

Development of the European Framework for Electromobility

FP7 call TRANSPORT – 2010 TREN -1

43 partners

Project Start: March 2011

24 Mio € funded by:



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Will I be able to charge my eCar anywhere in Europe?



takes care that you will be e-mobile throughout Europe

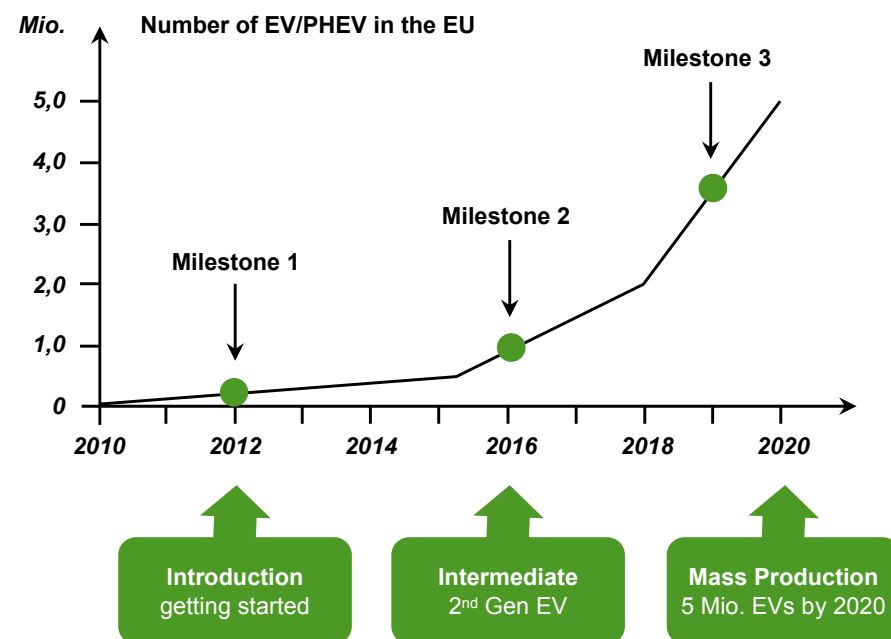
Motivation for the Green eMotion Project

The situation:

- Number of electric vehicles (EV) is increasing heavily in Europe over the next decade (see draft of EGCI Roadmap for EV in Europe)
- Quite a big number of local electromobility demonstration projects funded by regional, national or European programs are running

Leads to three major requirements:

- Coordination of results from existing demonstration projects to define best in class solutions
- Standardisation of technologies has to be in place 2015 at the latest.
- To drive a car conveniently between the existing demo regions, an overarching coordination is necessary (roaming)

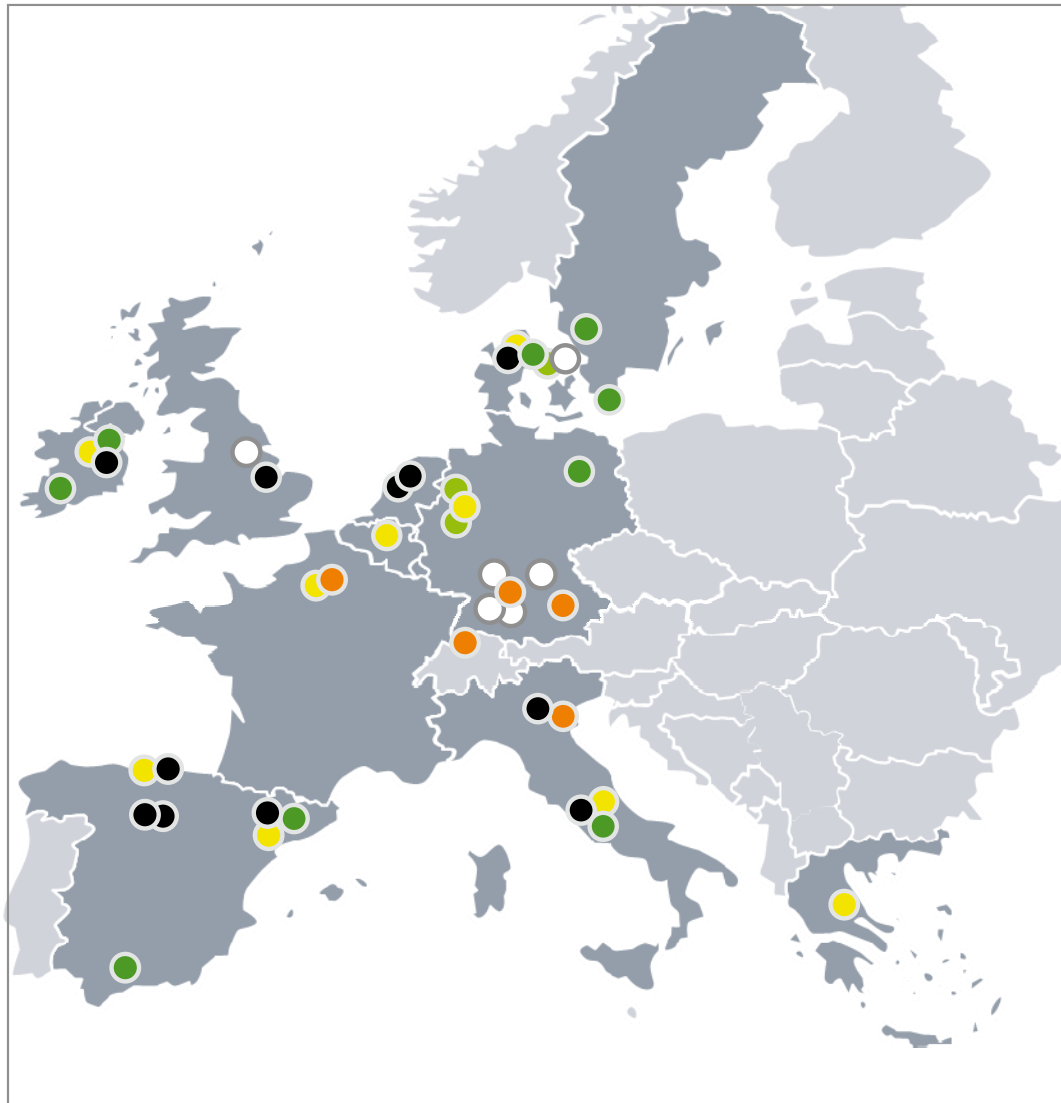


Aims of Green eMotion – Siim Kallas October 2011

- Green eMotion (€24 million EC contribution) will connect ongoing regional and national electromobility initiatives leveraging on the results and comparing the different technology approaches to promote the best solutions for the European market.
- A virtual marketplace will be created to enable the different actors to interact and to allow for new high-value transportation services as well as EV-user convenience in billing. Furthermore, the project will demonstrate integration into electrical networks as well as solutions for electric vehicles themselves.
- It will contribute to the improvement and development of new and existing standards for electromobility interfaces. The elaborated technological solutions will be demonstrated in all participating demonstration regions to prove the interoperability of the framework.
- Green eMotion will facilitate the understanding of all stakeholders about the parameters which influence the achievement of best possible results for society, environment as well as economy and thus ensure transfer of best practices.
- As a result, policy makers, urban planners and electric utilities will receive a reference model for a sustainable rollout of electromobility in Europe.

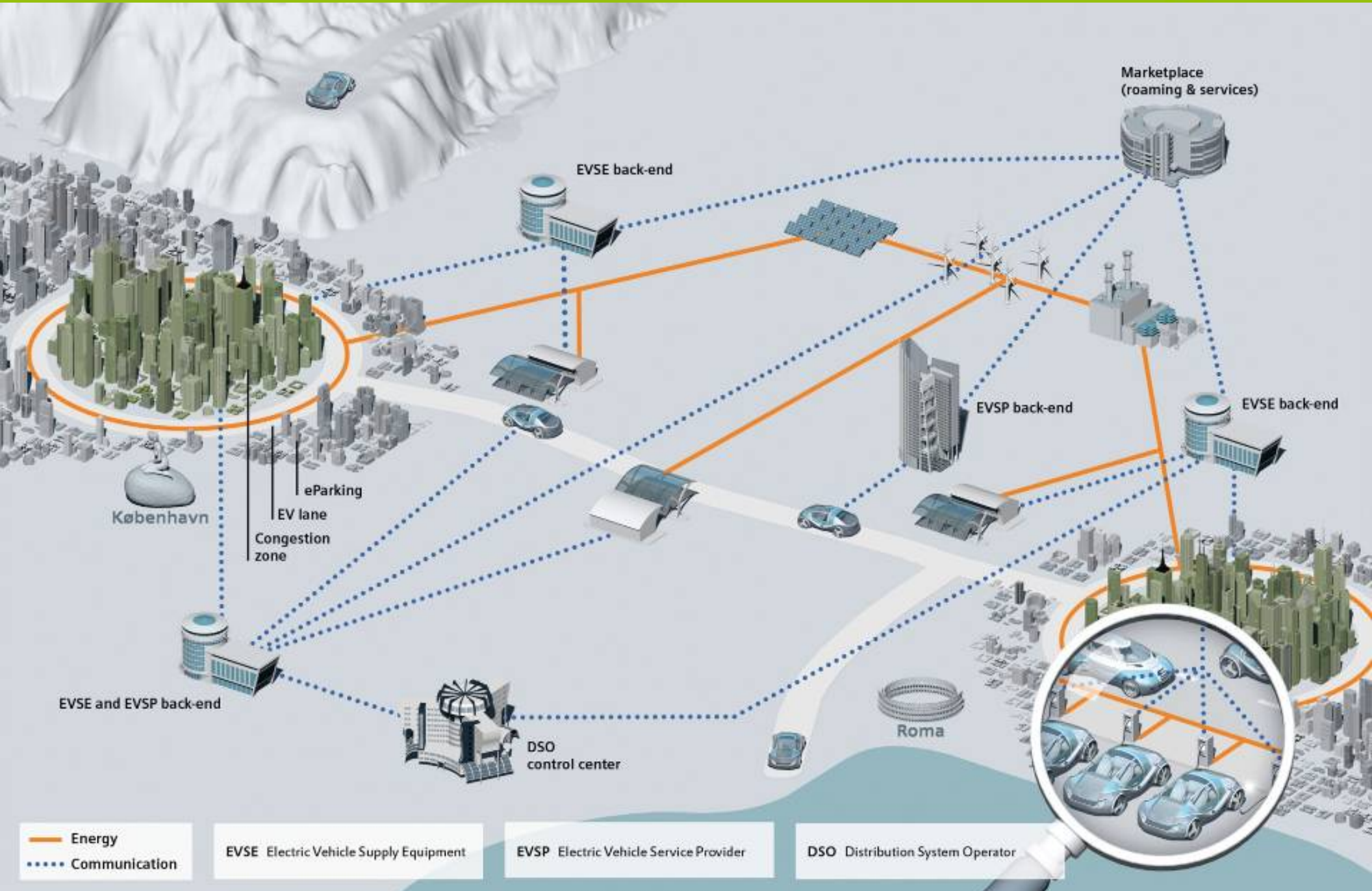
Source: EurActiv Newsletter

Green eMotion with 43 Partners



- **Industries:**
Alstom, Better Place, Bosch, IBM, SAP, Siemens (Project Coordinator)
- **Utilities:**
Danish Energy Association, EDF, Endesa, Enel, ESB, Eurelectric, Iberdrola, RWE, PPC
- **Electric Vehicle Manufacturers:**
BMW, Daimler, Micro-Vett, Nissan, Renault
- **Municipalities:**
Barcelona, Berlin, Bornholm, Copenhagen, Cork, Dublin, Malaga, Malmö, Rome
- **Research Institutions and Universities:**
Cartif, Cidaut, CTL, DTU, ECN, Imperial, IREC, RSE, TCD, Tecnalia, TNO
- **EV Technology Institutions:**
DTI, FKA, TÜV Nord

European electromobility – the big picture



Defining the Framework for Electromobility in Europe



- Green eMotion tests and demonstrates the **interoperability** of an electromobility system in selected demo regions
- Green eMotion analyses the operability of electric cars under **real life conditions** and develops recommendations for the implementation of the mass market (to increase user acceptance)
- Green eMotion recommends ways to an optimised grid and charging **infrastructure**



Defining the Framework for Electromobility in Europe



- Green eMotion recommends selected **standards** for an interoperable electromobility system (de facto standards for Europe)
- Green eMotion adjusts the proposals and results in discussion with a broad **stakeholder** base
- Green eMotion defines the IT architecture for a European **marketplace** including interfaces which allows competition in implementation



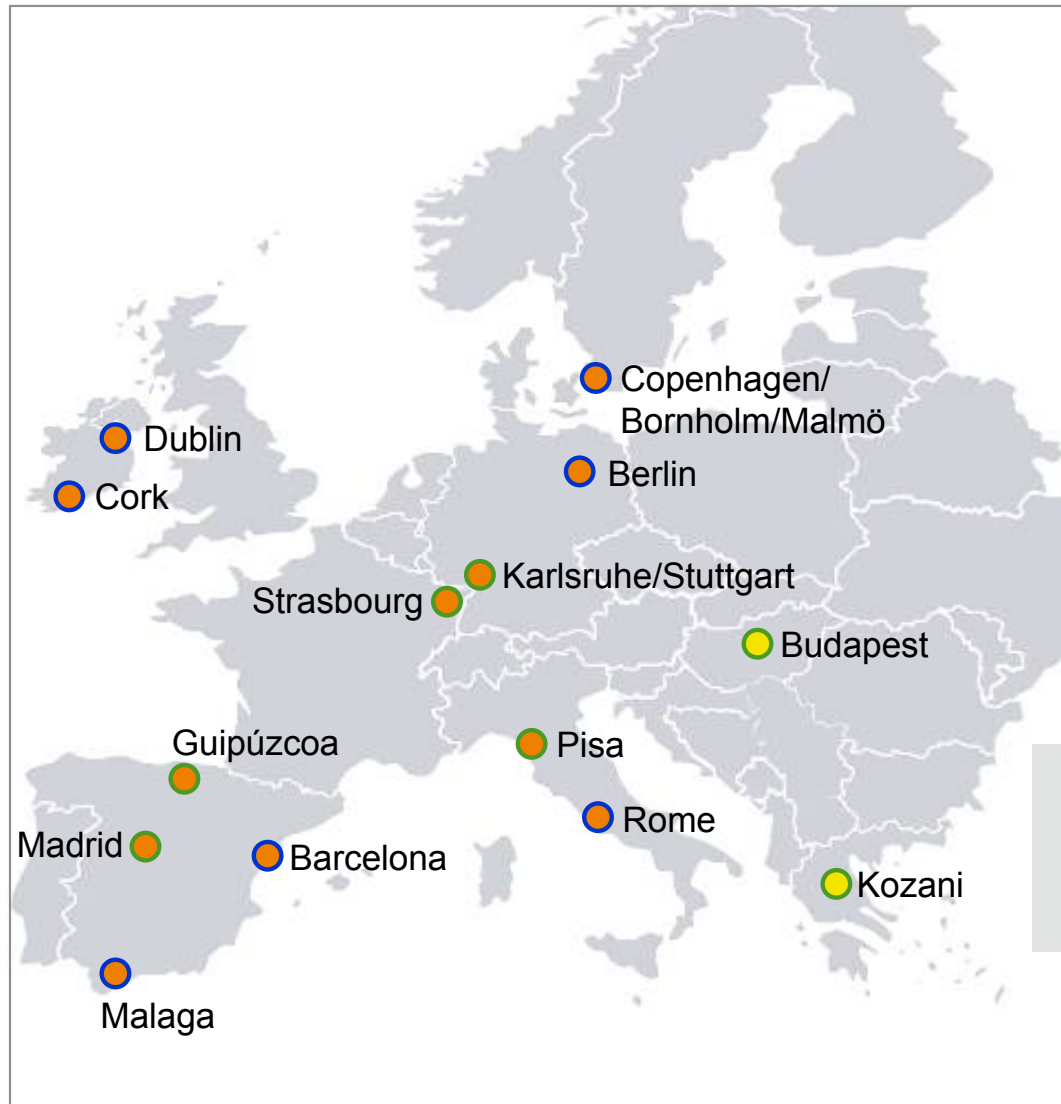
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Green eMotion – Demonstration Regions



In the Green eMotion demo regions roughly 2,000 EVs were driving end of 2011 and more than 2,500 charging points were installed to supply electricity for them.

This will increase to around 70,000 EVs and more than 80,000 charging posts in 2015.

In total more than 380 Mio € are spent in funded projects within these demo regions (plus private investments by Green eMotion partners).

- Existing demonstration region
- Replication region
- Municipalities involved in Green eMotion



Leveraging on experiences from existing demo regions:

- System approach enabling innovative services and user interfaces, kWh billing system, alternative business models testing
- Different charging solutions: AC, DC, battery swapping
- Cross boarder traffic, roaming
- Integrated project testing business models and consumer behaviour
- Embedded in local Smart Grid concepts
- Optimized bi-directional charging
- Various EV fleets: from bicycles and motor bikes to standard cars and delivery trucks; full electric and plug-in-hybrids

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Green eMotion develops a Market Place

Green eMotion develops and demonstrates a virtual marketplace for electromobility to enable Europe wide electromobility and to allow for new added value transportation services to increase EV-user convenience.



- Local solutions
- Free charging or flat rate for registered users
- Some upcoming local roaming solutions

- Business analysis
- System architecture (04/12)
- Development (wip*)
- Implementation (04/13)
- Demonstration (from 04/13)

- Europe-wide roaming
- Interoperable system
- New business models with added-value services
- Increased user acceptance

* wip = work in progress

Green eMotion prepares standards

Green eMotion contributes to the improvement and development of new and existing standards for electromobility, using the existing standardisation bodies for implementation of standards.



- Local solutions
- Different or missing standards e.g., plugs, communication protocols, unique identifier, payment

- Analysis of existing standards and needs
- Development of proposals (wip*)
- Harmonisation with stakeholders and standardisation committees (05/12, 04/14)
- Common methodology and field tests (07/12)
- Guidelines for the selection of standards (02/15)

- De facto standards for Europe accepted by a broad base of companies and institutions (partners and stakeholders)
- Open architecture for a complete European electromobility system allowing for competition in the market
- Interoperable system
- Increased user acceptance

* wip = work in progress

Green eMotion defines infrastructure needs

Green eMotion delivers a set of requirements regarding networks and charging infrastructure for the successful implementation of electromobility systems.



- Local pilot projects
- Many independent approaches leading to versatile, not compatible solutions
- Small product series with high costs
- No common knowledge base: technology, charging network, grid interface

- Data collection and evaluation (wip*)
- Development for a planning toolkit (10/13)
- Guidelines for infrastructure deployment (04/14)
- Demonstration of different types of charging solutions (10/13 – 04/14)
- Implementation of charging management solutions for optimised integration of EVs in local grids (10/13)

- Recommendation on optimal charging infrastructure: type, number, location, and user acceptance
- Recommendation on charging infrastructure with minimised grid enhancement costs

* wip = work in progress

Green eMotion validates the performance of EV technology in terms of durability, costs and safety aspects under real world driving conditions in different climatic zones.



- Most EVs are converted combustion cars
 - Only small number of EVs on the roads
 - Small product series with high costs
 - Limited experience with durability of EVs
- Performance validation (grid to road efficiency, battery performance, climate aspects, safety aspects, maintenance) (01/15)
 - Technical analysis in the demo regions
 - Evaluation of environmental impact based on EV life-cycle analysis (from “cradle to grave“) (10/14)
- Report on real-life performance of vehicles compared to marketing facts and OEM figures
 - Safety and maintenance training (handbook and web-based)

* wip = work in progress

Green eMotion generates proposals regarding policies and regulations



Green eMotion assures that the electromobility system will be understood from a multi-criteria perspective regarding technical, economic, environmental and social aspects.



- Local policies and regulations (municipalities, countries)
- Limited experience on effectiveness of measures
- Limited experience on acceptance of concepts

- Data collection and evaluation (wip*)
- Identification of hurdles and barriers (social, technical, environmental, legal, economic) (04/13)
- Evaluation of field test results based on real data about costs, barriers, user acceptance, potentialities (05/13)
- Evaluation of the environmental impact of intermodal transportation concepts (10/14)
- Increase user acceptance through extensive dissemination activities during the project (wip*)

- Report describing key features of successful implementation of electromobility
- Recommendations for the mass market roll out of Evs in the EU based on the analysis of user acceptance, environmental impact, and technology

* wip = work in progress

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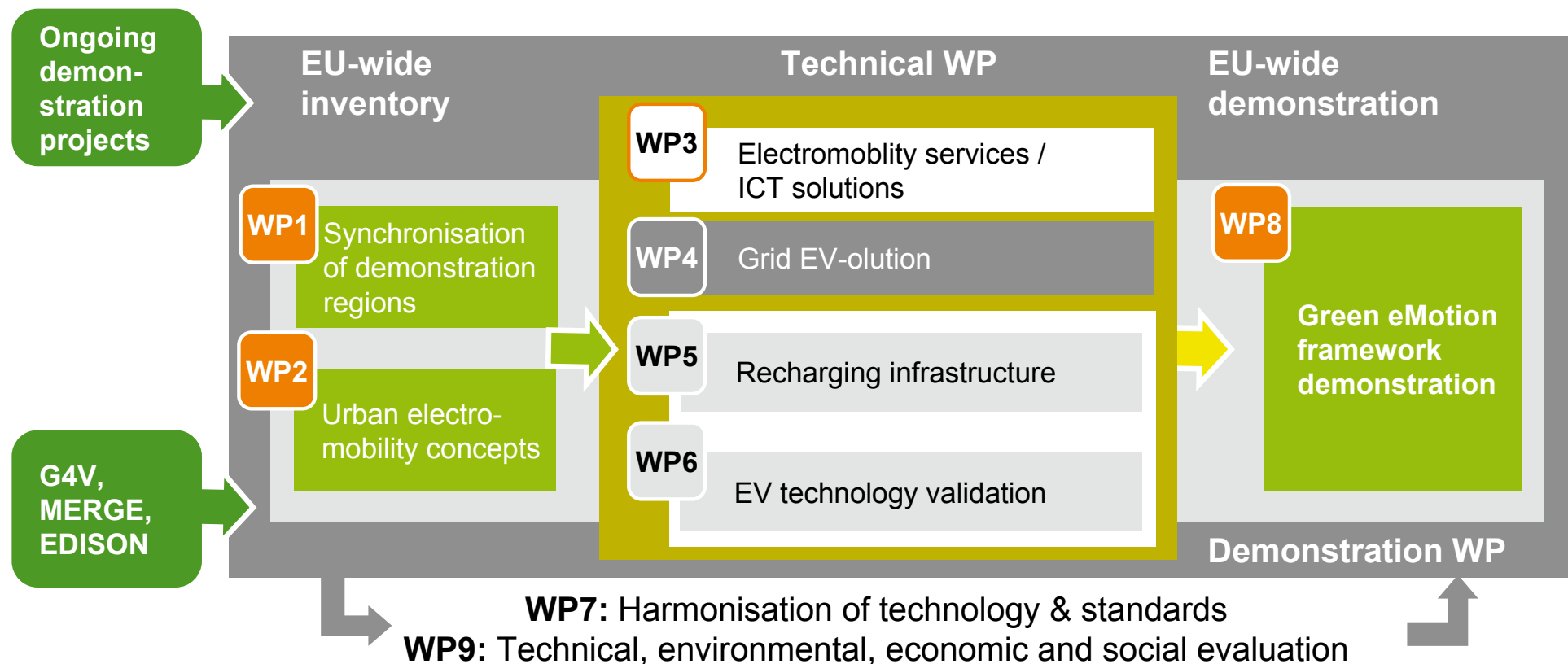


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Work structure

Administrative WP – Dissemination (WP10), Project Management (WP11)



Subject: Integrated European demonstration on electro-mobility – Vehicles, infrastructure, grid, IT applications, user acceptance

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External Stakeholder Forum



The Green eMotion Stakeholder Forum gives input and feedback to the results of the project. So the project findings are built on a very broad base and can therefore lead to an interoperable electromobility system that delivers a seamless, integrated experience for end users.

- So far, nearly 200 institutions and companies have signed in as members
- Four meetings held: March 16, 2011, in Brussels, June 20, 2011, in Dublin, November 22, 2011, in Paris and May 10/11, 2012, in Brussels
- Next meeting: November 27/28, 2012, focused on ICT solutions in Ehningen (near Stuttgart, Germany; host IBM)
- Future meetings:
Full meetings: Brussels, May 2013 and 2014, February 2015
Workshops: Copenhagen Nov. 2013, Barcelona Nov. 2014



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What we have achieved so far – ICT solutions

- ICT reference architecture for a marketplace system including protocol specifications and service use cases available
- Pilot for first release finished and test started
- Green eMotion Marketplace release 1 (May 2013):
 - Core system (platform)
 - Search EV services
 - Roaming und Clearing (data management for billing)
- Green eMotion Marketplace release 2 (May 2014):
 - Reserve EV services
 - Energy (Load Management)
- For more information check on www.greenemotion-project.eu/dissemination.



What we have achieved so far - standards

- Standards: Which ones are currently in use and gap analysis
 - Green eMotion is focusing on interfaces and identification
- Identification:
 - We need unique identifiers for Europe
 - for supply equipment, contracts, e-cars
 - has to cover country code, provider, number
- Interfaces:
 - Charge point – Charge Management System
 - Charge Management System - Marketplace
- Green eMotion is actively participating in the industry initiative “eMobility ICT Interoperability Interest Group”
- In preparation:
 - Gaps and recommended actions towards minimal features interoperable charging stations



What we have achieved so far – city solutions

- **Vision, strategy and policy** of the Green eMotion municipalities:
 - reduce emissions and noise in the cities by promoting the use of EVs with
 - tax incentives, grants for buying an EV, e-parking, installation of public charging infrastructure, free parking for EVs and municipal EVs.

- -> D 2.1 public on www.greenemotion-project.eu/dissemination

- In preparation (available May 2013):
 - A report describing the various hurdles arising at different policy making and implementation stages when rolling out an infrastructure for EVs and how to overcome them.
 - A report describing the key features we experienced that are necessary for a successful rollout of EVs



What we have achieved so far - Infrastructure

- **Overview** on charging infrastructure and how to connect it to the grid
 - D4.1 public on www.greenemotion-project.eu/dissemination
- Analysis of **DSOs needs** regarding charging infrastructure, e.g. balancing, peak shaving, ancillary services
- Measurements of impact on the grid caused by different **charging strategies**, e.g. smart charging, scheduled charging
 - D4.2 public in Nov 2012
- **Outlook:** New features for the existing **grid planning tools** will be developed and public available in autumn 2013 (D4.3)
- For more information check on www.greenemotion-project.eu/dissemination.



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Thank you for your attention.

