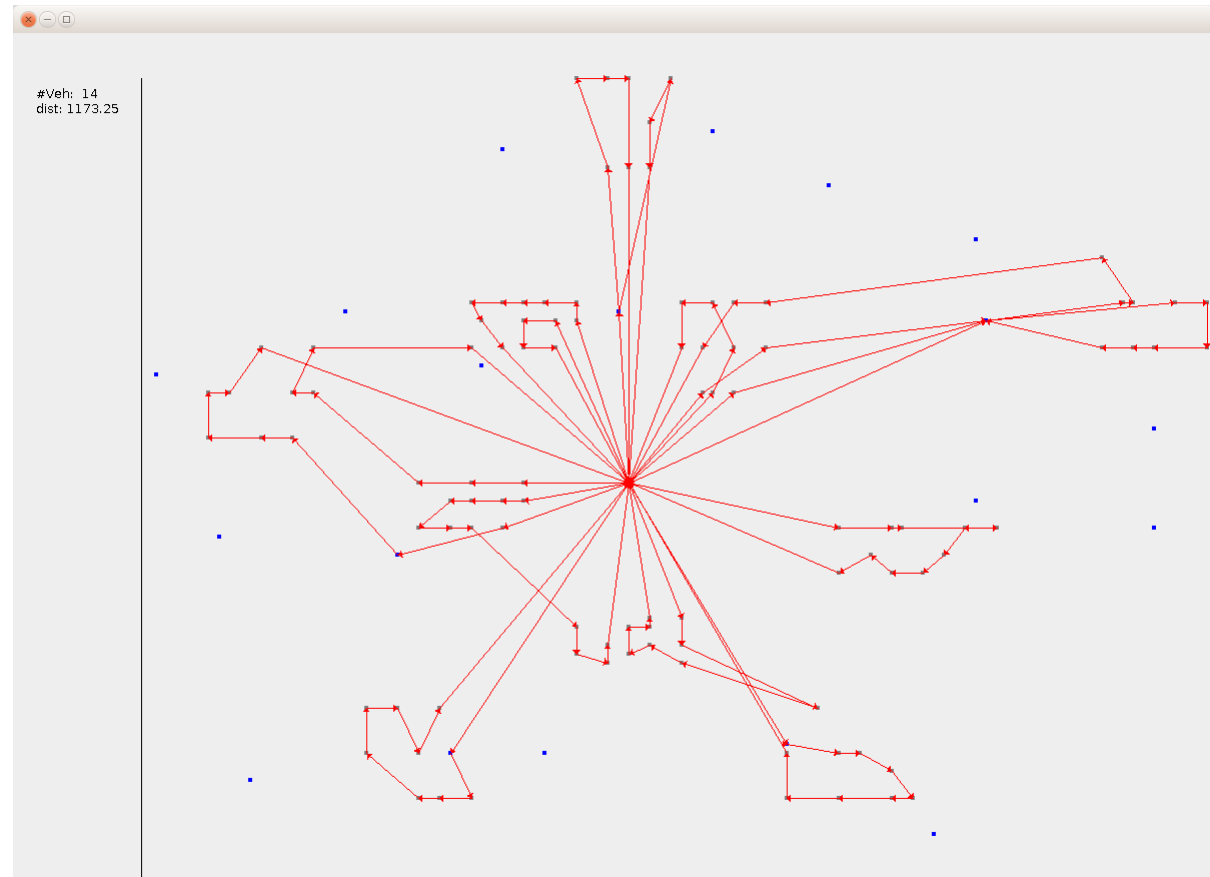


SELECT Findings: Methodological framework for fleet management

Classic EVRPTW (Electric Vehicle Routing Problem with Time Windows)

Exemplary
Implementation:

Final solution



SELECT Summary and recommendations

Summary

- High share of daily trips in commercial transport within range of electric vehicles
- Transport needs of commercial sectors suit specifications of electric vehicles
- Positive attitudes towards electric mobility in commercial transport
- Methodological framework for fleet management developed

Recommendations

- General need for a broader variety of available vehicles
- Pilot projects and fleet trials of electric vehicles are incentives to take steps towards electric mobility
- Give companies possibility to learn about the ease of use of electric vehicles



SELECT Outlook

- Commercial transport as potential use case for electric mobility
- Combined analysis of economic efficiency and user acceptance
- Long term reliability of vehicle and battery technology
- Suitable electric vehicle concepts and vehicle availability





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Jens Klauenberg
German Aerospace Center
Institute of Transport Research

Jens.Klauenberg@DLR.de

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SELECT Consortium



DLR - Institute of Transport Research, Germany



AIT Mobility – Austrian Institute of Technology, Austria



DTU Transport – Technical University of Denmark, Denmark



CLEVER A/S, Denmark



Consilio Information Management GmbH, Austria



Reffcon GmbH, Austria

