FASTINCHARGE

innovative FAST INductive CHARGing solution for Electric vehicles

**Funding:** European (7th RTD Framework Programme)
**Duration:** Oct 2012 - Sep 2015
**Status:** Complete with results
**Total project cost:** €2,397,043
**EU contribution:** €1,654,085

**Call for proposal:** FP7-SST-2012-RTD-1
**CORDIS RCN:** 106328

**Background & policy context:**

The overall objective of FastInCharge is to foster the democratisation of electric vehicles in the urban environment by developing an easier and more comfortable charging solution which will enable to ease the EV use by the large public and facilitate their implementation in the urban grid. FastInCharge’s intention is to develop a cost-effective modular infrastructure offering a global solution for EV charging. Its success will boost research in the direction of dynamic charging solutions.

**Objectives:**

With the advent of new electrified vehicles (EV) for application in the urban environment, a significant need exists to drastically improve the convenience and sustainability of car-based mobility. In particular, research should focus on the development of smart infrastructures, and innovative solutions which will permit full EV integration in the urban road systems while facilitating evolution in customer acceptance.

Within this context, activities will focus on:

- Investigation into alternative, innovative solutions for recharging stationary EV minimising risks deriving from vandalism (e.g. inductive charging).
- Study of on-route charging technologies which would increase the vehicle range while reducing the size of on-board energy storage systems.
- Development of innovative location based Demand Management systems by means of intelligent systems integrated in both EV and charging stations that can communicate and manage adaptively the charging process autonomously, if necessary, or taking into account the priorities of the user-grid.
- Development of data security standards and crypto measures to ensure privacy protection.
- Intelligent coordinated systems (micro-grids) that balance the simultaneous demand of a given geographically location (multiple, slow and fast charging EV combined with other electric consumers) with policies that prioritise emergencies, security of the net, minimal autonomy for all the elements, etc., and that can also coordinate with neighbouring microgrids and upper level electric grid control.

Projects may address these issues by technology development and demonstration from a technological perspective while focusing on business case analyses and impact studies demonstrating the feasibility and viability of the proposed solutions across a wide-range of operational situations.

**Methodology:**

The concept of FastInCharge is to create a highly performing inductive solution which will enable a 40 kW power transfer to the vehicles in two charging operational situations: one stationary and one on-
route. The inductive technology developed will be integrated into one electric car (secondary charging block) and two charging stations, one stationary and one on-route (primary charging block). The full functional chain will be carefully scrutinised in order to ensure an optimal, safe, and sustainable solution: battery charging, EV performance and safety, EV range, communication EV/station, connection station to the grid, grid management, and energy supply, intelligent coordinated systems.

The FastInCharge project will impact on various stakeholders and address different priorities of private industrials, research centres and a cluster. The main categories of target groups (stakeholders) are: Industry and SME specialised in green technologies, Industry and SME in need of green technologies, Research institutes, Decision makers and Public entities and the General public.

**Parent Programmes:**
**FP7-SST - Sustainable Surface Transport**

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

**Lead Organisation:**

**Douaisienne De Basse Tension Sas**

**Address:**
Parc Horizon 2000
62117 Brebieres
France

**EU Contribution:** €382,350

**Partner Organisations:**

**Automobilovy Klaster - Zapadne Slovensko Zdruzenie**

**Address:**
Hlavna 5
917 01 Trnava
Slovakia

**EU Contribution:** €19,950

**Centro Ricerche Fiat - Societa Consortile Per Azioni**

**Address:**
Strada Torino, 50
10043 ORBASSANO (TO)
Italy

**Organisation Website:**
http://www.crf.it

**EU Contribution:** €382,935

**Fundacion Tecnalia Research & Innovation**

**Address:**
Parque Tecnologico De Bizkaia - Calle Geldo - Edificio 700
48160 Derio
Spain

**Organisation Website:**
http://www.tecnalia.com

**EU Contribution:** €121,536
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<td>Commune De Douai</td>
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<td>Technical University - Gabrovo</td>
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<td>Euroquality</td>
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**Organisation Website:**
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- [http://www.iccs.gr](http://www.iccs.gr)

**Technologies:**
- Electric road vehicles
- Energy management system for charging station
  
  **Development phase:** Research/Invention

- Electric road vehicles
- Inductive charging station
  
  **Development phase:** Research/Invention
Electric road vehicles
Inductive power transfer module
**Development phase:** Research/Invention

EV support technologies
Power electronics for inductive charging
**Development phase:** Research/Invention

Electric road vehicles
Electro mechanical system for inductive charging on vehicle side
**Development phase:** Research/Invention

**Key Results:**

**Wireless electric car charging**

The widespread use of electric vehicles (EVs) could make a tremendous contribution to the reduction of urban pollution and global carbon dioxide emissions. Novel wireless charging technology with increased convenience and providing longer driving distances may tip the scales.

In the last decade, most major automobile manufacturers have invested in research and development of EV technologies. Excellent progress has been made and EVs are now a small part of the landscape of many countries and their roadways. However, important technical obstacles associated with faster charging the EVs must be overcome to increase market uptake.

Exploitation of a phenomenon discovered in the early 1800s, the principle of electromagnetic induction, may provide the answer in the form of wireless charging. Scientists working on the EU-funded project 'Innovative fast inductive charging solution for electric vehicles' ([http://www.fastincharge.eu/](http://www.fastincharge.eu/)) (FASTINCHARGE) are creating the electricity for charging by exposing a coil (a wound conductor) to a varying magnetic field. The result is EV charging with no need to plug in. The technology is targeted to enable a 40 kW power transfer to EVs in either stationary or en route situations.

Currently, EV owners have several options for recharging their cars, depending on where they live. The most common is still to charge overnight (stationary) at home. There are also public charging stations for charging while parked at shops and businesses, as well as high-power, fast-charge stations similar to conventional gas stations.

FASTINCHARGE is developing the fast inductive charging technology that will be implemented in one EV, one charging station of four blocks installed at an urban crossroad and one stationary charging station. The team is assessing all necessary components, including EV performance and safety, EV range, grid connection and management, and intelligent coordinated systems.

Within the first project phase, the team produced prototypes for the stationary and mobile applications as well as the test bench on which to assess performance of the technology. Scientists also conducted an analysis of user acceptance of various EV inductive charging solutions.

Researchers plan to demonstrate the enhanced convenience of the new technology. Its simplicity with no plug-in and reduced charging time combined with increased driving range by charging on the road when stopped at the electrified crossroad should foster enthusiasm on the part of potential EV customers. Reduced total cost of ownership compared to previous solutions could tip the scale and make the sale.

Documents:

- [Final Report Summary - FASTINCHARGE (Innovative fast inductive charging solution for electric vehicles)](http://www.fastincharge.eu/)

**STRIA Roadmaps:** electrification

**Transport mode:** Road transport

**Transport sectors:** Passenger transport

**Transport policies:** Safety/Security

**Geo-spatial type:** Urban