DELIVERABLE

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Smart Charging Station Upgrades

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Peer Review

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CONTENTS

1 EXECUTIVE SUMMARY

The project ICT4EVEU contains the development of new services that influence the functionality of the charging stations.

Beside the functionality there is also a technical adaptation based on the electrical charging equipment. This paper describes the changes and adaption in the charging equipment within the different pilots that is necessary for meeting the actual needs of the users (fast charging stations and connection to IMS). Furthermore, it shows the increasing numbers of charging stations in the pilots in preparation for greater e-mobility uptake.

This paper describes the increasing numbers of high level smart charging stations.

2 INTRODUCTION

2.1 Objective of document

This document concentrates on the actual status of the hardware and software of the smart charging stations and the necessary upgrades to fulfil the objectives of the ICT4EVEU project.

This paper does not describe specific hardware and software specifications as they are defined in other deliverables such as *D1.3 Pilots Components and Requirements Identification* or *D2.1 GMS-IMS architecture.*

2.2 Content and structure of document

To reach the objective of the document, this paper is structured in the following way:

- The status of the charging stations in the different pilots is described individually based on the number of stations and operators (if there is more than one) and the technical development concerning the project objective. Information regarding the status of the Infrastructure Management Systems (IMS) in each of the different pilots is also provided.
- A summary conclusion.

3   FRAMEWORK CONDITIONS

This document reflects the actual status as of July 2014 with the outlook for the end of the project by December 2014. At the time of delivery the project is in month 31 of 36. The project is now in its evaluation phase.

This report concentrates on the hardware and software of the installed or planned charging stations and does not cover other topics regarding functionality or software and communication requirements.

4   BRISTOL PILOT STATUS

The "Description of Work" (DOW) stated that the Bristol pilot would start the ICT4EVEU project with 40 intelligent charge points. These units were provided through a separate source of funding that Bristol City Council had secured. The majority of installations were Chargemaster two sockets (type 3 13A and type 2 32A), wall mounted units that were placed in Bristol City Council's public car parks.

Bristol City Council additionally submitted a successful joint council bid for £343,000.00 worth of infrastructure funding from the Local Sustainable Transport Fund (LSTF). This funding covers the purchasing of intelligent charge points, their installation as well as electricity costs. As a result of this funding the different local authorities formed a consortium called Source West.

In 2013 Gloucestershire County Council joined Source West bringing their own LSTF funding. It was agreed that all of the Source West charge points would be used in the Bristol pilot of the ICT4EVEU project to offer greater regional coverage.

Presently there are 83 charge points showing on the Source West website's charge point map. By the end of December 2014 there will be 150 charge points.
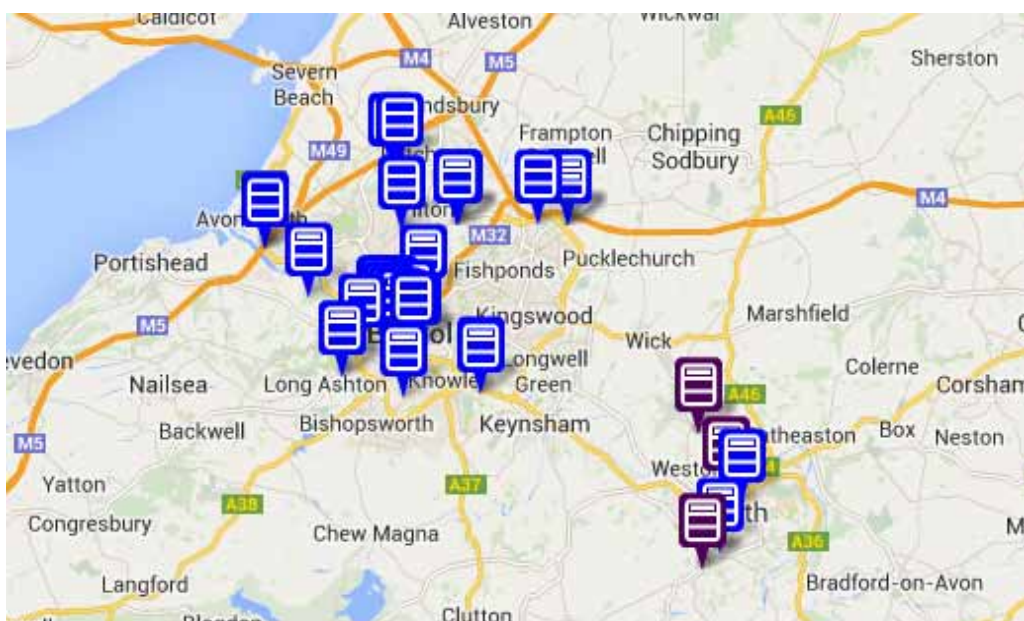

Figure 1 Source West charge points by July 2014

These charge points are a combination of wall and post mounted Chargemaster, Elektromotive, APT and PodPoint units. The charge points have a type 3 3-pin 13A socket and/or type 2 Mennekes 32A socket. By December 2014, 138 of these points will be connected to the IMS, have the latest software release and will be updatable. 106 of these points are remotely updatable.

Source West has also been successful in obtaining funding for 18 fast/rapid charge points. Rapid charge points have a charge of 50 kW (400V/125A) and fully charge a compatible electric vehicle between 20 and 30 minutes. The rapid charge points have three connectors, AC43 (AC mode 3 type 2), CHAdeMO (DC) and Combined Charging System (DC). Between 6 and 18 units will be installed by the end of December 2014.

A further 53 charge points including the remainder of the remaining rapid charging points will be installed across the Source West region after December 2014. The "standard" charge points will have a type 3 3-pin 13A socket and/or a type 2 Mennekes 32A socket. The fast/rapid charge points will have three connectors, type AC43 (AC mode 3 type 2), CHAdeMO (DC) and Combined Charging System (DC). All of these will be connected to the IMS.

This will bring the total number of Source West charge points to 203.

The UK model is a pluralistic one with different suppliers and network operators all providing charging stations. The challenge for the Bristol pilot is to coordinate this effort and provide a single software gateway into these networks. Therefore, Source West's entire charge point infrastructure has the ability to connect to a third party network CPMS from Charge Your Car (developer of the Bristol pilot's GMS). The Charge Your Car System has been designed to communicate directly with electric vehicle charging built to OCPP V1.5 and to non OCPP equipment via customised Application Programming Interfaces (API).

5 LJUBLJANA/MARIBOR STATUS

In Ljubljana and Maribor, the Infrastructure Management Systems (IMSs) are in operation and several charging stations are already connected to the IMSs.

In the Maribor and Ljubljana region, there are 35 charging stations available – four of them are fast DC charging stations, all other are "standard" AC charging stations. The DC stations have Schuko and/or Mennekes type sockets. The AC charging stations have CHAdeMO and/or Mennekes type sockets. There are 25 charging stations which are connected to the IMS. All AC charging stations which are connected to the IMS are remotely updatable and have the latest software release.

It is planned to install 5 new charging stations after December 2014. It is expected that three of these stations will each have two Mennekes type sockets and two stations will each have Schuko and Mennekes type sockets. All of these stations will be connected to the IMS allowing the stations to be remotely updatable. None of these stations are fast/rapid charging points.

The charging stations locations involved in the pilot are shown on the below maps of the Maribor and Ljubljana region:
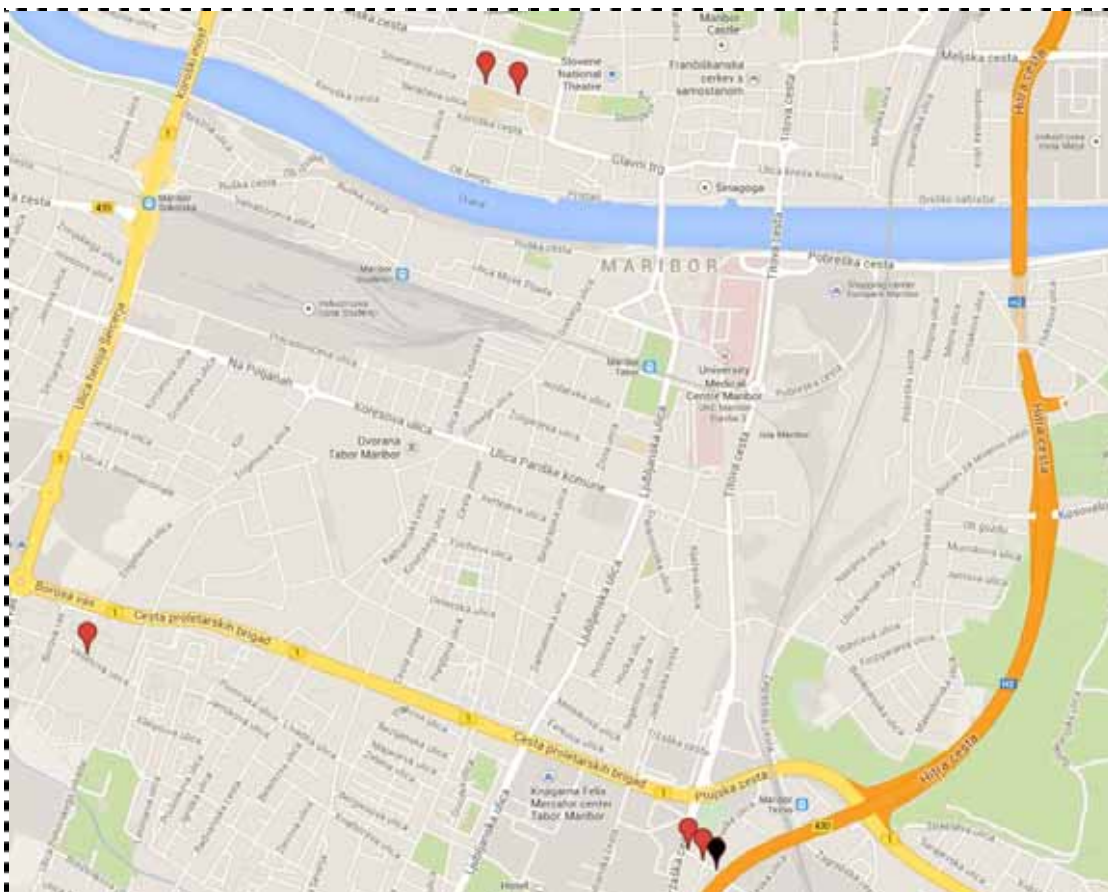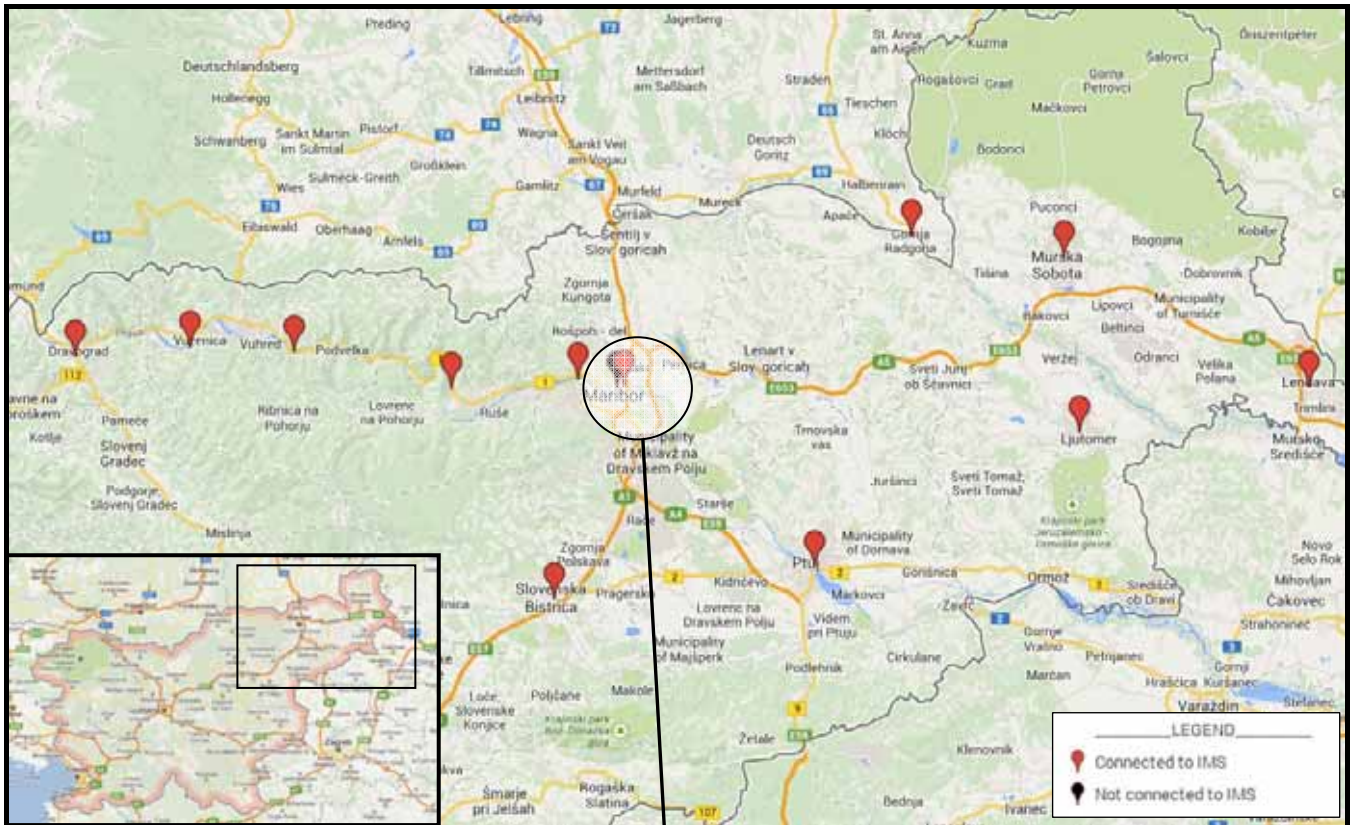
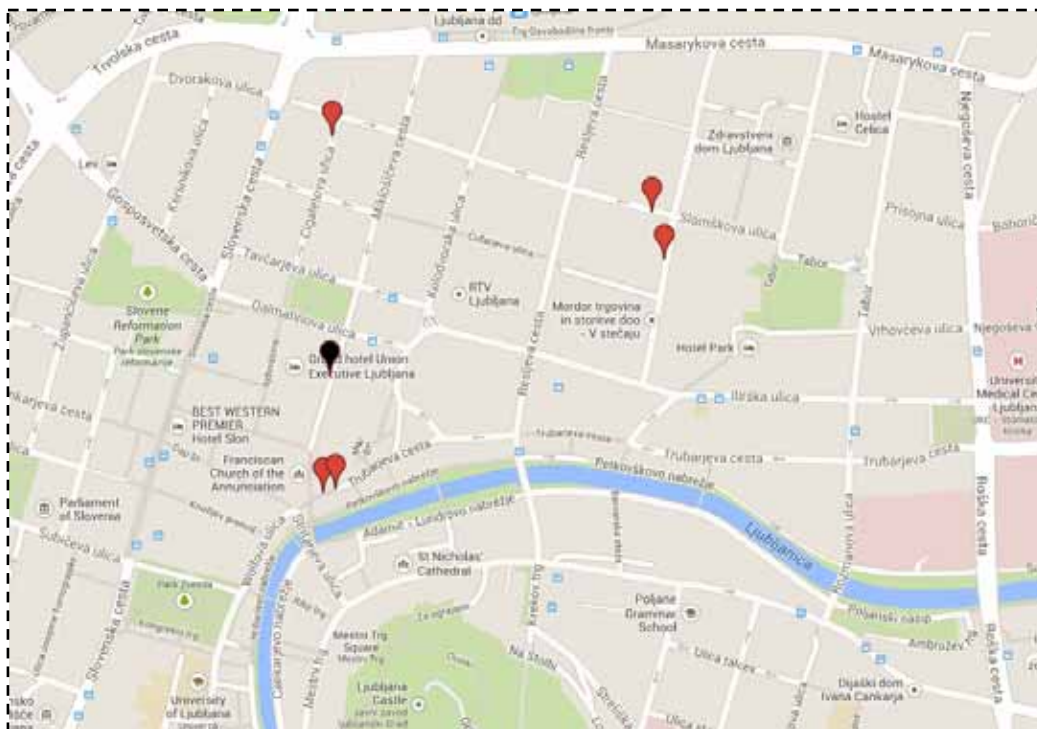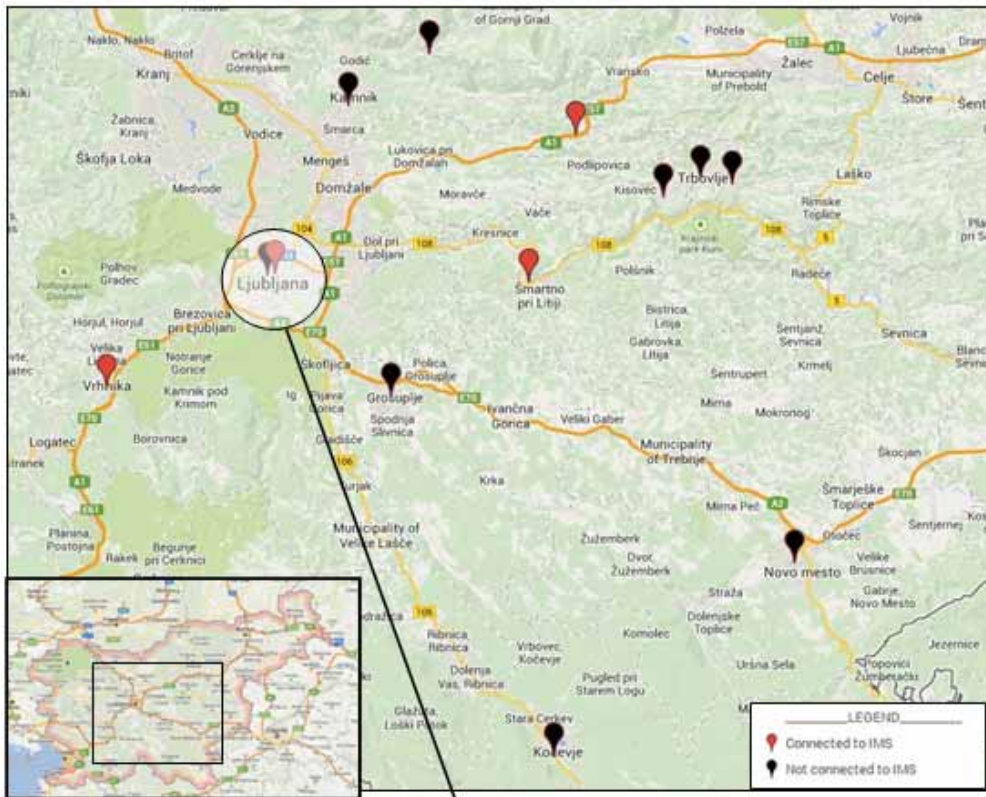Figure 2: Charging stations in Maribor region

Figure 3: Charging stations in Ljubljana region

6   PAMPLONA/VITORIA STATUS

In Pamplona and Vitoria, the IMS and charging stations belong to different operators, and thus are being analyzed independently.

In Pamplona, the IMS and the charging stations are operated by the company Iberdrola. There are currently 4 public charging stations. At the end of the project by December 2014 there will be 12 charging stations. Each station has two sockets (one Schuko and one Mennekes). All of these charging stations are connected to the IMS, with the latest software release and are remotely updatable. None of these stations are fast/rapid charge points.

The complete hardware used in these charging stations and their internal schematics can be found in Chapter 6.2 of D1.3 Pilots Components and Requirements Identification.

They are all capable of establishing a communication with Iberdrola's IMS via a 3G/GPRS modem and the higher level protocol OCPP (Open Charge Point Protocol), which is described in Annex 1 of D1.2 Pilots technical and services design and evaluation of design report.

After December 2014 Iberdrola intends to install between 2 and 10 more charging stations, which will have Schuko and Mennekes type sockets, as above. The stations will be connected to the IMS and will be remotely updatable. Some of these new stations will be fast/rapid charging stations.
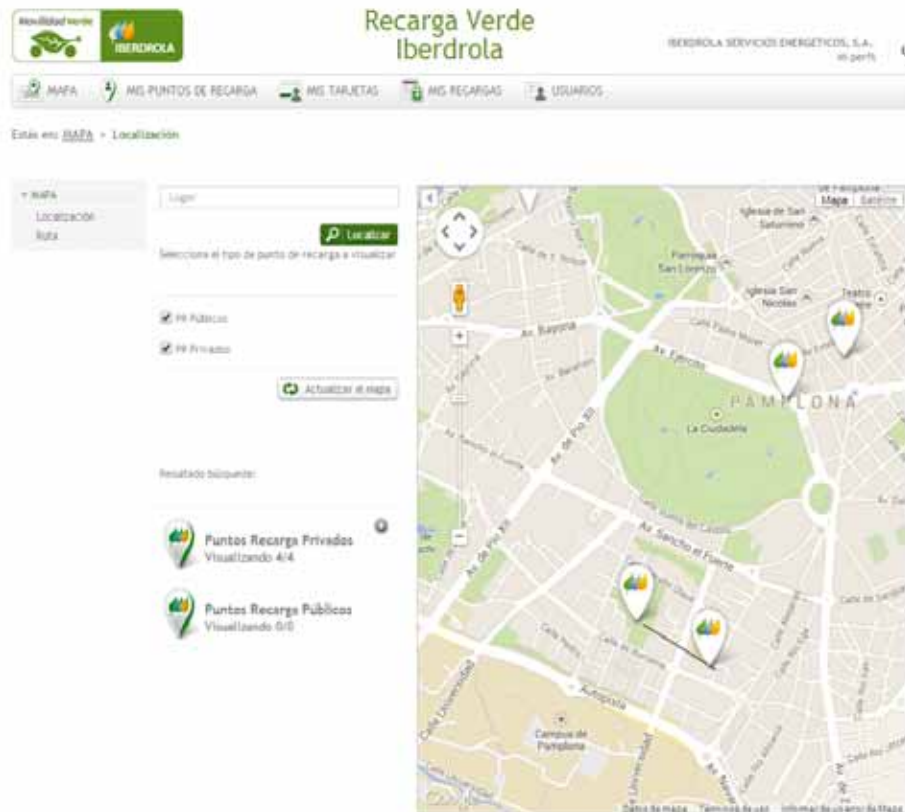
Figure 4 Charging stations in Pamplona

The IMS from Iberdrola has been implemented according the description given in chapter 3.1 of D2.1 GMS-IMS architecture of the pilots.

In Vitoria, IBIL operates 9 charging stations which contain all the necessary equipment to interact with IBIL's IMS, as described in chapter 6.3 of D1.3. One of these stations is a fast/rapid charge point.

They are all capable of establishing a communication with IIBIL's IMS via a 3G/GPRS modem and the higher level protocol OCPP (Open Charge Point Protocol). All stations have the latest software release and are remotely updatable.

These stations were put in service between August 2011 and July 2012, and they integrate all necessary components to service EV users and bill for the supplied energy. No additional charging stations are planned to be installed.
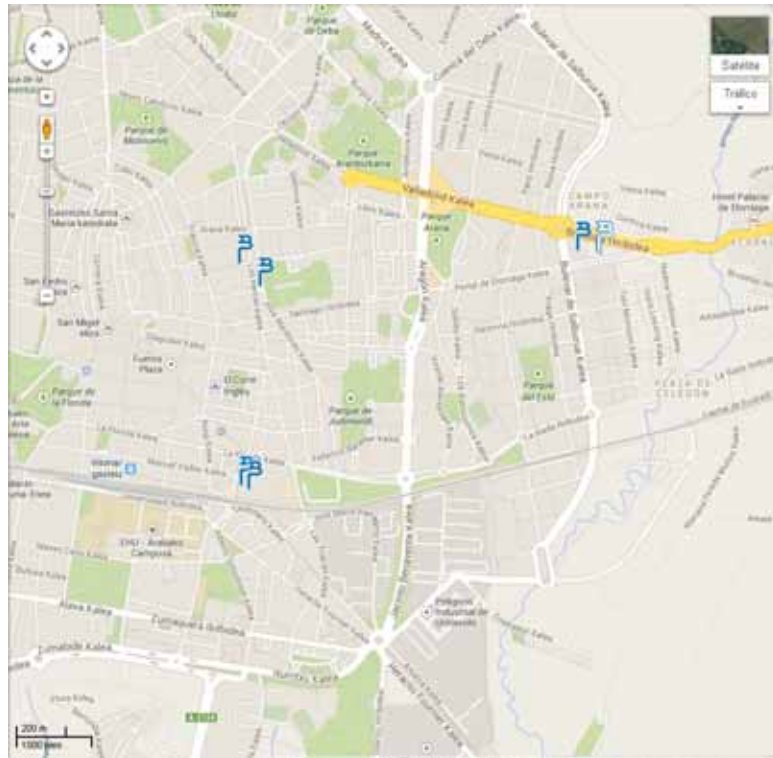
Figure 5 Charging stations in Vitoria

The IMS from IBIL has been implemented according the description given in chapter 3.1 of D2.1 GMS-IMS architecture of the pilots.
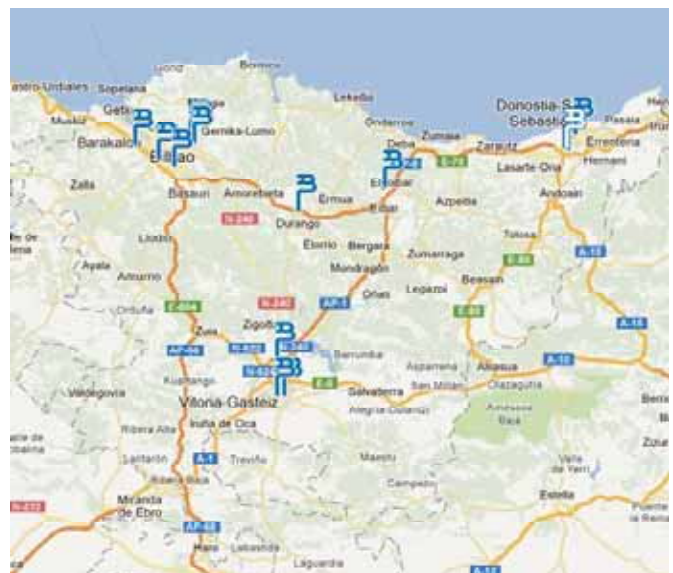

Figure 6 IBIL charging stations in interactive map

The IMS from IBIL has been in operation since February 2012 and controls over 150 charging stations spread across Spain.

Both IMSs will be able to communicate between each other via a GMS, which is being developed by the company Tecnalia, upon an agreed specification from IBIL and Iberdrola.

7 SUMMARY

This chapter summarises available charging stations by December 2014. It is also shown how many of these charging stations will be connected to an IMS, will have the latest software release and will be updatable.

Number of charging stations:

- Bristol (UK): 150 charging stations
- Ljubljana/Maribor (SLO): 35 charging stations
- Pamplona/Vitoria (ESP): 21 charging stations
- Sum of all: 206 charging stations

Number of charging stations connected to an IMS:

- Bristol (UK): 138 charging stations (92 %)
- Ljubljana/Maribor (SLO): 25 charging stations (71 %)
- Pamplona/Vitoria (ESP): 21 charging stations (100 %)
- Sum of all: 184 charging stations (89 %)

Number of charging stations which have the latest software release:

- Bristol (UK): 138 charging stations (92 %)
- Ljubljana/Maribor (SLO): 22 charging stations (63 %)
- Pamplona/Vitoria (ESP): 21 charging stations (100 %)
- Sum of all: 181 charging stations (88 %)

Number of charging stations which are updatable:

- Bristol (UK): 106 charging stations (71 %)
- Ljubljana/Maribor (SLO): 22 charging stations (63 %)
- Pamplona/Vitoria (ESP): 21 charging stations (100 %)
- Sum of all: 149 charging stations (72 %)

8 CONCLUSION

Within the pilots there is an intensive on-going process of adapting the existing charging stations to the latest standardised developments. These adaptations not only cover the installation of up to date electrical components but also the realisation of software for the charging stations to make them "smart" as defined in the deliverables.

Making the charging stations of the pilots "smart" also realises the integration of the charging stations into the IMS including the communication between charging station and IMS. As analysed in chapter 7 the bulk of the charging stations of the pilots is connected to an IMS, has the latest software update and is remotely updatable.