

SEVENTH FRAMEWORK PROGRAMME

Collaborative project



Mobincity

Smart Mobility in Smart City

FP7-314328

D8.4 Publications, articles and press releases

Technomar GmbH

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1 Summary

Publication of articles and press releases is an on-going process over the whole project period and depends on the project progress. Therefore This deliverable gives an overview of the current situation related to the publications and press releases during the first period and will have updates in the next years.

Workshops and publications have the overall aim of disseminating the project results to stakeholders and experts outside the consortium.

There are planned two workshops (D8.3), one intermediate workshop focussing on all aspects surrounding the project development targeting a wide audience (around M24) with the preliminary results. The second workshop will be the project final conference as an open event addressed to all the targeted MOBINCITY audience showing the obtained results and the final conclusions. Invitation to the major stakeholders of the EV sector will be sent out.

Additional to the workshops several participations to conferences and fairs are planned.

Concerning publications, three types of publications are envisaged and realized for dissemination of the research activities:

- A leaflet about the project has been prepared at the beginning of the project
- Scientific publications obtaining R&D results have been published in internationally recognized scientific journals, national journals, conferences proceedings and through the website.
- Press releases: Press releases towards the European press summarizing the effort of the consortium have been published.

All presentations, contributions and publications include the project logo prominently acknowledging the FP7 grant.

2 Introduction

The general objective of Mobincity is to make urban mobility more environmentally sustainable by means of the wide deployment of Full-Electric Vehicles as mass market product in cities. With this regard, Mobincity aims at the maximization of FEV autonomy range thanks to the development of a complete ICT-based integrated system able to interact between driver, vehicle and transport and energy infrastructures, taking advantage of the information provided from these sources in order to optimise both energy charging and discharging processes and the increase in energy efficiency.

The project Mobincity is divided into nine different work packages. The structure is based on the different interactions that will be developed within the project, as shown in the following figure.

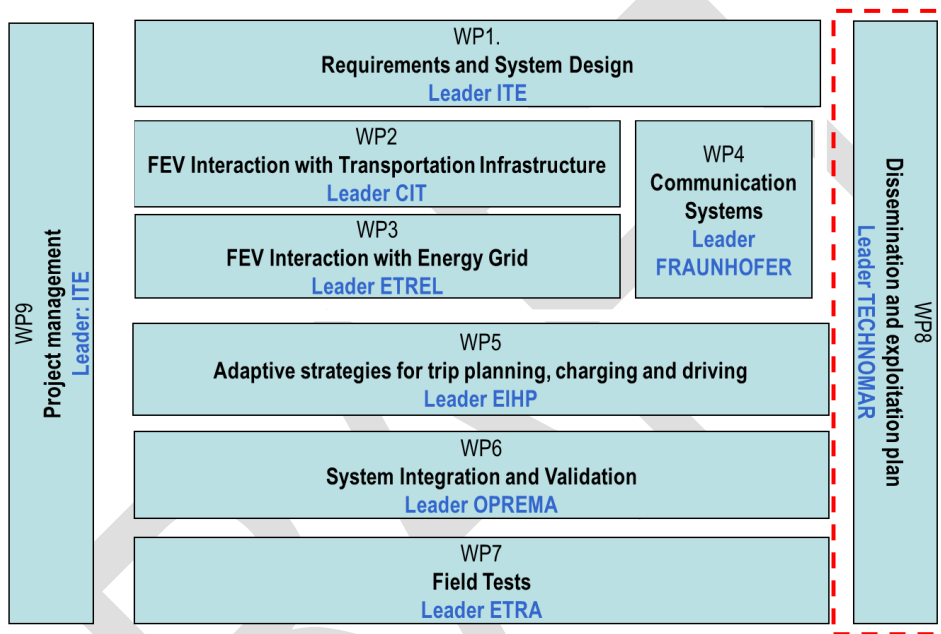


Figure 1. MOBINCITY Working Package Structure

This deliverable is part of WP8 Dissemination and Exploitation plan.

The main objective of task 8.3 *Workshops and Publications* is to represent the MOBINCITY project and to raise awareness of the MOBINCITY project in the scientific community and interested stakeholders. The major tasks are organizing project workshops, representing MOBINCITY at fairs and conferences, and disseminating scientific and common publications as well as press releases.

The output of the Task 8.3 *Workshops and Publications* shall give a contribution to disseminate the project itself and provide information for the business plan D8.5 which shall be completed at the end of the project.

3 Publications and Press Releases

In order to increase information and awareness about the project objectives, activities and results, three types of publications are envisaged for dissemination of the research activities:

- A leaflet
- Scientific publications
- Press releases

All presentations, contributions and publications included the **project logo** prominently acknowledging the FP7 grant.

3.1 Status and adaptation

3.1.1 Leaflet

In preparation of the project a leaflet was produced and published on the MOBINCITY web page and on all partners homepages (see annex A). The flyer describes the main objectives of the project as well as the different categories of use cases which have been defined in WP1. The flyer also shows the developed and presents the consortium members.

3.1.2 Scientific publications

During the reporting period, the following papers have been submitted and accepted for publication in the Conference Proceedings of the 20th and 21st Mediterranean Conference on Control and Automation. The papers have been presented during the “Renewable Energy and Sustainability” session of the conference that has been held on July 3-6, 2012 and June 25-28, 2013 respectively.

1. Mercurio A., Di Giorgio A., Quaresima A., “*Distributed control approach for Community Energy Management Systems in presence of storage*”, 20th Mediterranean Conference on Control and Automation MED12, 1303-1308, Barcelona, July 2012. DOI: [10.1109/MED.2012.6265819](https://doi.org/10.1109/MED.2012.6265819)

Abstract: In this paper we present a system architecture and suitable control methodologies for the management and control of Distributed Generation (DG) units, Renewable Energy Resources (RES), Active Demand (AD) and storage units, being these Electric Vehicles (EV) or Uninterruptible Power Supply (UPS). Within the proposed platform, control methodologies allow to adapt unit generation profiles and active loads to ensure economic benefits to each actor. The key aspect is the organization in two levels of control: at residential level a Smart Home Controller (SHC) monitors and controls smart appliances while at higher level a Community Energy Management System (CEMS) coordinates generation units, negotiates consumption with SHCs and sets power grid energy withdrawals. Proposed control methodologies involve the solution of a Walrasian market equilibrium and the design of a distributed solution of a dynamic programming problem.

Relevance to Mobincity: The paper explores a control methodology which has been the starting point for the design of the macro load area aggregator’s control logic.

2. Mercurio A., Di Giorgio A., Purificato F. (2013). "Optimal Fully Electric Vehicle load balancing with an ADMM algorithm in Smartgrids". In: 21st Mediterranean Conference on Control and Automation MED13. IEEE, Chania, GR, June 25 - 28, 2013. DOI: [10.1109/MED.2013.6608708](https://doi.org/10.1109/MED.2013.6608708)

Abstract: In this paper we present a system architecture and a suitable control methodology for the load balancing of Fully Electric Vehicles at Charging Station (CS). Within the proposed architecture, control methodologies allow to adapt Distributed Energy Resources (DER) generation profiles and active loads to ensure economic benefits to each actor. The key aspect is the organization in two levels of control: at local level a Load Area Controller (LAC) optimally calculates the FEV’s charging

sessions, while at higher level a Macro Load Area Aggregator (MLAA) provides DER with energy production profiles, and LACs with energy withdrawal profiles. Proposed control methodologies involve the solution of a Walrasian market equilibrium and the design of a distributed algorithm.

Relevance to Mobincity: The paper introduces the concept of macro load area aggregator and presents the related algorithm.

3. Di Giorgio A., Mercurio A., Liberati F. (2013). "Regulation of Angular Speed and Reactive Power for a Wind Turbine Applying Robust Feedback Linearization and H-infinity Control". In: 21st Mediterranean Conference on Control and Automation MED13. IEEE, Chania, GR, June 25 - 28, 2013. DOI: [10.1109/MED.2013.6608890](https://doi.org/10.1109/MED.2013.6608890)

Abstract: This paper deals with the robust regulation of reactive power and rotor angular speed in a wind turbine driven Doubly Fed Induction Generator, which constitutes one of the key functionalities for the implementation of the future Smart Grids. The focus of the work is the application of a recent development in the theory of robust control of nonlinear systems, which combines robust feedback linearization and H-infinity linear control. The derived robust control system is compared to a traditional one making use of classical feedback linearization and PI controllers. Simulations show the effectiveness of the new approach in extending the performances of the classical feedback linearization based regulator from nominal parameters condition to the perturbed one.

Relevance to Mobincity: The paper is relevant with respect to the topic of distributed energy resources integration and management by the load area controllers. In particular, the scenario in which both charging stations and wind turbine generators are installed in a same load area represents an interesting case study that could be analyzed starting from the results presented in the paper.

The following papers have been submitted to the 52nd IEEE Conference on Decision and Control that will be held in December 2013 in Florence, Italy.

4. Di Giorgio A., Liberati F., "Residential Demand Side Management in Presence of Electric Vehicles and Renewable Energy Sources", submitted to the 52nd IEEE Conference on Decision and Control, Florence, December 2013.

Abstract: This paper presents an event driven model predictive control approach for a local energy management system, enabling residential consumers to the automated participation in demand side management (DSM) programs. We consider a household equipped with smart appliances, a storage unit, electric vehicles and micro-generation. Resources are coordinated according to the needs of maximizing self-consumption and minimizing the cost of energy consumption, in a contractual scenario characterized by designed or market indexed pricing models, with DSM options. The control action (appliances' start times, the storage charging profile and the charging process of the electric vehicles) is updated every time an event triggers the controller, such as a user request, a price/volume signal or the notification of a new generation forecast. The control framework is flexible enough to meet the real dynamics of a household and short term grid requirements, while taking into account user preferences, contractual and technical constraints. A proper set of simulations validates the proposed approach.

Relevance to Mobincity: The paper investigates an algorithm to manage the charging process in the residential context.

5. Di Giorgio A., Liberati F., Pietrabissa A., "On-board stochastic control of Electric Vehicle recharging", submitted to the 52nd IEEE Conference on Decision and Control, Florence, December 2013.

Abstract: This paper deals with the design of an on-board control strategy for Electric Vehicle recharging under the hypothesis of missing knowledge of the future energy price and the presence of vehicle to grid capability. For this purpose the charging session is modeled as a finite horizon Markov

Decision Process and the optimal charging policy is computed according to Reinforcement Learning techniques, the learning phase makes use of the revenues received when taking actions in states represented by the current level of charge, the leftover charging time and the last realization of energy price. Simulation results show the effectiveness of the proposed approach with respect to the fulfillment of driver preferences in charging and the diversification of the control action during charging for the exploitation of the vehicle to grid concept.

Relevance to Mobincity: The paper introduces a stochastic control methodology which could be considered for an upgrade of the load area controller logics.

3.1.3 Scientific work

Dissemination also happened on scientific level as it is important to reach universities and research peripheries. In that sense, Preliminary results achieved within the project have been presented in teaching activities involving Master and PhD students at the University of Rome Sapienza.

The following two Master Thesis have been developed during the first reporting period:

1. Fabio Purificato, “Metodologie di bilanciamento per la ricarica dei veicoli elettrici in ambito Smartgrids”¹, Master degree in Systems Engineering. Advisor: Prof. Francesco Delli Priscoli, co-advisor: Dr. Andrea Mercurio and Dr. Alessandro Di Giorgio.

Short description: The thesis investigates the problem of finding a proper network balance by maximizing the satisfaction of user of electric vehicles (i.e. cost minimization and respect of user preferences), maximizing the profits of network’s retailer and minimizing the costs of suppliers. Producers’ offers and consumers’ demands are collected in a central unit whose name is macro load area aggregator, which elaborates the market clearing price. The price calculated by the macro load area aggregator represents Lagrange multiplier and is used by all market players to solve their optimization primal problems. Nowadays most of the energy trading is based on Pool market. Nevertheless in this kind of market two important faults can be noticed: producers’ offers are independent each other and don’t satisfy the consumption prediction and, moreover, there might be cases of uncertainty in making market clearing price. However, the optimal solution exists and it is the only one. The thesis solves these problems throughout the Walresian balance and, in particular, tries to optimize social benefit, ensuring fairness to all grid’s actors. In practice, specific software could be easily implementable in suitable computing platform. The thesis solves the problem of the day-ahead market and it could be considered as the starting point for next researches about real time market issues.

Relevance to Mobincity: The thesis is entirely focuses on the control logics resident in the macro load area aggregator, the Mobincity module which establishes the load area targets (the references for the load area controllers) on a day ahead basis.

2. Diego Deola, “Progetto e simulazione di un sistema di controllo per la ricarica dei veicoli elettrici nelle reti di distribuzione”², Master degree in Systems Engineering. Advisor: Prof. Francesco Delli Priscoli, co-advisor: Dr. Alessandro Di Giorgio.

Short description: The thesis focuses on the load area controller’s algorithm for charging control of electric vehicles, based on *Model Predictive Control* (MPC). The thesis puts particular focus on:

- Battery modelling for control purposes,
- Solutions for an effective choice of the weights in the objective function considered by the MPC engine.

¹ The title can be translated as “Methodologies for balancing charging electric vehicles in smart grids”

² The title can be translated as “Idealization and simulation of a control system for electric vehicles charging in distribution networks”

- Solutions for avoiding power saturations.

Relevance to Mobincity: The thesis is entirely focuses on the control logics resident in the load area controller, the Mobincity module which performs the crucial task of dynamically scheduling and controlling the charging sessions.

3.1.4 Other publications and press releases

At 36th International Convention on Information and Communication Technology, Electronics and Microelectronics MIPRO, Croatian Telecom, presented the MOBINCITY Project and first project results. More than 16 different media channels, newspapers, online magazines and TV channels published articles about HT's presentation and the EVs showed (see annex B).

Media response of the HT's MIPRO presentation was vast and number of national (Vecernji list, Poslovni dnevnik etc...) and EU relevant sources (Telecompaper, Parliament Magazine etc.) covered the project and presentation.



Figure 2. MIPRO magazine article

Additionally to the print media, following online media reported about HT presentation of the MOBINCITY project:

- Telecompaper <http://www.telecompaper.com/news/hrvatski-telekom-presents-ict-solution-for-electric-cars--946330>
- Večernji list http://www.presscut.hr/web%20Sharing%20ZON/05-2013/23-05-2013/Večernji%20list%20-%20Hrvatska/Presscut_13712083.pdf
- Poslovni dnevnik http://www.presscut.hr/web%20Sharing%20ZON/05-2013/23-05-2013/Poslovni%20dnevnik/Presscut_13712389.pdf
- Vecernji.hr <http://www.vecernji.hr/biznis/elektricne-ce-aute-povezati-mobincity-clanak-558007>
- netokracija http://www.netokracija.com/ht-mobincity-50505?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+netokracija+%28Netokracija%29

- bug <http://www.bug.hr/vijesti/ht-rjesenje-elektricna-vozila/124029.aspx>
- Ictbusiness <http://www.ictbusiness.info/poslovna-rjesenja/ht-predstavio-ict-rjesenje-za-elektricna-vozila-mobincity>
- tportal <http://www.tportal.hr/scitech/tehnolo/263444/HT-razvija-europski-elektricni-auto.html>
- dnevno.hr <http://www.dnevno.hr/auto-moto/novosti/87351-ht-predstavio-projekt-mobincity-za-doprinos-koristenju-elektricnih-vozila.html>
- poslovni.hr <http://www.poslovni.hr/mobile/domace-kompanije/infografika-ovaj-ht-ov-projekt-treba-bi-pogurati-masovnije-koristenje-elektricnih-vozila-241910>
- limun.hr <http://limun.hr/main.aspx?ID=930704>

The international journal THE PARLIAMENT published an article at issue 372 in June 2013.



Figure 3. MOBINCITY Article in THE PARLIAMENT

4 Conclusions

The carried out dissemination activities, especially HT's presentation at MIPRO, created a high media response. This is remarkable, because the project is just at the beginning and essentially findings will be available within the second and third period. It indicates that smart mobility is a subject, which becomes more and more into focus of public perception. The more the project supplies results, the more it will be possible to arouse public interest. On the other hand, with ongoing of the project not only public interest can be generated, but also news, focused on specific target groups, which may be interested in a later cooperation, can and will be envisaged.

All planned activities are well on schedule:

- A leaflet originally planned for May 2013 has been created in December 2012
- First presentations on fairs and conferences have been started in October 2012
- Several publications and press releases have been published already in June 2013

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5 Outlook to next period

Following main events are planned to present project results in the next project period:

Conference/ trade fair	Venue	Date
The 21st Mediterranean Conference on Control and Automation, MED'13	Creta, Greece	25.6. - 28.6.2013
eCarTec 2013 International Fair for Electro Mobility	Munich, Germany	15.10. - 17.10.2013
Egética-Expoenergética 2013 , event specialized in the energy sector	Valencia, Spain	13.11. -15.11.2013
EVS 27 – Electric Vehicle Symposium	Barcelona, Spain	17.11. - 20.11.2013
The 52nd IEEE Conference on Decision and Control	Florence, Italy	10.12. - 13.12.2013
TRA2014 Transport Research Arena 2014, Innovate Mobility	Paris La Défense, France	14.4. - 17.4.2014
FISITA World Automotive Congress	Maastricht, the Netherlands	2.6. - 6.6.2014

Table 1. Table of planned contributions to conferences and fairs

As showed in table 1, within the next period several fairs and conferences have been selected to present the project and project results. The content of the presentations will be adapted to the state of the project. Next bigger events are ecartec and EVS27 where the project will share an own booth with FP7 project smartv2g (see www.smrvt2g.eu) which deals with communication infrastructure in a smart grid. With regard to content to Mobincity, showing both projects at one booth has financial advantages and gives the opportunity to present the link of the two projects.

6 Glossary

The glossary of terms used in this deliverable can be found in the public document Glossary_Terms.doc, available at <http://www.mobincity.eu>.

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Annex A: **Mobincity project flyer**

The contents of this annex are included in a separated document with the title D8.4 annex A Mobincity Project Flyer

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Annex B: MIPRO presentation

The contents of this annex are included in a separated document with the title “D8.4 annex B HT MIPRO Presentation”

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