Electric driving & Wireless charging on highways

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Agenda

• Electric mobility: background
• What role for the highway operators?
• Different ways to charge a vehicle
• Sanef’s actions
• FABRIC project
Electric mobility: background

• Environmental and public health issue
  – Reduction of CO2 emissions:
    • Transport= 25% of mondial CO2 emissions (18% for road transport)
    • Carbon footprint of electric vehicle (<130g/km) is better than traditional vehicle (average 160 g/km)
  – Public health:
    • Air quality: no emission of hydrocarbons, NOx, CO, fine particles
    • Low noise

• But a slow and long-lasting deployment
  – Price of the vehicle
  – Autonomy of vehicle (around 150 km vs 700 km for traditional vehicle)
What role for the highway operators?

- Electric vehicle / highway: a difficult association considering the autonomy of the vehicles

- Motorways are designed for fuel engine vehicles: service stations are built in coherence with their long range autonomy

- A key role for the highway operators: enhance the development of the electric vehicles by supporting the implementation of charging systems
Different ways to charge a vehicle on highways

Static charge
- Conductive
- Wireless

Dynamic charge
- Conductive
- Wireless

Operational:
- Slow or fast charge
- Test: 2 bus in South Korea, Promising results: > 95% efficiency, R&D: Developed by Siemens and Scania in Sweden, European project « Fast in charge »

State of the art:
- R&D in South Korea and Germany, European R&D project FABRIC

Obstacle:
- Standard in progress: 3 plugs, 4 modes of charge
- Heavy visual impact
Sanef’s actions

- Static charge: contribution to the expansion of the electric charge points’ network
  - The nature of the charge points (normal / fast) is selected according to the nature of the stops
    - Carpool parks: long stop => normal (=long) charge point (8h)
    - Service areas: short stop => fast charge point (20 min)

- Dynamic charge: involvement in R&D project FABRIC as road infrastructure expert
Service areas programme

• Since 2013, all call for service areas concessions renewals require the implementation of 4 static charging points.

• Sanef is associated in a French deployment programme of 200 fast charging points.

• Sanef will fund part of the investment costs for service areas on its network (~30 sites). The first implementation are planned for the beginning of 2015.

• Operation of charging points will be outsourced.
FABRIC project: outline

• EU project, started since 1/01/2014, for 4 years. 23 partners involved. Budget: 9M€ (with EU support). Coordination: ICCS (Greek Academic Research body)

• Objective: Feasibility analysis and development of on-road charging solution for future electric vehicles

• 2 test sites will be implemented:
  – In France at Versailles-Satory, operated by VeDeCom (French Institute of Excellence on Zero Carbon energy)
  – In Italy at Torino, operated by CRF (Fiat)
Inductive charging: principles of functioning

On-Board Electronics

Inductive loops
FABRIC project : issues for highway operators

- Impact of inductive systems on the infrastructure (cracking, road surface quality)
- Ability of the system to cope with roadwork conditions (temperature of mixture, pressure of compactor)
- Ability of the system to cope with « normal » traffic conditions (130 km/h, mix of light and heavy vehicles)
- Organisation of the operation of the system (share of responsibilities between highway operator, charging infrastructure operator, grid operator, electric vehicle backend operator)
- Economical feasibility !
- …