COTEVOS

Specification, analysis and assessment of the situation or interoperability related to EV deployment in EU cities and member states

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Abstract

A methodology was set up for the identification of demonstration initiatives and pilots dealing with e-mobility interoperability. A first description of projects led to the selection of the most interesting ones, in the search for interoperability solutions. The analysis permitted to depict the current status of interoperability deployment and to catch sight of future trends, which were mainly pointed out by the work performed in research projects.

The results of the analysis were presented with the SGAM model layers in mind, covering issues related to business and regulation, services, systems, and communication and information protocols. In addition, data dealing with testing and aspects for improvement was also extracted from project descriptions.

Regulation represents the highest level framework for service implementation. Even if the regulatory analysis was not an objective of this work, this background surfaced from the analysis of the demo projects. For example, in Spain the roles of EMSP (e-mobility service provider) and EVSEO (infrastructure operator) are assumed by the same actor, which is entitled to resell electricity. Italy and Portugal have temporary regulations addressed to the first phases of EV market development. While in Italy it is considered that the DSO may play the roles of EMSP and EVSEO, in Portugal the EMSP and EVSEO roles are assumed by a regulated party which manages a national infrastructure for the charge of electric vehicles (EV), however private EVSEOs are also permitted.

Business market roles and models were first divided into four domains:

- Public and semi-public charging.
- Private charging.
- Mobile metering.
- Fleet management.

Public and semi-public charging present the highest range of solutions and of complexity, due to the fact that a higher amount of roles might be involved, including e-mobility service provider (EMSP), charging infrastructure operator (EVSEO), ICT interoperability (IOP) platform manager, etc. This has a direct impact on end-to-end communication complexity. The use of ICT interoperability platforms (marketplace, roaming...) is mostly under demonstration phase but some commercial applications already exist in the market. The next figure represents a general scheme showing possible business (**orange**) and communication (**black**) relationships between actors/roles.

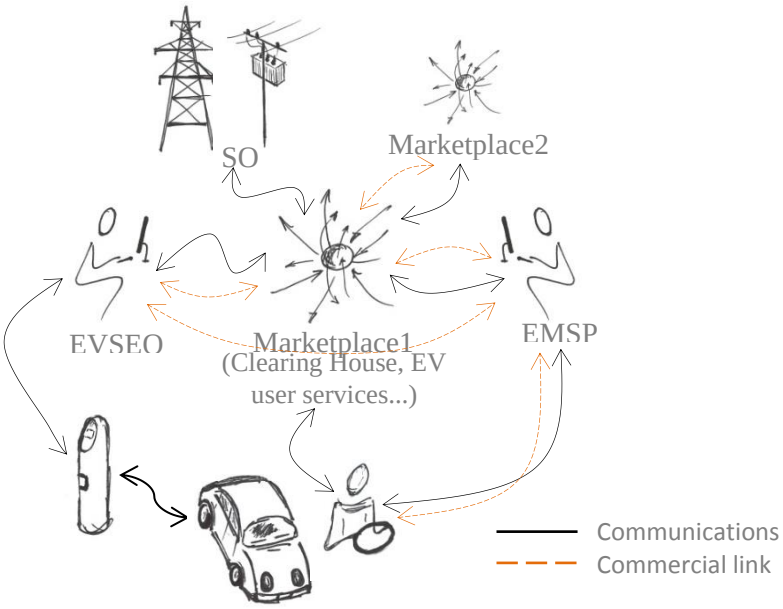

Figure 1. General market and business model (GeM project)

Within this scheme, several are the suitable business models and they will depend on applicable regulations in each region and on market approaches of stakeholders. The number of actors and their roles might also differ according to the use case; normally, it will be lower than in the figure above, at least in the first steps of market development, where complexity might be a cause for high investment.

The EV charge in the **private domain** is similar to that in public and semi-public areas when e-mobility service providers and/or EVSE operators are involved. However, many EV users might charge their vehicles under conventional energy contracts and using their building electricity infrastructure. In this case, the contract holder would assume the role of EVSEO and the electricity retailer that of EMSP. DSOs might perform load management in the frame of residential demand response strategies, using the infrastructure and protocols deployed for that purpose, including Home Energy Management Systems (HEMS), Advanced Metering Infrastructure (AMI), etc.

Mobile metering is a special case related to both the public and the private domain. This business approach proposes to use smart sockets for EV charging, instead of the more expensive dedicated EVSEs.

Fleet management requires normally some specific services, such as EV monitoring, that other activities may not need. It is suitable for public transport and new businesses, such as the e-car sharing or flexibility aggregation.

Many **services** were identified in demo projects but their feasibility needs to be validated both in real markets and regulatory frameworks since, in many cases, they were developed under research and pilot project environments.

The **systems** related to the different roles (more than actors) are of great importance when going down in the layer stack. These systems communicate with each other and they might be similar for different actors. For example, front-ends of EMSP, EVSEO, retailer, flexibility manager, etc. for ICT platform connections might share similar communication and information protocols.

C**ommunication and information** standards used in the pilot projects were also identified and summarized in two figures.

Testing activities remain scarce but valuable and this is the gap COTEVOS project should fill in. PowerUp project, although not really related to demonstration, is remarkable in this field.

Some **aspects for improvement** were also highlighted stemming from the experience of the participants in these demo projects. In most cases, solving them remains out of the scope of COTEVOS objectives. However, their knowledge gives interesting information for future phases of the project.