Scientific Accompanying Research of the Electric Mobility Model Region VLOTTE in Austria

Model Region | Project Purposes | Research Purposes | Metering concept | Results | Conclusions
Austrian’s first Electric Mobility Model Region

- North-South-Expansion: 86 km
- East-West-Expansion: 54 km
- Rhine Valley is an urban agglomeration
- 370 000 Inhabitants (80% in the Rhine Valley)
- Compact but also spread, with valleys and hills
- Development of public transport is difficult
- 94% of all daily routes are shorter than 50 km
VLOTTE – Project’s Purposes

- All-In-One leasing package for companies and institutions
  - Electric vehicle with ZEBRA-Battery
    (Today ca. 100 vehicles)
  - Energy from all public recharging stations
  - Warranty insurance
  - Service
  - Tickets for public transportation
  - Membership of Austrian Automobile Association

- To Build up necessary charging stations incl. parking place
  (Today ca. 50 charging stations “Park & Charge”)

- To Implement new renewable energy sources (460 + 570 m² PV)
➢ To Define a metering concept for monitoring the vehicles, charging stations and costumer behaviors

➢ To Analyze the total car consumptions, the overall charging processes and the client’s driving behaviors
- Single measurements of specific car values of “TH!NK city” and converted “FIAT 500”

- Series of measurements in practical use over a period of six weeks (19 “TH!NK cities”)

- Continuous measurements of charging stations
Results

- Driving consumptions and car losses
- Stand-by-Losses
- Charging process of all cars
- Charging profile at a working day
- Dwell Time Analyzes
- Dwell Time Distribution
Driving consumptions and car losses

- **TH!NK city**
  - Battery energy: 20.29 kWh (78%)
  - Charging losses: 5.73 kWh (22%)

- **FIAT 500**
  - Battery energy: 19.59 kWh (85%)
  - Charging losses: 3.56 kWh (15%)

*Test drives in Vorarlberg*
Charging process of all cars

Data sources are charges of all 19 vehicles, which are observed for three weeks.
Charging profile at a working day
Dwell Time Analyzes

- 8% of vehicles are unplugged.
- 92% of vehicles are plugged.

EAEW, TU Vienna
Driving consumption of a test drive incl. charging losses
“TH!NK city” 26.0 kWh/100km
“FIAT 500” 23.2 kWh/100km

Charging losses are between 13 and 27% of the total charging energy

Stand-by-Losses are between 0.107 and 0.165 kWh/h

Only 20% of all full charges needed more than 30% of the total battery capacity (28.2 kWh)

The peak of load profile increase at 0.74 kW/car on average, if the charging process is not controlled

50% of all stops longer than 30 minutes are plugged with a one charging infrastructure
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