AUTOMATIC CONDUCTIVE CHARGING OF ELECTRIC CARS

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AUTOMATIC CONDUCTIVE CHARGING OF ELECTRIC CARS

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Prestudy Electric Road Conductive Car Charging

- **Why:** Charging infrastructure for electric cars utilizing ERS technology would create a possibility for automatic charging, while stationary as well as during movement, and thereby simplifying everyday life for users of electric cars.

- **Purpose 1:** Evaluate the potential of various ERS solutions to be used for automatic conductive energy transfer from road to electric cars that are stationary or moving slowly over short distances (e.g. queues)

- **Purpose 2:** Identify and plan next steps
Expectations from automobile manufacturer point-of-view

- **Target usage for conductive energy transfer from road at standstill**
  - Replace normal convenience charging – 3,5 kW AC (usually during night time)
  - Fast charging with as high power as possible (AC or DC)
- **Expectations in comparison to inductive charging**
  - Low price and less complexity?
  - Higher charging power
  - Lower flux/field emissions

- **Target usage for conductive energy transfer from road at low speeds**
  - Increased opportunity to charge in dedicated spots
  - Fast charging with as high power as possible (AC or DC)
Why is conductive energy transfer from road interesting?

- Automatic fast charging with adjustable power for different vehicle types
- Automatic charging at public parking places (e.g. at super market)
- Automatic charging at private parking with no guidance and automatic driving
- Automatic charging at places where cars are frequently fetched (e.g. car pool)
- Automatic charging when driving in queues at a low speed (e.g. taxi)
- Automatic energy transfer (propulsion and charging) from road to different vehicle types with different power requirements at higher speeds

more

- Enabler for autonomous vehicles
- Reduced need for batteries
Solutions for conductive road car charging

Alstom ERS
- Two rails in the road surface level
- Energy pick-up by AB Volvo
- Test at test track

Alstom SRS
- Charging slot at bus stops
- Buss "Apis" and SRS will be demonstrated in Paris spring 2018

Elonroad
- Short rails in sequence
- Rises about 5 cm and with slantwise sides
- Energy pick-up with at the least 3 contacts

Elways
- One rail with two tracks
- Conductive parts down in the tracks
- Demonstration on public road autumn 2017
Strengths and weaknesses

**Alstom ERS**
- Available product for tramways
- Exposed rail (electrical safety)

**Elonroad**
- Easy installation, and open design of pick-up
- Early development phase

**Alstom SRS**
- Development for stationary buses
- Parking guidance needed

**Elways**
- Many years of test and development
- Focus on trucks
The energy pick-up is a critical component
Conclusions

LET’S PUT OUR HEADS TOGETHER TO KEEP AHEAD.
Analysis

- Interesting possibility to use conductive energy transfer from road to electric cars that are stationary or moving slowly over short distances (e.g. queues).

- The studied solutions have low maturity and development of applications for cars must be done before a conclusion of possibilities and potential can be made.

- User friendliness, availability and functional safety are absolute requirements – Access to voltage-carrying parts must not be possible for unmonitored charging.
Plan for next steps

- Continued development must be done before it is feasible to plan for a demonstration project of conductive energy transfer from road surface to cars.

- Necessary conditions for discussing participation from automobile manufacturers in a future demonstration project:
  - Specification of appropriate application areas where conductive energy transfer from road surface with high power makes a difference (e.g. taxi queues, car pool centrals)
  - "Automotive-grade" energy pick-up with the right design
  - Performed work on functional safety (especially electricity hazards)
  - Standardization of public solutions initiated (or at least planned)
THANKS!

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