

Electricity consumption

Real life aquisition of Electric Cars

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Kamoo AG Electrocars

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Outline

- 1 Kamoo AG Electrocars
Battery Technology
Vehicle

Kamoo - Partner for Electric Cars

- Manufacturing
 - Service
 - Sales
 - Integration
 - Development
- Twingo Elektra
 - 500 Elektra
 - 500 220i
 - Sam EV II
 - Fleet Management
 - Fleet Surveillance
 - Car Sharing Solutions

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Zebra Battery from FZsonick



- 2NaClNi-battery
- Operating temperature: 242 degree Celsius
- Weight: 180kg

Twingo Elektra



- Weight: 933 kg
- Battery: FZSonick Z5
- Usable Rated Energy: 16.96 kWh
- Autonomy: 120 km

Twingo Elektra



- 200 Twingo Elektras in use
- 120 Twingo Elektras with a Kamoo service contract
- Customers are reporting max range higher than 200km

Kamoo 500c 220i

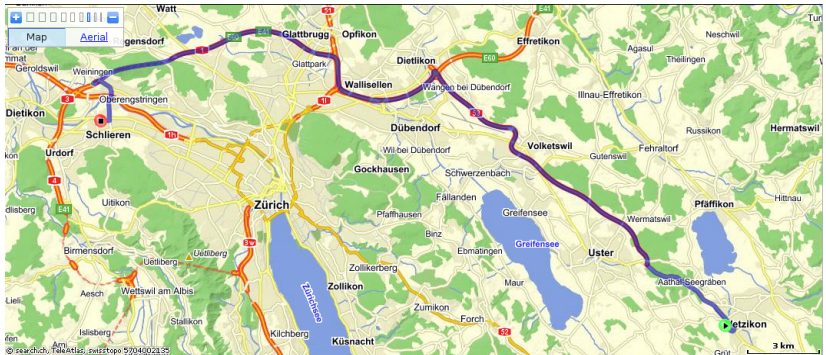


- Weight: 1050 kg
- Usable Rated Energy: 23.76 kWh
- Autonomy: 180 km

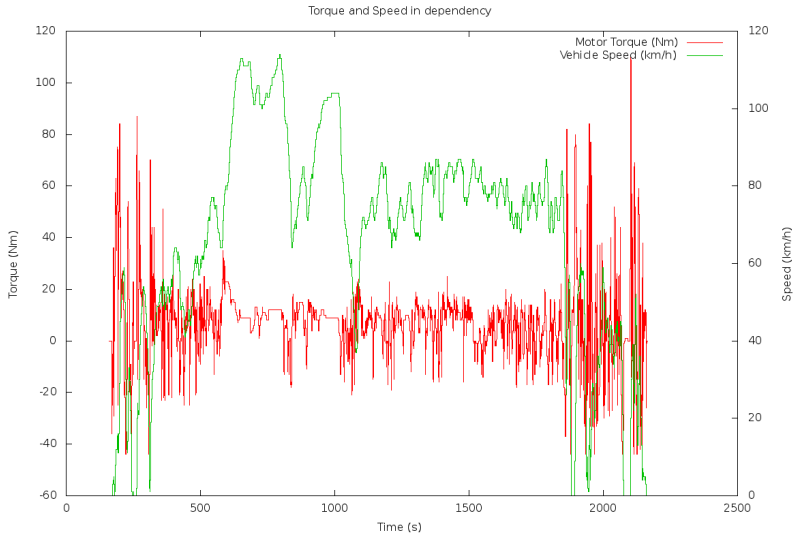
Outline

- ② Evaluation
 - Testdrive Zebra
 - Testladung

Testdrive from Wetzikon to Schlieren



Wetzikon to Schlieren

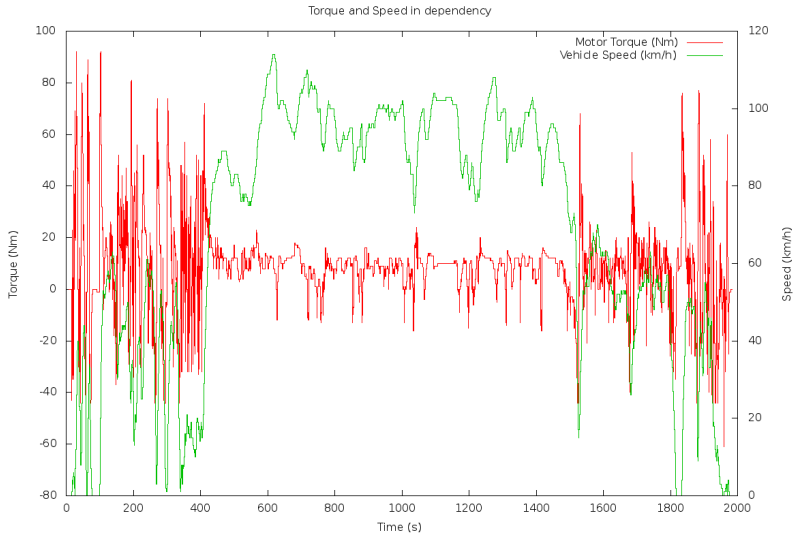


Wetizkon to Schlieren

Distance: 37.1 km
Energy consumption: 4.982 kWh
13.4 kWh/100km

Efficiency area	Duration
> 90%	9.6%
85%-90%	69.5%
80%-85%	16.9%
< 80%	3.9%

Schlieren to Wetzikon

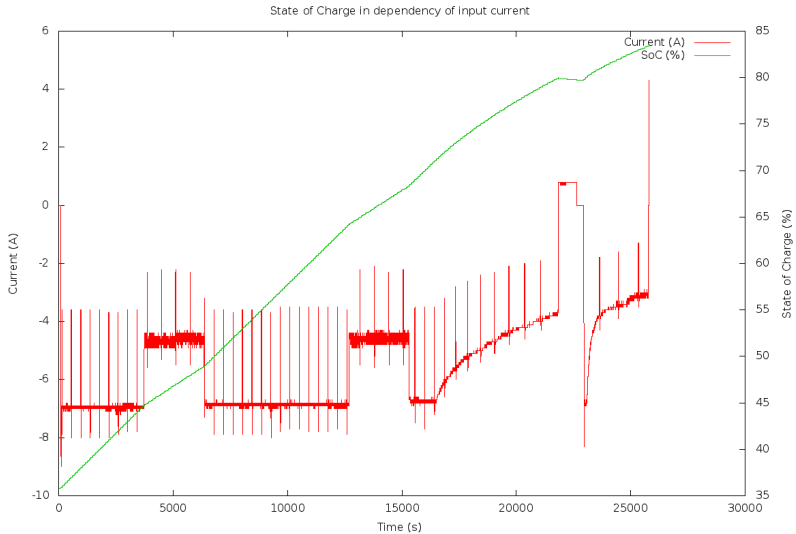


Schlieren to Wetzikon

Distance: 37.1 km
Energy consumption: 6.466 kWh
17.4 kWh/100km

Efficiency area	Duration
> 90%	9.4%
85%-90%	52.9%
80%-85%	32.1%
< 80%	5.5%

Charging behaviour Zebra



Charging Efficiency: > 85%

Loss	Item
7%	Charger
7.5%	Battery Heater
< 0.5%	Cables and Fuses

Outline

3 Conclusion

Energy consumption of Twingo Elektra

- 14 kWh/100km nominal case
16.5 kWh drawn from mains
- 11 kWh/100km best case
- High thermal loss of Zebra battery
80% in 8 days
- 200kg battery is enough for 200km

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- 200 km range possible with 200 kg battery
- Lithium-Cobalt battery would allow ranges up to 350km with the same car design
- Lithium-Cobalt not allowed yet (explosive)

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- 15kW motor is enough (high torque and low weight < 50kg)
- Total weight needs to be reduced
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