Deliverable 3.10

ICT Standards & Protocols 2

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List of Abbreviations

ANSI	American National Standards Institute
API	Application Programming Interface
B2B	Business to Business
B2C	Business to Consumer (aka: Business to Customer)
CA	Consortium Agreement
CDR	Charge Detail Record
CEMS	Customer Energy Management System
CH	Clearing House
CMS	Charge Management System
DoW	Description of Work (Annex I of Grant Agreement)
DSO	Distribution System Operator
EDI	Electronic Data Interchange
eMA ID	electromobility Account ID (as defined by eMI3)
EOC	End of Charge
ESB	Electricity Supply Board
EV	Electric Vehicle
EVCC	Electric Vehicle Communication Controller
EVCOID	Electric Vehicle Contract ID
EVSE	Electric Vehicle Supply Equipment
EVSEID	Electric Vehicle Supply Equipment ID (Charge Point / Unit)
EVSP	Electric Vehicle Service Provider
G4V	Grid for Vehicle (EU research project)
GeM	Green eMotion
HMI	Human Machine Interface
ICT	Information and Communication Technologies
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardisation
IT	Information technology
ITS	Intelligent Transportation System
KPI	Key Performance Indicator
LoI	Letter of Intent
MPO	Metering Point Operator
MSP	Measurement Service Provider

NA	Not Applicable
NFR	Non Functional Requirement
NPE	Nationale Plattform Elektromobilität (German initiative)
OCPP	Open Charge Point Protocol
OEM	Original Equipment Manufacturer, i.e. Electric Vehicle manufacturer
PHEV	Plug-in Hybrid Electric Vehicle
PLC	Power Line Communication
PoD	Point of Delivery
RES	Renewable Energy Source
RFID	Radio Frequency IDentification
SDR	Service Data Record
SECC	Supply Equipment Communication Controller
SLA	Service Level Agreement
TC	Technical Committee
TSO	Transmission System Operator
UID	Unique Identifier
UML	Unified Modelling Language
V2G	Vehicle to Grid
V2H	Vehicle to Home
VIN	Vehicle Identification Number
VPP	Virtual Power Plant
W3C	World Wide Web Consortium
WP	Work Package

1 Executive Summary

The impact on standardization is one major key indicator for the success of the GeM project.
Therefore, we decided to change the path outlined in D3.9[1], restructured the work in close cooperation with WP7 and initiated the formation of the eMI3 – eMobility ICT Interoperability Innovation group with the clear vision to solve the market needs with broader participation than in GeM and without the time limit of a project.
The major achievements of this WP3 task are:

- Agreement on the unique identifiers EVCO-ID and EVSE-ID on a broad international basis with contribution to ISO 15118 and further refinement in first eMI3 specification
- Cooperation with DKE, NEMA, IEC and eMI3 to develop and bring forward the NWIP for EVSE communication protocol to IEC TC57 and RFID card standardization with NWIP and IEC PT 62831
- Report the lessons learned from the demonstration projects for further inclusion into standardization
- Extend the view on smart charging introducing an innovative way to cost efficiently provide a large charging infrastructure with Lean (Smart) Charging
- Establish and maintain close links, cooperation and contribution with WP7
- Supporting the eMI3 formation with structure, technical work and results to close the gap between standardization and interoperability
- Proposals to overcome limitations in cooperation for fast (industry) standardization and outlook for possible future developments

Recommendations have been prepared reaching partly far beyond GeM:

- Further support cross sector interoperability and standardization resp. industry specifications in cooperation with eMI3.
- Stimulate formation of a common ITS platforms for better cooperation and interoperability by focusing on the B2B ICT service infrastructure platform
- Alternative solutions for EV charging eco systems with Lean (Smart) Charging - a use case controlling the charging via the OEM backend – EV connections without expensive charging stations.
- Overcome limitations from competition on individual, company and society level introducing the upcoming belief model holism with its impact on standardization

[1] http://www.greenemotion-project.eu/dissemination/deliverables-ict-solutions.php

Introduction

Beyond the success of the solutions developed, implemented and demonstrated within the Green eMotion project the subject here is the future impact of GeM on the European EV eco system. The challenge is how to profit best from the investments made and how to help shape the future based on the GeM results. ICT standardization is one of the major "vehicles" to meet this challenge and this deliverable describes the progress made focusing on the ICT interfaces, protocols and identifiers for business objects and the coordination with work performed with WP7.

1.1 Planned Tasks and Progress after D3.9

The deliverable D3.9[2] was written with a focus to describe the "now" status and the first steps and methods needed to develop missing ICT standards for the EV eco system. As Task 3.8 relied strongly on the deliverables D3.5[2] and D3.6[2] the partners decided to update the timeline and split Task 3.8 into three phases: now, next and future (see D3.9).

Taking into account the results of the review of the deliverable D3.9 the WP3 team strived for a more effective standardization as GeM itself had a limited project duration and coverage of countries and charging stations installations. In July 2012 major partners led by Daimler and Renault initiated a two day workshop in Berlin inviting many relevant EU EV players. There, they decided to form a new industry eMobility organization called eMI3 (eMobility ICT Interoperability Interest group) to bring together all the relevant partners from the different industry sectors.
Silvio Weeren, as task leader 3.8., was elected to setup the group and developed with a core team a Letter of Intent as an agreed bases.

In the WP3 meeting Sep 2012 in Rome, the team reviewed the recommendations from the D3.9 EC review and discussed the strategy for the next phases 2a and 2b and the relationship to the forming eMI3 group.
Three decisions have been taken:

1. Efforts are best invested by bringing in WP3 output directly to external groups: eMobility ICT Interoperability Interest Group (including other EV projects) which will work out recommendations for standardization, ISO / IEC standardization, CEN Adhoc Group Smart Charging of EVs and others as applicable.
2. The planned formal deliverables for Phases 2a and 2b will be omitted and the input to and progress of the above groups will be reported within the deliverables D7.2 2nd and 3rd edition.
3. Deliverable D3.10 unchanged

More details are described in the chapter 0

1.2 New Tasks and Progress Planning for D3.10

The original DoW listed for D3.10: Description of selection of ICT standards and protocols that are relevant to the marketplace system in second version.
This has been changed to the processes listed in this document and documented in the monthly reporting.
Thus, the main contents of D3.10 is a mixture of WP7 and eMI3 activities.
One early example is that eMI3 became one of the new focus areas of WP7 as part of task 7.5. An identified issue was the EVSE – EVSE backend communication which was not standardized and WP7

[2] http://www.greenemotion-project.eu/dissemination/deliverables-ict-solutions.php

was working towards a NWIP (New Work Item Proposal). eMI3 has invited OCPP and was working towards the formation of a new working group to standardize this communication in concert with the other activities. For more details see chapter 2.1.

1.3 Relationship of GeM and eMI3

Key GeM partners have initiated the formation of eMI3. GeM itself and quite some GeM partners became eMI3 members but as organization eMI3 is broader than GeM and completely independent.

As a result of the decisions from Rome, ICT standardization issues arising in GeM are discussed in WP3 with WP7 and, if appropriate, are effectively transferred to eMI3 for further consideration and resolution. Thus eMI3 efforts are treated as GeM WP3, WP5 or WP7 efforts respectively approved by the project coordinator. This has also been communicated in the Periodic Progress Report Year 2.

2 Cooperation with WP7

Since Workpackage 7 is concentrating on standardization issues arising in other GeM workpackages, people working in WP3 standardization topics worked closely together. Upcoming issues were discussed and brought into the proper standardization bodies and associations. This chapter describes the topics which were handled jointly and are also briefly covered in D7.8.

2.1 NWIP EVSE Communication Protocol

During January 2013, at the Tech Board meeting held in Málaga (SPAIN), a technical parallel session was held among WP7 task leaders together with ENEL, RWE, Siemens and Bosch. The objective of the meeting was to develop a working plan for analyzing the requirements of communication among EVSE and its backend systems.
It was agreed that this was a very relevant topic towards interoperability of EV. The aim of this activity was defined as follows: to elaborate a new work item proposal (NWIP) for standardization bodies on communication messages. This proposal focused on the content of this interface, not on the specific protocol to be used. Partners in Task 7.5 decided to identify the information needed to ensure interoperability, and later write it down in a proposal form to be addressed to the IEC.
A second working meeting was organized, and later held by Siemens in Munich on March 2013. During this meeting the specific requirements to be included in the communication protocol were identified. In this meeting participated Green eMotion partners from WP3, 4, 5 and 7.and relevant external stakeholders. A full list of requirements was defined, and the next steps of preparing the NWIP were planned.
During the following three months, CIDAUT, Siemens and RWE prepared the NWIP form that was later agreed among all WP7 partners. This document, together with the recommendation of addressing the National bodies to start the formal process to create a working group was sent to eMobility ICT Interoperability Innovation Group[3] (eMI[3]).
The decision to hand over the work to eMI[3] was taken to enlarge the number of industries involved, as well as to make sure that the process continued at the end of Green eMotion life.
eMI3 then acknowledged the Green eMotion proposal and established a new working group “WG5” on the topic communication protocol. The group is led by Joost Laarakkers (TNO), who has taken over this work a part of his Green eMotion commitments.
The group decided to improve the NWIP by preparing an annex document which could later be used for a more sophisticated NWIP to the IEC. This annex document shall provide requirements and use cases for the upcoming protocol.

Since a Chinese NWIP partly relating to the topic of the GeM/NWIP topic came up, discussions in GeM and eMI3 came up regarding speeding up handing in the NWIP in an updated version.

eMI3 WG5 since then updated the NWIP “Electric Mobility Infrastructure Open Protocol” (EMIOP) document, updated the annex document for the NWIP and plans to handing in the NWIP to IEC TC57 (Smart Grid). A preliminary version was handed to TC57 and was discussed during the November 2014 TC57 meeting in Tokyo. It was well received there and the TC 57 convener asked eMI3/GeM to make minor changes and hand in the NWIP.

During the December TC69 meeting the Chinese NWIP was discussed. According to the ballot the Chinese NWIP was accepted, but due to a lack of experts and the planned TC57 NWIP, it was decided to not pursue the Chinese NWIP at once but rather expect TC57 and TC69 to create a joined working group on this topic.

[3] http://emi3.org/

2.2 Experience from Demonstration (Roaming / Search of EVSE)

The chapters in this section present remarks and lessons learned during the implementation and demonstration of the following services:

- Basic charging with roaming
- Basic charging with charging app and remote start
- Search and find of EVSE

2.2.1 Unique IDs

A number of research projects with focus on information and communication technology (ICT) for electric mobility revealed the need for inter-organizationally standardized identifiers of selected entities around an electrically motorized individual traffic (E-Mobility). In particular, the charging and discharging of Electric Vehicles (EV) at an Electric Vehicle Supply Equipment (EVSE) requires a fundamental set of identifiers that are guaranteed to be unique beyond organizational borders (“global”).
Considering the two main communication scenarios in relation with EVSE, the unique identification of the following entities is required or useful for efficient inter-organizational E-Roaming processes: E-Mobility Operator (Contract), EVSE Operator (EVSE). Additionally, for reservation of EVSE (modus: “reserve one, select any”), an aggregation of EVSEs (“Pool”) should be identifiable globally. Due to different types of ID tokens, the actual token type needs to be specified.

In order to guarantee the uniqueness of these identifiers, a central issuing authority and coordinated assigning process is needed (see chapter 2.2.4)

Afterwards an overview about the relevant identifiers is given:

The VIN (vehicle identifier number) is already established within the car manufacture industry and is globally valid and unique. The VIN is valid for ICE (internal combustion engine cars) as well as for electrical BEV (battery electrical vehicle) and hybrids like PHEV (plug in hybrid electric vehicle). One vehicle can only have one VIN.
To identify the charging point the EVSE ID (electric vehicle supplier equipment identifier) is established in the e-mobility branch. E-mobility related standards like ISO/IEC 15118, projects like Green eMotion / eMI3 and also roaming platforms like e-clearing.net and Hubject are based on this identifier. The EVSE-ID will be used in all relevant e-mobility processes like charging of EV, search of EVSE or reservation of EVSE. An EVSE-operator can have several EVSEs, but one EVSE can only belong to one EVSE operator.
The Electric vehicle contract ID (EVCOID) is the corresponding data field to the Contract ID, which is defined within ISO/IEC 15118-1. The EVCOID will be used in all relevant e-mobility processes where the EV-Driver or and EVSP customer is involved. This is the case for e.g. charging of EV, reservation of EVSE. The Electric vehicle contract ID will be provided by the EVSP. An Electric vehicle contract ID reflects the B2C business relationship between the EVSP and the EVSP customer. An Electric vehicle contract ID can only be linked to one EVSP and one EVSP customer. But an EVSP can have several EVSP customers and therefore also several Electric Vehicle contract IDs. Also, the EVSP customer can have several Electric Vehicle contract IDs with the same or different EVSP.
The PoD (Point of Delivery) ID is the grid connection point for the EVSE. The PoD is the substation (transformer station) where the power from the low voltage grid is distributed to the EVSE. Today no standard for the identification of the substation is established. To one POD ID several EVSE can be connected. But one EVSE can only be connected to one PoD.
All sub-station in a geographical area a located to a local area grid connection. This connection point can be identified with the load area ID. Today no standard for the identification of the load area grid point is established.

2.2.2 EVSE-ID

The defined structure of the EVSE-ID has been developed during the GeM project-time. The alliance with the eMI3 and ISO/IEC 15118 has resulted in several documents and publication which have been used by the GeM implementation partners.
The relevant documents from the above mentioned projects/organizations are not 100 % aligned. Some different interpretations/implementation have been made and led to some adjustments during the demonstration.
Structure of EVSE-ID corresponding GeM D3.6
EVSE ID (Country Code -, two character country code according toISO-3166-1 (Alpha-2-Code),
Spot Operator ID - 3 alpha / digits), Power Outlet ID (1-32 digits)

Structure of EVSE ID corresponding DIN Spec 91286

- <Country Code> "*" <Spot Operator ID> "*" <Power Outlet ID>
- <Country Code>: 1 - 3-digits, numeric country code according ITU-T E.164:11/2010
- <Spot Operator ID>: 3-6- digits, numeric ID spot operator (EVSE-Operator)
- <Power Outlet ID>: 1-32-digits ID for charging point with digits or separator "*"
- Example: „+49*123*456*789"

Structure of EVSE-ID corresponding ISO/IEC 15118-2 Annex H

- EVSE-ID (Country Code – 2 alpha, two character country code according to ISO-3166-1 (Alpha-2-Code), Spot Operator ID – 3 alpha / digits, Power outlet (1-32
- Country Code> <S> <EVSE Operator ID> <S> <ID Type> <Power Outlet ID>

<Country Code>: 2-character country code according DIN EN ISO-3166-1 (Alpha-2-Code)
<S>: "*" as separator
<EVSE Operator ID>: 3-characters, alphanumeric ID spot operator (EVSE-Operator)
<Power Outlet ID>: 1-31-characters alphanumeric ID for charging point
Example: „FR*A23*E45B*78C"

- **The country code** was changed from numeric (e.g. "49") ***to alpha (e.g. "DE"). This change was done*** due to the fact that the EVSE-ID should have the same country code characteristic as the EVCO-ID.
- **Spot operator ID** length was changed from 3 to 6 digits. The extension was necessary to ensure the possibilities to register a high number of EVSE operator
- **ID-Type** has been added, for EVSE the ID-type is "E" defined by eMI3 and ISO/IEC 15118.
  The "E" was defined to differentiate an EVSE-ID from an EMA-ID (or EVCO-ID). As both are structured similar (at last in the eMI3 definition) without an "E" it would not be possible to distinguish them.
- The EVSE-ID was not fully transferred to ISO so currently the E is only mandatory for EVSE-IDs and at the same time there is no prescription what characters can be used for the EMA-ID.
- **Power Outlet ID** is only allowed to be with pure digits in latest version.
  Length cut from 32 to 31 in length and only digits and characters are allowed.

In the Green eMotion demonstration phase we have seen all mentioned implementation structures. This has occurred due to several reasons:

- Charging Management system was already implemented and an internal proprietary solution has been used
- Implementation based on different standards like ISO/IEC vs. DIN

For the planned European wide roaming scenario an unique and aligned IT standard for the structure of the Business objects EVSE-ID and EVCO-ID including the operator IDs are absolutely necessity.

2.2.3 EVCO-ID

The Contract Identifier EVCO-ID (also known as eMA ID) describes the method for uniquely identifying the EV user's contract for the usage of EV services like charging an EV.
The EVCO-ID is described by the Green eMotion Deliverable D3.6[2], eMI3 first specification and standardized in ISO/IEC-15118.

The syntax of a Contract-ID is:

<EVCOID> = <Country Code> <S> <Provider ID> <S> <ID Type> <ID Instance> <S> <Check Digit>

This syntax is based on DIN SPEC 91286 (2011), from where it was adapted by ISO/IEC 15118 and extended for further international use.

There are currently different implementations in the market, some make use of the check digit, some not. These minor differences are currently addressed within eMI3 and the ISO/IEC 15118 user group. The user group describes how to best implement ISO/IEC 15118 for maximum interoperability.

The EVCO-ID plays a major role for interoperability of systems and is the key to enable roaming in the EV market. An EVSE operator can easily tell to which EVSP a customer belongs to and whether there is a proper roaming agreement available for this customer.

Currently there is an IEC project team (IEC PT 62831) defining interoperable RFID cards and NFC technology for authentication of EV drivers at charging stations. This approach also makes use of the EVCO-ID as the unique identifier.

Also several Smartphone Apps use the EVCO-ID as the unique identifier.

2.2.4 Registration Organization for Provider IDs

In order to guarantee the uniqueness of these identifiers, a central issuing authority and a coordinated assigning process is needed. In some countries (e.g. Austria, France, Germany and the Netherlands) a country wide organization to coordinate the registration of provider ID is established. On a national level the provider ID must be unique while globally the provider ID is only unique with the country code.
For an European wide e-Mobility roaming scenario in each country an organization to coordinate the Provider IDs or alternative an European wide organization (e.g. eMI3) is necessary.
In the following countries a Registration Organization is already established:

- Austria -> Austrian Mobile Power (www.austrian-mobile-power.at/tools/id-vergabe)
- France -> Gireve (www.gireve.com)
- Germany -> BDEW (https://bdew-emobility.de)
- Netherlands –> (www.eviolin.nl)

2.2.5 Session-ID Handling

To identify the charging session a unique session ID will be used by each e-Mobility partner.
Within the GeM demonstration phase the EVSE-Operator Session-ID has been used. For the operational process within the charging management system the EVSE-Operator session ID will be used and transferred, within the relevant process steps, charging service. The length of the session-ID has been defined to be 32 characters.

Within the demonstration phase it was noticed that not all connected IT backend / charging management systems have considered the defined length and corresponding adjustments, e.g. adaption of the interfaces that have been implemented.
It has been observed that also the other e-Mobility actors, like EVSP or clearing house, can operate their own Session-ID.
The EVSP can create an own session ID within the EVSP backend system, this is for example the case when the EVSP initiate the charging request e.g. with an EVSP charging app. The EVSP will send the EVSP charging session ID within the relevant process steps to the e-Mobility partner, like EVSE-Operator. The handling of the EVSP ID was not part of GeM.

To track the interactions within the clearinghouse the clearinghouse can create an own clearing house session ID and the clearinghouse can also forward this session ID to the relevant e-Mobility partner. The handling of the clearinghouse session ID was not part of GeM.

2.2.6 Charging App

The EVSE-ID and EVCO-ID were the fundamental elements for the GeM charging App. For the remote start of the charging session the relevant CMS system has been identified with the EVSE-ID. The clearinghouse forwarded the EVCO-ID from the EV Driver to the relevant CMS in order to start the charging session on the relevant charging station identified with the EVSE-ID.

2.2.7 Search of EVSE

The service “Search of EVSE” is based on the EVSE-ID. The static data (e.g. charging station address and technical information like charging type) and also the dynamic data (e.g. actual status of the charging station) has been forwarded from the relevant Charging Management System to the Service “Search of EVSE”. The EVSE-ID was a mandatory field and the key element to integrate the delivered data and necessary for a centralized handling of charging stations (EVSEs).

2.3 RFID Standardization - NWIP and IEC PT 62831

RFID cards have been in use for several year as a simple, cheap, and convenient method for identifying users or user’s contracts e.g. in public transport. So, most producers of EVSEs thought of RFID cards as a suitable method for authentication of users for charging at an EVSE. Most RFID cards are based on the ISO 14443 standard, cards and readers are widely available and cheap. Furthermore users are used to work with contactless cards from their daily life.
Consequently a lot of different energy suppliers, municipalities and other companies, acting as service providers, started to hand out RFID-based customer cards for the use at the charging stations operated by themselves. This worked well until EV drivers wanted to drive outside the boundaries of the EVSE locations of their energy provider. This reality became very quickly, since the autonomy of the EVs available was increasing.
An example is the situation in Denmark by 2012. Two major players were on the market of operating EVSEs: Better Place and ChooseEV (now “Clever”) and they faced the same issue: customers finding enough EVSEs but they were not able to use the chargers of the other company.
Companies were then and are now mostly using the serial number of an RFID card as an identifier. This works well as long as the whole system, handling the customer contracts and in the same time the EVSE operation, is in one hand. In the case the two roles are independent, meaning the EVSE operating system is different from that one handling the customer contracts, the EVSE operating system would have to check with all potential partners for a valid customer contract.
In 2012 Better Place therefore proposed a solution of this problem to the Green eMotion WP7 partners. Their proposal described an approach away from using the serial number of an RFID – the so called UID – but to have specific data in the memory area of the RFID card. Any RFID reader following this approach

would be able to find out whether a RFID card used at an EVSE is suitable for the charging process in general. Furthermore there is also information available about who has issued the card and about the underlying contract. In addition the proposal also addressed security issues with the existing RFID cards and proposed ways around those issues.
As a next step Better Place handed their concept document - in the form of a new work item proposal (NWIP) - to the IEC. In a ballot following the review period of the document, the members of the IEC agreed in fall 2012 to pursue the standardization of this topic. The name of the upcoming standard was chosen to be “User identification in Electric vehicle Service Equipment using a smartcard” – IEC PT 62831.
Better Place was named to lead the project team. But due to the financial turmoil and the following bankruptcy of Better Place the work did not start.
Beginning 2013 the German DKE offered to take over as an interim lead and the work progressed there in the group DKE AK 353.0.8 "Nutzerautorisierung für Ladeinfrastruktur" (German for “user authorization in EVSEs”). The group continued working on the Better Place proposal, enhancing it with now standardized information like the electrical vehicle contract ID (EVCOID) and new means of identification like NFC enabled smart phones. Also, a security team joined the group to ensure security needs. Several Green eMotion partners (e.g. Bosch, IBM, RWE, Siemens) have joined the work there to continue the Green eMotion effort.
Meanwhile in the US, the standardization body NEMA also continued to improve the original proposal. They presented an enhanced version of the original Better Place proposal to the eMI3 group which was consequently handed over to the DKE group. It is currently been analyzed by the experts of the DKE group and if suitable will be merged into the ongoing work.
In September 2014 IEC TC 69 started the work on the NWIP on an international level and in consequence a first face-to-face meeting was held in Brussels in December 2014. Since Better Place is not available anymore a new convenor was elected. Dan Lee from ChargePoint is now in lead of the project team. He is also active in eMI3 and NEMA. A program of work has been defined there and target dates aiming for a committee draft of the standard in 7/2015 have been set.

3 Communication in e-Mobility Business Processes

This section describes communication needs and necessary communication interfaces to marketplace or clearinghouse for relevant e-Mobility Business processes.

3.1 Load Management – Experience from Demo in Malaga

A charging / load management (LM) concept was developed and has been implemented in the demo-region ES1 (Malaga). The concept concentrates on the LM functionality provided by the different participants (EVSE operator, DSO and EVSP)
The AC charging infrastructure available today is largely based on IEC 61851-1 / PWM signalization. The PWM signaling allows limiting the current which an EV may draw from the EVSE. This solution properly allows protecting a PoD / grid connection from overload. The EVs used in the demonstration quickly followed all changes of the current signaled by the EVSE.
AC load management with PWM signaling can fulfill most requirements. Nevertheless there's one important requirement coming from the DSO that cannot properly be fulfilled and that is guaranteeing that a certain amount of energy is drawn per time interval. This requirement demands a more powerful communication between the EVSE and the EV. ISO/IEC 15118 will allow the negotiation of so called charge plans between the EV and the infrastructure. Once the implementation of ISO/IEC 15118 communication is available at the majority of EVs and EVSEs load management can bring even more benefit to the grid integration.
From the demonstration phase in Malaga we may also take the conclusion that AC load management helps balancing interest best in case we have 22kW/43kW AC chargers build into the EV. In this case a broad bandwidth from low power to high power demand can be realized.

Need for standardization from Load-Management demonstration in Malaga:
There is a huge demand on standardizing parameters necessary for the realization of load management. Especially parameters given by the different participants taking part at the communication have to be clearly described and implemented.

- Customer contract information
  For a worldwide approach of load management, it must be possible for the customer to charge the EV at EVSEs of different EVSE operators. Therefore customer contracts have to be standardized and contain the same information independent from the EVSE Operator and / or EVSP the customer is in contractual relationship with.
  Therefore it has to be defined how customer contracts shall look like and which data shall be contained. Thereby it is necessary to define which customer service levels shall be possible (e.g. level 1, level 2, etc. or basic, silver, gold) and how each level shall be treated at the load management.
- Grid structure and information exchange
  On the other hand parameters for grid communication also have to be defined to make load management feasible. For any kind of negotiation between the DSO and other stakeholders like the EVSP or the EVSE operator, the affected load areas have to be clearly described, including Identifier for Business objects, down to the level of the point of delivery (PoD).
  GeM deliverables D4.2[4] and D3.5[2] already gave a clear view about the communication to the grid and made some assumptions for the structure of identifiers like the load area ID. This should be improved and extended by other necessary parameters e. g. for the point of delivery (PoD) and lead to European and / or international standardization committees to make grid communication possible in the future.

[4] http://www.greenemotion-project.eu/dissemination/deliverables-infrastructure-solutions.php

3.2 Smart Charging via EVSE Operator

The smart charging process via the EVSE Operator (CMS) was demonstrated in the Demo Region Malaga. The results and necessary IT standardization needs are described in the non public D5.5 (Deliver charging management system to region for load management) and will be followed up by partners in future standardization activities.

3.3 Smart Charging via OEM Backend

Smart Charging via OEM Backend is a new and alternative way for charging an EV and described in detail in chapter 4.2.5.

The main benefit of this option is to use the existing intelligence build into the EV to control the charging process and the connectivity of the EV to the OEM backend either via GSM or indirectly via the internet.

The smart charging itself is managed e.g. by an IT service running in the cloud.

Thus a simple plug or home charger is sufficient and no investments are needed into a connected, intelligent and managed EVSE infrastructure.

Although this option would allow to rather immediately add millions of EVSEs to the EU it would require a common interface from the smart charging provider to the OEM backend and, which seems to be even more difficult, a general mind change on intelligent charging. As indicated by the experiences in California, this option will most likely be promoted by parties with a business case beyond billing for charging like department stores, restaurants, hotels, company parking sites and at home where the costs for the electricity are covered – or assumed free of charge – eliminating the need for accurate billing to the EV driver. eMI3 is considering to specify the necessary interfaces in a future release of the specifications.

4 eMI3 - eMobility ICT Interoperability Innovation Group

4.1 Development of the Organisation

4.1.1 Interoperability – More than Standardisation

The eMobility eco system around EVs mushroomed in Europe first as hundreds of island projects or solutions – often with or based on local, national or EU public funding - and with the growing numbers of EVs introduced into the market, the need for better interoperability became obvious.
First the main focus was on the plugs for charging the EVs but soon the more complex requirements for ICT systems interoperability arose demanding cooperation and joint development of organizations across industrial sectors and standardization beyond the existing vertical structures e.g. in ISO and IEC.

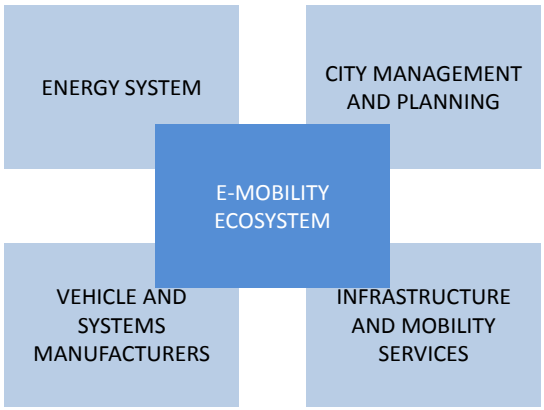

Figure 4-1 e-Mobility Ecosystem

Often the idea – or illusion – prevails that interoperability is achieved if standardized products, interfaces or protocols are used. However, as the reality of EV plugs – or household plugs as another example – in Europe shows, developing standards and applying standardized plugs is not enough. It needs an agreement within the industry or society which of the standardized options shall be chosen and in which way applied in the market. For the plugs in Europe the issue was – more or less - “solved” by the EC decision based on the ACEA recommendation.

In international standardization acceptance for a standard is sometimes only achieved if competing or supplemental requirements are integrated as different options to comply with the standard. Thus, a real consensus is not achieved for implementation although market players may state conformance to the standard. These different options will then lead inevitably to non-interoperable system implementations.

For the ICT interfaces beyond the EV-EVSE interface for charging – covered in ISO/IEC 15118 - GeM partners and partners from other EU funded projects or commercial enterprises formed or joined eMI3 with the goals or vision to achieve or ease interoperability.

4.1.2 eMI3 eMobility ICT Interoperability (Interest) Innovation Group

The motivation and initial process to form eMI3 is described in chapter 1.1. The first Letter of Intent with vision, scope, objectives and signing parties was issued Oct, 8th 2012 with 15 parties followed by versions on Oct 15th with 19 and Oct 22nd with 22 parties listed in the Annex 8.1.

At the GeM stakeholder forum in Ehningen (IBM) in Nov 2012, a first technical work plan & roadmap was presented by eMI3 representing 26 members covering more than 80% of public charging stations in many EU countries.

This was the vision which has been slightly updated but still valid in the core today.

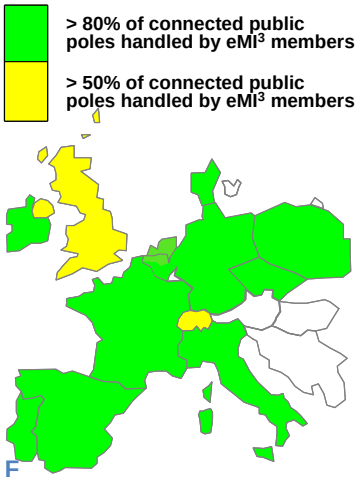

Figure 4-2 eMI3 coverage of public charging stations

eMobility ICT Interoperability Interest Group – Letter of Intent Promoting Cross-Sector ICT Standards and Interoperability for Electric Vehicle Services

Vision
An open interest group of significant players in the global Electric Vehicles market has joined forces driven by a common vision:

- **Enable global EV services interoperability by harmonizing existing and preparing standardization of future ICT data standards & protocols including security and authentication.**
- **Enable global EV service development by harmonizing and improving implementation between all sectors.**
- **Coordinate and build upon the work of other EV initiatives and, especially, enable European projects to provide interoperability for EV users**
- **Support all required business processes and speed up introduction of new services to provide a richness of compelling services to EV users. Especially, EV users should be able to use any charging point.**

While sharing the same vision, the initial focus of the eMI3 members was to “standardize” – meaning agreeing on - the necessary unique IDs to allow interoperability in Europe for roaming and finding charging stations. During this technical work - described below – eMI3 acknowledged the need for internal processes (e.g. document revisions and sharing tools) and voting rules.

Three options have been intensively investigated to better support the LoI based work:

A. Formation of a new legal organization
B. Formation of a TC under ECMA International
C. Formation of an Innovation Group under ERTICO

Option A was not followed as the efforts to do so were estimated to be rather high contradicting the goal to have fast progress on the technical roadmap given the limited resources within the group.

Option B promised to use a well-established standardization organization with fast track possibilities to ISO and or IEC but driven by stakeholders from the IT, Audio and Video sectors.

Option C promised to use a well-established industry organization with broad representation of the sectors in the EV eco system – except utilities organized in Eurelectric.

Options B and C have been thoroughly prepared with corresponding secretaries from both organizations and eMI3 applied successfully to an ERTICO call for innovation projects.
In the second meeting in Mannheim, Nov 2012, the eMI3 parties voted 1/3 for option B and 2/3 for option C.
So, eMI3 has selected ERTICO as organization to host the group and worked out the legal setup with Terms of References (ToR) based on ERTICO project experiences including IPR rules adopted from CEN/CENELEC.

Consequently, eMI3 formally launched as new organization at the EVS27 in Barcelona Nov, 18th 2013 with a base of around 50 parties from the LoI and many GeM partners. The name was changed from "interest group" to "innovation group".

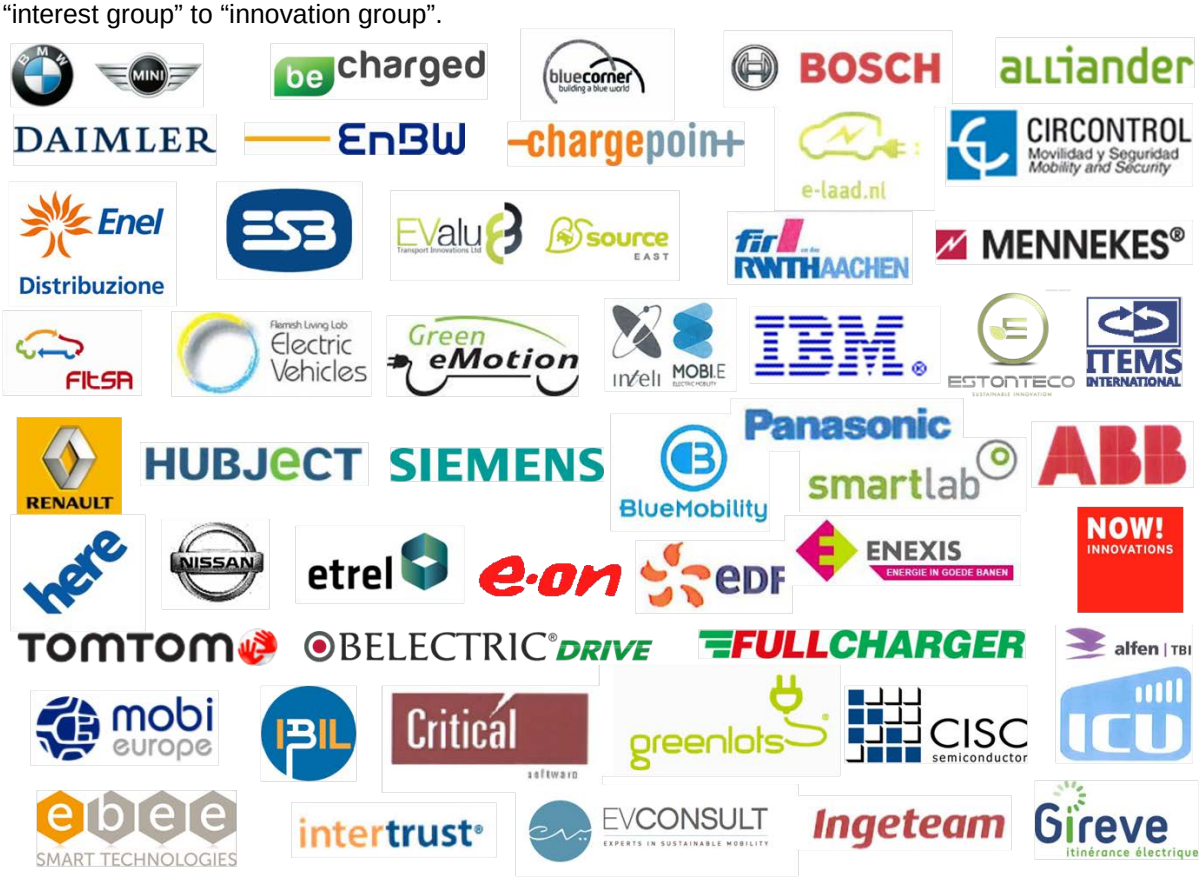

Figure 4-3 eMI3 members 2013

At the end of the ToR development process one party identified a liability issue coming from the base construction of the members' relationship in the ToR: (in non-legal language here) Each party could be sued on behalf of all others.
As there was no time left for the required changes while meeting the launch at EVS27 and to pursue the technical work most parties agreed to remedy this in 2014 by transforming eMI3 into an international industry organization called AISBL under Belgium law.
The corresponding new statues will been signed by the Belgium King in Feb 2015 and hence some members could now rejoin eMI3.

4.2 Structure of Technical Work and Results

4.2.1 Structure of Working Groups and Correlation with T3.8

As regularly presented in the org chart, eMI3 initially had three and now has four technical working groups where GeM partners provide a great part of the input:

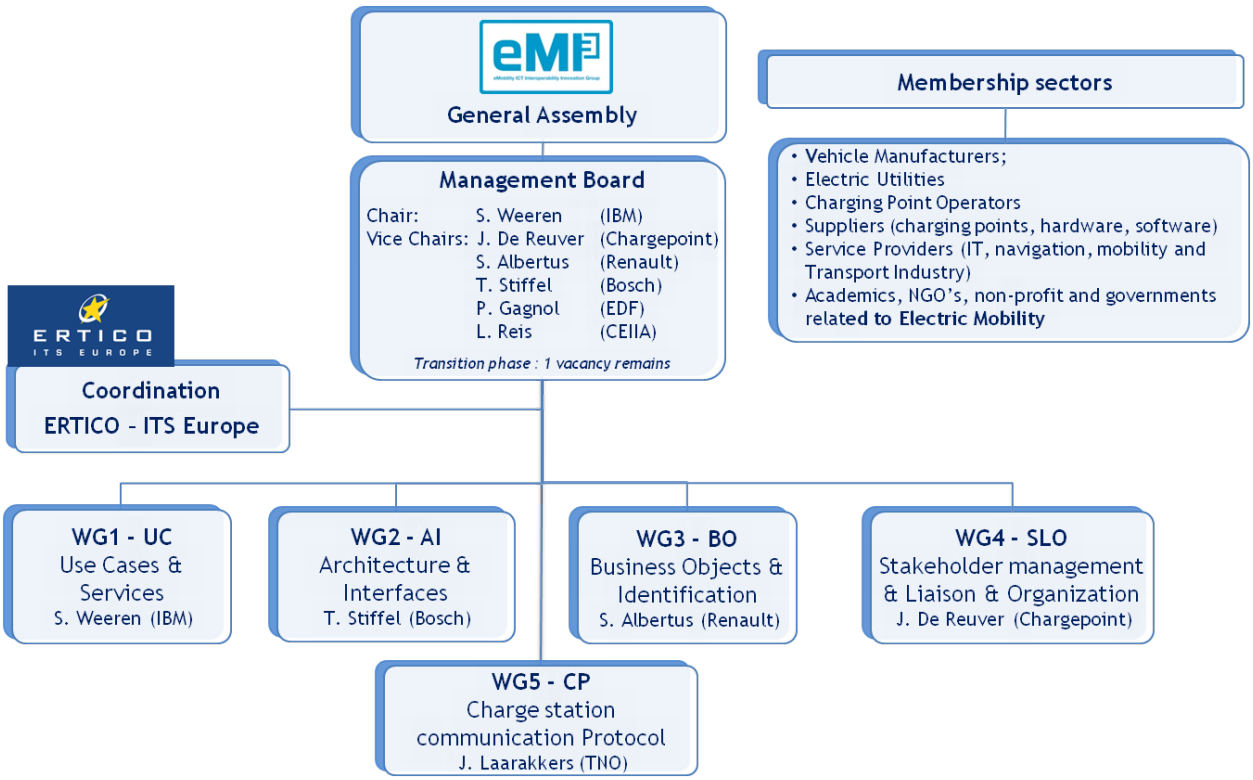

Figure 4-4 eMI3 organization chart 2014

WG1 - Use Cases and service (WG UC) develops a common understanding within the group after assessing existing standardization developments (like ISO15118 and IEC SG WGSP) and prioritizes the work items.
WG2 - Architecture and Interfaces (WG AI) develops an architecture framework to support and implement the agreed use cases and identifies the requirement for business objects like unique identifiers to be developed by
WG3 - Business Objects (WG BO) develops the definition and data structure of all business objects like unique identifiers or EVSE characteristics.
WG5 – Charging Station Communication Protocol (WG CP) develops the interface between the Charging Station and the charging station management system and beyond following the NWIP prepared by GeM.

4.2.2 Unique Identifiers

As a first result, eMI3 has acted on the most pressing issue identified in D3.9[2] and produced a first draft specification with updated unique identifiers EVCO ID and EVSE IDs and sent it to DIN and ISO15118 for review and inclusion.

- EVCOID has been developed to an eMobility Account (eMA) ID and extended with a specific Token ID (eMT ID) for authorization for each device (like RFID card or smart phone).
- The EVSE ID has been updated (being backwards compatibility to DIN SPEC 91286) and a new charging station data field structure.

4.2.3 Charging Station Communication Protocol (NWIP)

After handing over the GeM NWIP draft for the backend communication protocol for EVSE to eMI3 the first step was to establish a new working group within eMI3 which handles the topic.
The original plan was to continue work there quickly, but finding the proper lead was not as easy as planned. After successfully establishing the group the next step was to analyze protocols already existing on the market. Gaining access to those protocols was also a hard step. Although several partners offered to provide their protocols to the group, legal concerns about intellectual property etc. had to be clarified first with the corresponding legal departments. The whole process took a relatively long time.
After this step work went on smoothly. A document describing use cases and requirements was prepared and discussion started whether to hand the work over to a standardization body or not. And if: what would be the right timing for that step. A third question was if eMI3 will still be able to work on this topic or if all work will then be out of the hands of eMI3.
During the November meeting of WG5 in Amsterdam the group decided after some discussion to open the option to hand over the NWIP to IEC TC57, since this needs to be done by a country representative (not company/legal entity representative). The decision was based on the information that a type D liaison offers the possibility for eMI3 to still influence the work even within IEC. An updated draft was created together with an annex document.

4.2.4 Core Architecture

eMI3 has developed its role model and core architecture bases on the one used in GeM. Due to the larger group many different role models, definitions and experiences in productive projects had to be discussed and combined and thus agreeing on a common core architecture supporting all the different market models took a long time but now there is full agreement on the core actor names and interactions.

The resulting role model and architecture is described in the first eMI3 specification (see www.eMI3.org) and here only an overview picture is given for reference.

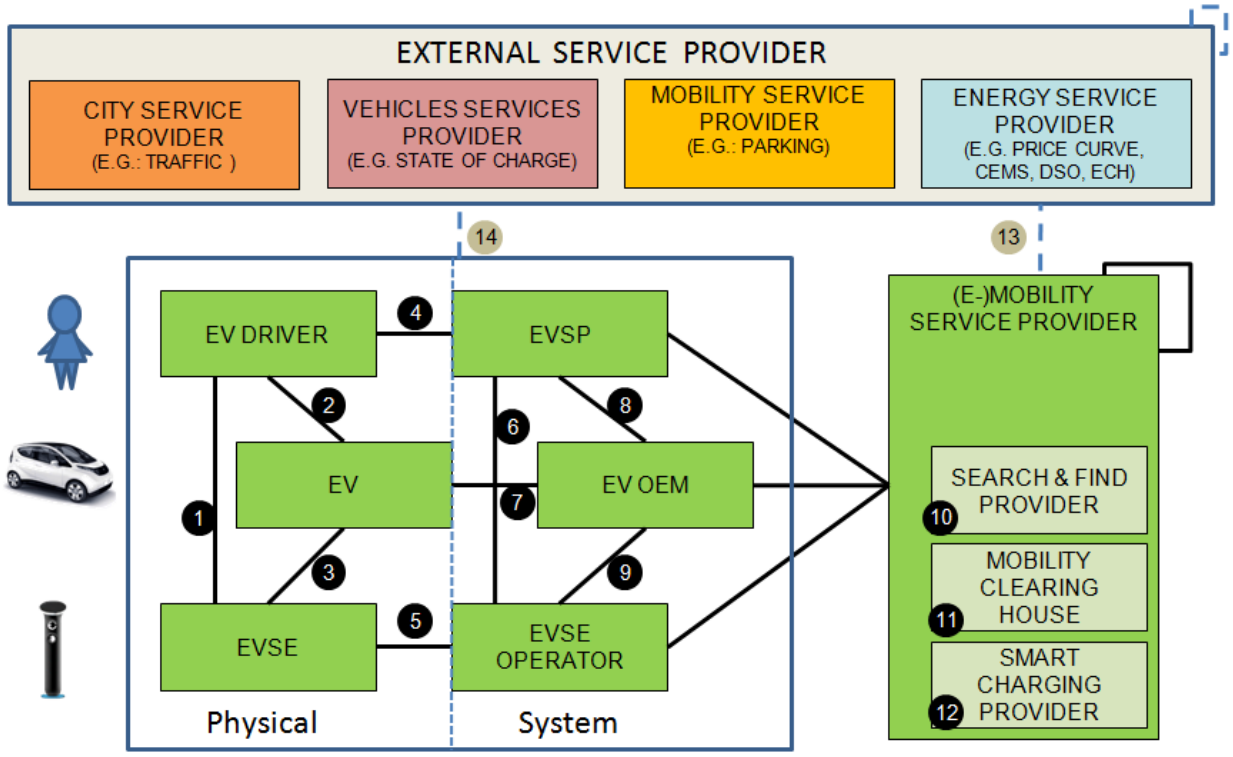

Figure 4-5 eMI3 core architecture

4.2.5 Smart Charging Provider and Lean Smart Charging

One recommendation from the EC review of D3.9[2] was:
"Regarding the scope of the ICT system for EV service markets, namely when EV are parked at home (home charging), it would be interesting to evaluate the possibility of using local smart meters as a gateway to be used for communication with EV aggregators under an "extended market place"."

So, at the Rome WP3 meeting Sep 2012, IBM presented the IBM ZRL proposal "IBM FERN Smart Charging Interface between EV FO and Retailer" (http://www.zurich.ibm.com/pdf/ecogrid-/b2bprotocol_ver1.3.pdf) based on experiences from two pilot projects which implemented a Virtual Power Plant (VPP). The WP3 team rated that this would only be applicable in the far future and not relevant for GeM as smart charging is implemented differently in WP8.

Consequently, IBM brought this item to eMI3 as there is a clear and valid short term applicability of Lean Smart Charging as described in the draft eMI3 use case 310. The dispute stems from the different views of IT service providers, OEM car manufacturers and utilities. Although this alternative charging infrastructure solution was presented many times by eMI3, smart charging was omitted in the very last versions of the first eMI3 specifications, due to a variety of different short and long-term possibilities to perform smart charging. But it is recognized that the priority is high to define a set of smart charging use cases that also includes alternative communication options like in the proposed Lean Smart Charging example use case.

During the initial work on smart charging use cases eMI3 analyzed the existing use cases of Green eMotion and standardization groups and derived four possible generic smart charging use cases. These were mainly depended on who makes the chargeplan. In the attempt to develop most generic use cases we discovered that these four use cases could be combined into one introducing a new role named “Smart Charging Provider” (SCP).
Smart Charging is combining the eco systems of the energy market and eMobility and thus presents a special challenge to standardize and harmonize use cases, roles and actors from these two points of view.
Possible roles are indicated in below graphics adopted from RWE showing a combined view on the energy and eMobility market roles and serves as basis for the simplified role model used in eMI3.

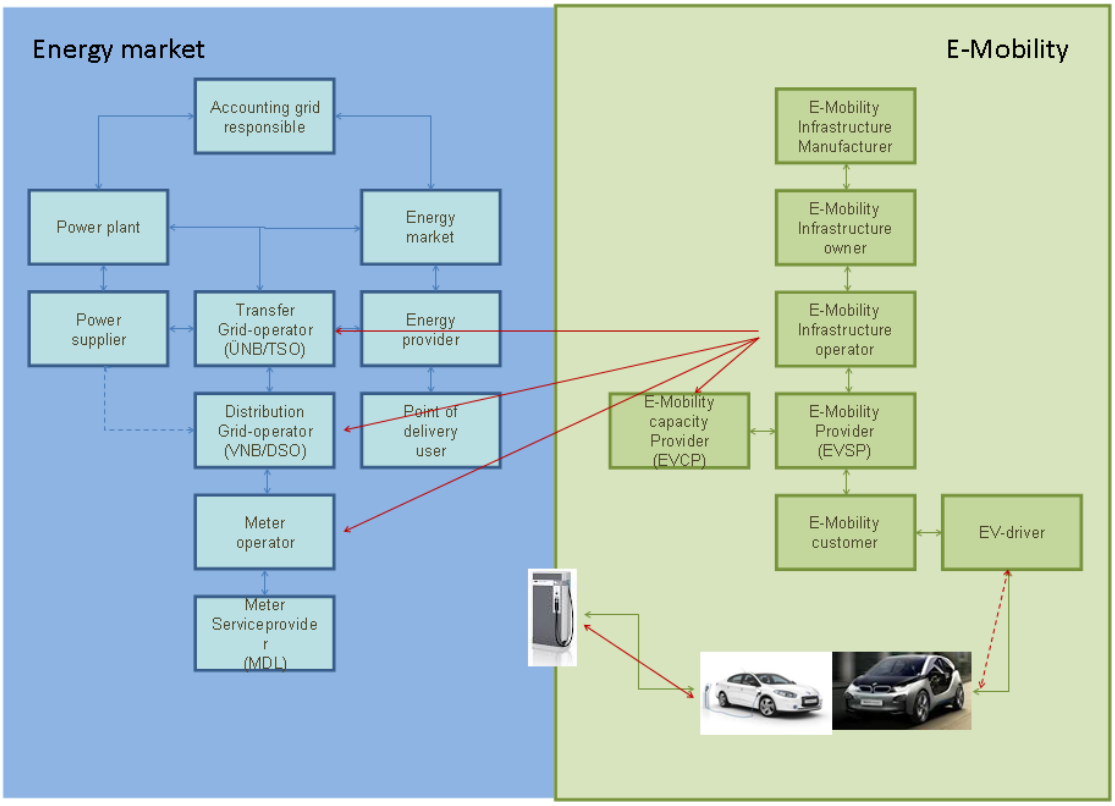

Figure 4-6 Possible roles in the Energy Market and eMobility (after RWE)

Definitions:
Smart Charging Provider (SCP) is responsible to provide an executable chargeplan for an EV to be charged taking into account requirements and limitations from the EV, EV Driver (desired chargeplan), EVSE, Grid Operator and energy market. An existing contract between the EV Driver and an EVSP is assumed enabling smart charging and listing user predefined requirements.
Chargeplan is a schedule of a sequence of (de-) charging events executed by the EV (if intelligent) or EVSE to smart charge an EV. The chargeplan is setup and negotiated by the SCP.
Remark: Technically always the EV will control the charging; EVSE may limit it (power, time).
Remark: A simple and unconnected wall box would also be an EVSE (example home charging).
Chargeplan executer: is an actor to execute the chargeplan. This could be the EV or the EVSE (limiting the power or pausing the charging e.g. for non-smart EVs).

With this new SCP role we are able to bring together smart charging use cases at a public EVSE and communication via EVSE Operator and/or at home or semi-public via direct communication to the EV.
From a business perspective, the SCP could be performed by an EVSP, EVSE Operator, fleet operator, CEMS or another party.

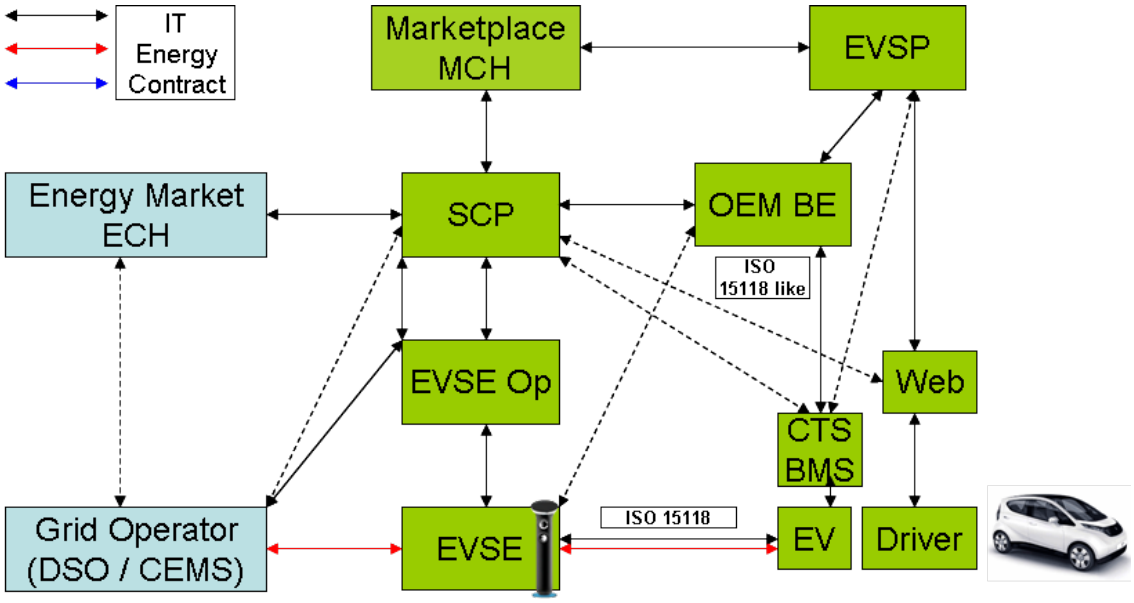

Figure 4-7 eMI3 role model for smart charging

eMI3 is using a simplified view of the energy market represented by an Energy Clearing House (ECH) – in the energy domain often called Demand Clearing House.
Remarks:
Communication to the EV:
There are two ways to communicate the chargeplan to the EV:

1. Via EVSE using the ISO/IEC15118 protocol
2. Via car telematics (and OEM back end) using a protocol to be defined (may be similar to ISO15118)

Option 2 requires OEMs to implement an interface in the car telematics system CTS to support smart charging. Currently, the communication is assumed to go via an OEM back end but could also be implemented as open interface directly to the EV.

Grid Operator: The term grid operator is taken from ENTSO-E and used to cover either DSO or CEMS if energy management is being performed locally (after the meter)

The Smart Charging Provider role also covers the functionalities of the use case WGSP-1300 (see Fig below). Comparing the SCP to the rectangular box including the check and evaluation in Fig 2 of WGSP-1300 smart re de charging_v063.doc could result in regarding the SCP role as consistent with WGSP-1300.

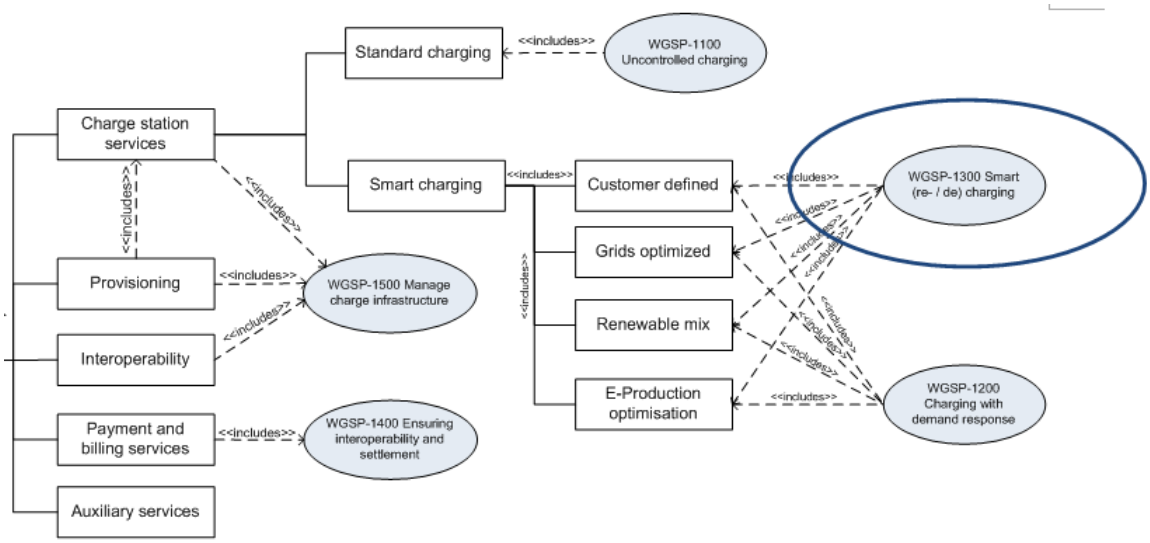

Figure 4-8 Use Case EV charging of SGCG WG SP

Further, eMI3 seeked to cover the scenarios in Annex B of the SGCG Report
Working Group Smart Charching version1.0 from April 2013. The SCP could be regarded as a sub role of a Customer Energy Management System (see figure below) if functions are limited to optimize after the point of delivery and meter. Thus, SCP represents a modification of a CEMS function beyond the local grid and hence consistent with the role model below.

5 Results of Cooperation with Standardization Organizations

Building bridges between traditional standardization bodies and eMI3 as an industry consortium is not always easy, since traditional standardization work traditionally does not consider groups like eMI3 as basis for standards. Nevertheless there are ways like liaison agreements to enable cooperation between groups like eMI3 and traditional standardization bodies.

5.1 Standards Development with NEMA

NEMA, the National Electrical Manufacturers Association, is an U.S. national accredited standards organization and the 5EVSE section is covering the U.S. EV ICT related standardization with the following mission:

- Formed to Develop Standards for EVSE Components, Systems, and Services
  a) EVSE Safety, Wire and Cables
  b) EVSE Submeters
  c) EV Charging Network Interoperability for Service Roaming
- Other Functions Beyond Standards Development
  a) Industry Advocacy
  b) Governmental Policy Positions

To reach the goal of global harmonization and as Chargepoint is chairing this group and member of eMI3, a liaison agreement was setup early in 2013 to enable a deep cooperation with NEMA.
Although the different market needs and development in the U.S. led to different charging solutions the ambition was to develop compatible standards as far as possible. Openly discussing the different viewpoints and existing solutions resulted in mutual enrichment of the current and possible future market needs and developments.

Consequently, NEMA adapted the eMA ID and EVSE ID definitions from eMI3.
They also provided the detailed station directory specification which was adapted as far as possible for the first eMI3 specification in a rather long discussion and agreement process contributing significantly to its delay.

Further, NEMA provided a draft for a standard on “Contactless RFID Credential for Authentication” with a very flexible security architecture. This draft is now used as the ground work for the upcoming IEC 62831 standard on RFID and NFC authentication at EVSEs.

5.2 Information Privacy and Security with DKE

In 2013, DKE has setup a new working group now DKE AK1911.11.5 "Informationssicherheit für Elektromobilität" (Information Security for electro mobility) covering privacy and security aspects focusing on charging infrastructure.
The work is based on use cases and experiences from current EV, public transportation and smart grid metering systems.
IBM is co-chairing this group and responsible to link the work with eMI3 focusing to WG use cases. RWE and Siemens are further members in this group.

The DKE group has joint meetings with DKE AK 353.0.8 which is the German mirror of IEC PT 62831 covering the RFID Authentication. Consequently, IBM presented the NEMA draft standard on “Contactless RFID Credential for Authentication” for review. A mapping of the NEMA to the ISO/IEC

15118 method and data fields has been completed but a final assessment is still open. The NEMA draft provides a very flexible security architecture allowing the individual network operator (equivalent to EVSP operator) to determine the security level for the authentication token e.g. smart card as the network operator is also responsible to balance the security costs (upfront investment vs. fraud). All authentications must be executed online. ISO/IEC 15118 however defines a uniform high security level for the EV to EVSE communications and thus suggest a corresponding level for EVSE to EVSE Operator level and beyond.

DKE (and CENELEC) are developing use case repositories as web based tools to foster broad and early interchange of use cases between adjacent sectors like smart grid, smart cities and smart building. A cooperation is in preparation to allow eMI3 to use the same tool and thus more effectively cooperate and integrate the work with DKE, CEN/ CENELEC and IEC.

5.3 Cooperation with IEC

Although there is no direct connection between Green eMotion and the IEC the work and interaction between IEC / ISO TCs and Green eMotion went rather smoothly. Several partners of Green eMotion are actively involved in ISO and IEC TCs and working groups. Generally those partners actively informed the standardization body about the ongoing work within Green eMotion. The same partners brought back information from the standardization body into Green eMotion. Topics like the EVCO-ID (ISO/IEC 15118), RFID Authentication (IEC PT 62831), and backend-communication protocol for EVSEs (NWIP TO IEC TC 57) have been successfully placed within IEC respectively ISO by Green eMotion partners.

6 Results and Recommendations

6.1 Further Support Cross Sector Interoperability and Standardization

First, standardization does not inherently ensure interoperability (see chapter 4.1.1).

Cross sector consensus building (horizontal standardization) is more complex and time consuming than the traditional vertical standardization within one sector. International Standardisation Organizations (ISOs) like CEN/CENELEC, IEC and ISO have taken this challenge and have been establishing cross sector coordination committees.

For the EV ICT (charging related) sector eMI3 has been formed under ERTICO to ensure interoperability and cooperate with standardization organizations. Thus, related national and international activities should join or cooperate with eMI3. In particular, EC projects, activities and communications might well profit from the powerful industry expertise and coordination provided by eMI3 to validate, steer and coordinate related processes.
Further, GeM suggests to enhance the cooperation with other standardization domains like Smart City and/or Internet of Things.

Non-ISOs – aka Industry - standardization (or more precise industry specifications) should be more widely recognized and stimulated by the EC e.g. by requiring coordination with or liaisons to industry groups like eMI3 in public funded projects.

6.2 Stimulate Formation of Common ITS Platforms for better Cooperation and Interoperability

In the EU hundreds of EV related projects have been funded and many of them started to build or setup IT systems separately from scratch with limited budget, limited market view and limited time scope. They developed IT services and solutions isolated from each other and IT platform with rather limited or stripped down capabilities as the marketplace in GeM.

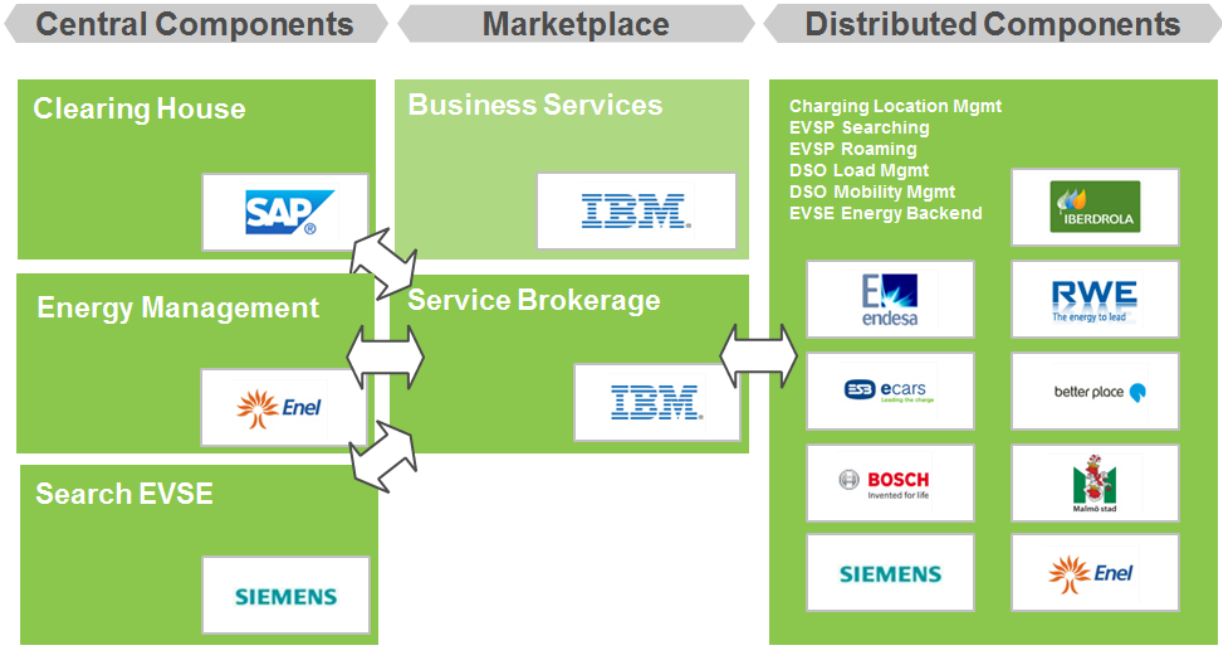

Figure 6-1 Release ICT Environment: Overview of Business Components (WP3 Focus)

Figure 6-1 is identical to figure 2-3 from D3.13 (non public) and shows the two basic blocks of the marketplace and the many other IT services build on or attached to it, developed or adapted specifically to the GeM interface specifications (business services) running on a rather generic core services platform named Service Brokerage here. These core services are part of the strategic IBM cloud based Bluemix marketplace and correspond to the B2B Marketplace Infrastructure in Figure 6-2 below.

During a networking session after the presentations of seven EU mobility projects at the ITS Europe Conference in Helsinki 2014 (SIS04) the discussion focused on how we could better cooperate and join or share forces and resourced in the future. So, we developed the basic idea behind figure 7-2 first presented at the EUSEW in Brussels 2014: Common infrastructure(s) would burst cooperation and innovation with reduced costs.

If many EU ITS projects – starting with some major ones - shared the costs for setting up and running a common B2B marketplace ICT infrastructure these projects would profit from a well-established cross sectors capable rich platform and would stimulate far more efficient future IT services development and implementations.

B2B services and solutions as in the green layer in Figure 6-2 could be separately developed like in GeM, MOBINET and smartCEM in the past but then easily shared (based on shared interface specifications) among projects in the energy, electro mobility and ITS domain. New projects could reuse the existing service or add competing ones thus stimulating innovations. B2C services could be independently developed selecting B2B services from a much broader base.

A successful implementation of this concept would need an extendible, well-structured and rich B2B marketplace infrastructure with highly flexible and non-discriminatory setup like in GeM where each partner has the choice to run the service in the IT environment of its own, of a hoster or of the marketplace. E.g. the central components Clearing House and Search EVSE are being executed in the

SAP and Siemens IT environment (for project related contractual issues). Thus full competition is ensured on the relevant IT service level.
This corresponds to the real world traffic system where highways are built together and goods a transported on them in competition.

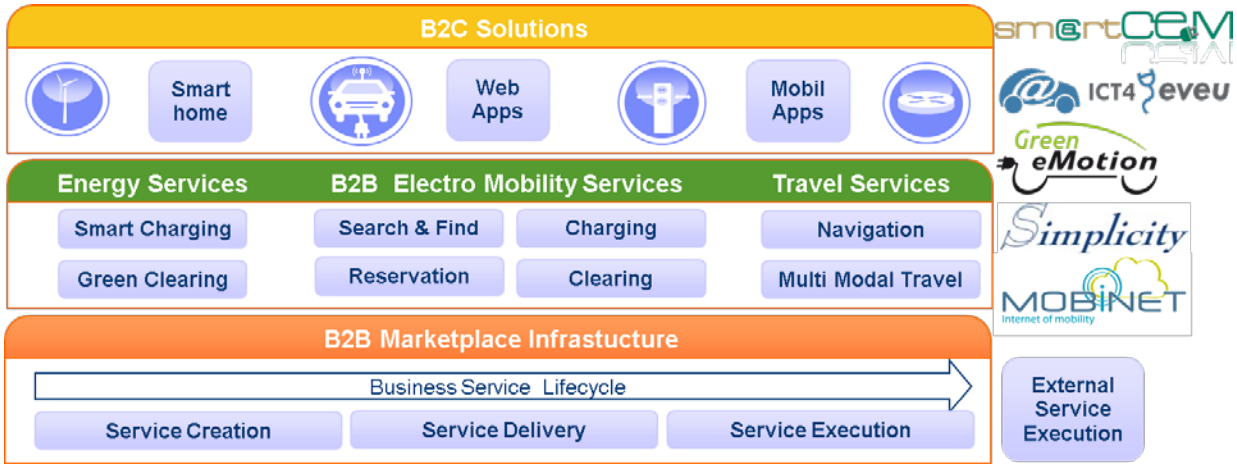

Figure 6-2 B2B ITS platform architecture

6.3 Alternative Solution for EV Charging Stations – Lean (Smart) Charging

Today, information exchange and technologies develop rapidly. A major enabler to innovations is the openness for “out of the box“ thinking to open the space for solutions and value of overall system. Better integration will result in higher common benefits vs. more sectorial and company interests.

The use case Lean Smart Charging (see chapters 3.3 and 4.2.5) is an example of “out of the box” thinking which generated new requirements for the standards and information interfaces. While 5 years ago a RFID card and communication with the EVSE seems to be the straight forward solution for EV charging, in the mean-time lots of other options have been becoming available and used (NFC, Mobile phone, wireless communication towards EVSE, using other (local) networks, direct EV communication, etc.). This requires a rich set of use cases that is supported by a generic (not fixed) architecture framework as being developed currently in eMI3. An active support from the EU to bring effort, ideas and technology and standardization activities together is required.

Today, there is no real viable financial business case for standard public charging stations (slow charging) selling energy mainly due to the high initial costs for the equipment and installation as sketched in Figure 6-3. Introducing smarter concepts like integrating charging stations into street lamps are a limited option within the traditional thinking but using existing installations or enabling many rather cheap new ones and using Lean (Smart) Charging is a real innovation.
Lean (Smart) Charging is described in chapters 3.3 and 4.2.5.

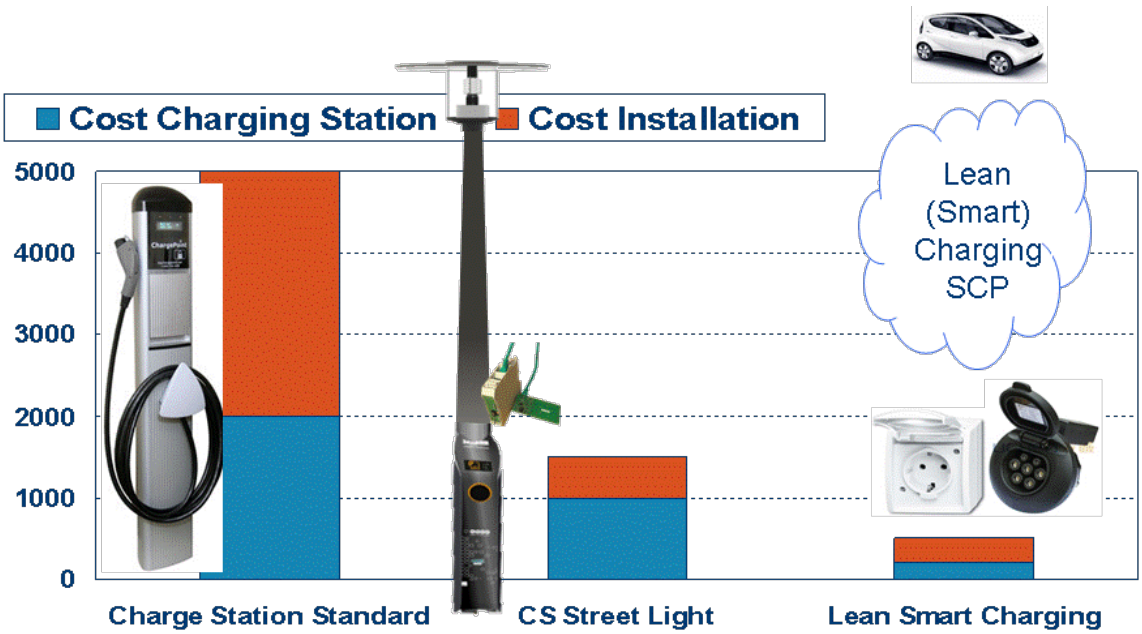

Figure 6-3 Cost estimates for charging station solutions

The following business case related information and recommendations have been presented in several GeM/eMI3 presentations.

- Forget (slow charging) business case on selling energy. The trend is to base on park time & (little) on charge.
- See US trend: free charging @ retailers, restaurants, hotels, companies ... (competition to public charging). The BC is based on attracting value customers.
- Exempt EV charging from employee benefit taxation (~30€/month) (as e.g. Siemens achieved). This removes need for expensive metering, management and billing.
- Lean Smart Charging via OEM backend would allow fast, cheap and broad charging infrastructure coverage and smart charging w/o smart meters
- BC is likely to be viable with integration of smarter city solutions (e.g. integrating charging, parking space allocation and other services into street lamps while upgrading them to LEDs).

6.4 Overcome Limitations from Competition

eMI3 has been founded with the idea to rapidly achieve agreement on the most pressing issues (unique identifiers) and to be much fast than laid out in ISO or IEC standardization processes. However, the initial roadmap and timing had to be shifted several times which caused quite some frustration among members. Also some other foundations (in the Smart Grid area) required one to two years to get a sound legal and practical cooperation structure.

eMI3 chair Silvio Weeren identified “competitive thinking” as the general main barrier and structured it into three levels: Individual, Organization and Society. He presented this “out of the box” analysis at the IEEE ICCVE 2014 conference in Vienna within session P5 “What global harmonization regarding regulations and standards do we need? Which impact to safety can we expect?”.

6.4.1 Individual Level

Who has not experienced members in standardization groups to fight fiercely for one position? The personal interest to „win“ in a debate or to “defend” an own position and the “red” emotions behind it (emotional struggle to survive) often slows down the consensus building process significantly. (It is acknowledged that these positions may be derived from a (perceived) company interest e.g. to safe guard a product under development). In the current public media environment with information flooding on war (in Ukraine, against terror, against financial/Euro weakness, etc) the individuals are increasingly kept in fear limiting their ability to openly and confidently communicate and cooperate.

Experienced group leaders and trainers in non-violent communication (Rosenberg) can clearly identify the limited individual level of awareness for the internal and external communication processes as a major barrier for authentic and cooperative behavior.

International, consensus based standardization of new technologies in a rapidly developing cross sector domain – like EV charging – brings extremely knowledge overview and communication challenges for the involved individuals. The people involved are experts on their technical areas but other skills are also required to be fast and successful.

Recommendation:
Ensure profound and dedicated team building and communication skills for (at least) group leaders (primus inter pares) and members. Be careful to select senior personalities as experts.

6.4.2 Organization Level

First, many standardization teams experience an increasing issue with man power allocation for standardization projects, especially in economical challenging or uncertain periods. This was broadly confirmed at the ICCVE conference. Probably, the reason is the (perceived) struggle to survive of the company or organizational unit.

Second, organizations have to decide on their visions, leadership style and strategies in the area of conflict between full competition and full cooperation with other organizations. Larger and older companies like IBM or Siemens seem to have developed more towards cooperation while protecting their IPR. But also SME e.g. around open source software recognize the benefits for a high level of cooperation but operate from open source, to ensure IPR topics are avoided

However, as companies are managed and operated by individuals, the attitudes on the individual levels prevail. All individual seem to have on common goal - to live in happiness. However, this is in obvious contrast to our lives in the organization with the increasing tend to experience burn-out.

Recommendation:
Openly discuss and review visions, leadership style and strategies and the applied communication processes in your organization and in how far they support the goal of the individuals.

6.4.3 Society Level

The believe model of a society is decisive for the attitudes and judgments of the majority of the individuals. However, societies grow, flower and perish with core believes but build on the experiences of the past.

- The last culture in the middle age was based on monotheism: „live as God (church) says“ and the earth is flat and the center of the universe

- The current culture is based on scientific materialism: „survival of the fittest“ and we live in a given (round) world anywhere in the universe.
  The belief in „survival of the fittest“ leads to an “everlasting” hunger for more (of the ego) and thus our society risks to destroy „good life conditions“ on whole earth! This culture is perishing and more humans start to recognize and admit this.
- The upcoming culture is based on holism – “we are all connected and in the essence we are all one consciousness in the universe” and we live a life in love and cooperation.
  Millions of humans are already aware of this and starting to live up to the new culture while still feeling and experiencing to be caught in the external boundaries of the current but perishing majority culture.

This deliverable is not suitable to deepen this aspect. I – Silvio Weeren – went through the transition in the three years after my burn out and I’m backing up the new earth as e.g. described in below figure with my profoundest experiences (now understanding many also from the childhood and youth).

Figure 6-4 Introducing a new earth

7 Conclusion

The WP3.8 standardization activities have been successfully cross linked with other standardization groups and helped to bring forward the future of seamless EV charging experience in Europe and beyond.

The major achievements are:

- Agreement on the unique identifiers EVCO-ID and EVSE-ID on a broad international basis with contribution to ISO 15118 and further refinement in first eMI3 specification
- Cooperation with DKE, NEMA, IEC and eMI3 to develop and bring forward the NWIP for EVSE communication protocol to IEC TC57 and RFID card standardization with NWIP and IEC PT 62831
- Report the lessons learned from the demonstration projects for further inclusion into standardization
- Extend the view on smart charging introducing an innovative way to cost efficiently provide a large charging infrastructure with Lean (Smart) Charging
- Establish and maintain close links, cooperation and contribution with WP7
- Supporting the eMI3 formation with structure, technical work and results to close the gap between standardization and interoperability
- Proposals to overcome limitations in cooperation for fast (industry) standardization and outlook for possible future developments

Recommendations have been prepared reaching partly far beyond GeM:

- Further support cross sector interoperability and standardization resp. industry specifications in cooperation with eMI3.
- Stimulate formation of a common ITS platforms for better cooperation and interoperability by focusing on the B2B ICT service infrastructure platform
- Alternative solutions for EV charging eco systems with Lean (Smart) Charging - a use case controlling the charging via the OEM backend – EV connections without expensive charging stations.
- Overcome limitations from competition on individual, company and society level introducing the upcoming belief model holism with its impact on standardization

8 Annexes

8.1 eMI3 Letter of Intent (Oct, 22nd 2012)

eMobility ICT Interoperability Interest Group – Letter of Intent

Promoting Cross-Sector ICT Standards and Interoperability for Electric Vehicle Services

Vision

An open interest group of significant players in the global Electric Vehicles market has joined forces driven by a common vision:

- Enable global EV services interoperability by harmonizing existing and preparing standardisation of future ICT data standards & protocols including security and authentication.
- Enable global EV service development by harmonizing and improving implementation between all sectors.
- Coordinate and build upon the work of other EV initiatives and, especially, enable European projects to provide interoperability for EV users
- Support all required business processes and speed up introduction of new services to provide a richness of compelling services to EV users. Especially, EV users should be able to use any charging point.

Scope

The scope of this group includes all ICT interfaces, application level protocols and standardized software services supporting all required business models and platforms of the stakeholders within the EV market. Initially, we intend to focus on unique identifiers, data models, attribute lists and data structures including those to enable interoperability of market places and clearing houses.

Objectives

The overall objective is to harmonize the ICT data definitions, formats, interfaces, and exchange mechanisms to create and/or enhance eMobility ICT standards.

- The short term objective is to agree on the detailed scope and work plan including a methodology to achieve transparent and open processes.
- The medium term objective is to support EV market ramp-up and interoperability of major current EV initiatives by developing eMobility ICT de facto data standards to be jointly implemented.
- The long term objective is to involve more partners to achieve widespread international harmonization and globally accepted and implemented ICT standards for the EV markets.

After review and approval within the group, all outputs should be publicly available through open channels, such as a public website. The intention is to release the results free of IPR restrictions and free to use following proper analysis of potential IPR restrictions.
This LoI is non binding to the parties and shall impose neither the obligation to contribute nor reason to expect this from the parties. As a consequence, none of the provisions in this document are legally enforceable.

The group already includes key EV market players and is open to new stakeholders.

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