eCo-FEV: an ICT solution for electric vehicle charging

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1. The eCo-FEV project
2. Goal
3. Design in real time
4. CWD and SCP
5. Test sites
6. WPT in POLITO
7. Conclusion and Next steps
1. The eCo-FEV project is a FP7 project
   - Car-Makers
   - Technical research institutes and centers
   - Business consultant
   - Energy provider
   - Highway management society
1. Create a cooperative ICT network among all the different Actors that needs to interact in the Electric Vehicles for private users in the actual and future transportation environment.

2. Management of the electric sources in order to remove the user anxiety for SoC in the EV drivers.
1. Design more than planning a trip for an EV is the key point of the assistance that the eCo-FEV project aims to give to the user of his network.
Need a strong backend

**Data Management**
- **PostgreSQL**
  - Open Source platform
  - Well documented
  - Extensible with plugins
- **PostGIS**
  - Support for OSM maps
- **pgRouting**
  - Fast prototyping of routing algorithms

**Application Logic**
- **Apache Tomcat**
  - Open Source platform
  - Well documented
  - Extensible with plugins
- **Spring Framework**
  - Fast development with Java J2EE
  - Extensive support for security aspects
- **Velocity Framework**
  - Fast GUI development

**COAP Californium**
- Validated platform for COAP data exchange
1. All possible sources will be considered, the more classical one like private and public charge points together with the more exotic and futuristic wireless charging both static or "while driving".

2. Two test sites have been created

   o France in Grenoble
     o Intermodal parking for private car
     o Renault Zoe

   o Italy in Susa
     o Experimental Test site for CWD tests for Light Vans
     o FIAT Ducato
French Test site

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Localization in a place with major traffic issues

EXPRESS BUS LINES

Bike ride

Sportive hobbies

Car sharing

Road traffic and public transport management center
French Test site

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Vertical markings

One charge station
3 / 7 KW
Normal charging mode
(Single-phase electrical supply)

One charge station
3 / 7 / 11 / 22 KW
Normal / Accelerated charging mode
(Three-phases electrical supply)

Horizontal markings

Four slots served
Two slots reserved

Two charging stations
Four (2x2) charging points
1. Route calculation: eCo-FEV back-end
2. Navigation and local rerouting: OsmAnd (on tablet)
3. Route monitoring and adjusting: eCo-FEV back-end
Italian Test site

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CHARGING DEVICES INSTALLATION

- Test Site track
- Control and power room location including office area and cabin area (details on next 2 slides)
- 5 x charging primary coils (each coil is 2m length)
- 2 x cabinet (mini-shelter including power electronics, measurements and ECUs)
- ANPR camera for vehicle identification
The vehicle HMI device is represented by a tablet that hosts an Android app (EcoFevDroid). Its look-and-feel is based on several pages and it is easily usable by means of big buttons on the top of the screen.
Inside the test site

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Diagram of test site components:
- 3-phase section
- DC distribution line
- HF transmitting section (road)
- HF receiving section (on board)
- DC section (on board)

Diagram showing:
- 3 phases
- Transformer
- DC/AC converter
- DC/DC converter
- Compensation capacitor
- Transmitting section (coil + capacitors)
- Receiving section (coil + capacitors)

Components labeled:
- Aluminum shielding beam
- Aluminum shield
- Ferrite cores
- Lexan plates
- Receiving coil
Conclusion and Next Steps

1. Complete Management Platform for the Electric Vehicle charge control has been developed in order to reduce the user anxiety for his SoC.

2. Communication system has been settled up to:
   - Manage the routing
   - Manage the charging

3. Test sites has been completely developed to start the assessment of the technology

Next Steps

1. Increase the Test site capability to reach a full dynamic recharge with different technologies
Thank you.

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