

In order to accelerate electric mobility uptake, it is argued that ICT interoperability is critical. **eMI³** explains how it is advancing this

eMI³; eMobility to the next level

Reducing greenhouse gases emissions, lowering transportation operational costs, limiting dependency on foreign oil imports, gaining competitive advantages in the automotive, energy or other industrial sectors, are all very valid reasons for pursuing and adopting new, more sustainable fuel alternatives. Europe, the United States, China, Japan, India, to name a few, have all put in place national and international programmes, and committed significant financial and political resources to the development and adoption of sustainable transportation alternatives. Despite these government programmes of strong, vested interests and commitments, progress towards the adoption of sustainable mobility remains painstakingly slow.

Oil

In Europe, oil accounts for 94% of the energy consumed in transportation, 84% of which is imported, impacting a 2.5% of GDP deficit in the European Union trade balance. Raising supply security concerns, Europe's foreign oil imports for transportation originate to a large degree from politically unstable regions. As a result of its heavy oil usage, the transport sector alone contributes 23% of all CO₂ emissions in the EU member states.

Taking into account the ever-increasing energy demand, the European Commission forecasted that gradually replacing oil with cleaner alternatives, and the necessary infrastructure included, could reduce the oil import bill by €4.2bn per year in 2020, by €9.3bn per year in 2030, and save another €1bn per year from dampening of oil price hikes.

Going electric?

Yet, recognising that previous efforts to incentivise the development and adoption of clean fuel alternatives have been largely unco-ordinated and insufficient, the European Commission announced on 24 January 2013, an unprecedented and ambitious set of measures to ensure and step-up the build-up of alternative fuel distribution infrastructure across Europe, mandating common standards for design and use.

In the view of the European Commission, adoption of cleaner mobility alternatives, such as Plug-In Electric Vehicles (PEVs), is being held back by three main obstacles: the high cost of vehicles; the lack and inconvenience of PEV charging infrastructure; and the low level of consumer acceptance. The latter being the result of the former two, to a significant degree.

It is a vicious circle. Deployment of electric charging stations is slow because there are not enough vehicles. Lack of demand for vehicles limits production volumes and the potential for lower costs. Consumers do not buy the vehicles because they are expensive, and because a

convenient PEV charging infrastructure is quasi non-existent compared to traditional gas-powered vehicles.

In its January 2013 Clean Fuel Strategy, the European Commission decisively defined a minimum number of PEV charging points for each of its member states. It also finally broke the *status quo*, and required the use of a common physical connector in all of its member states.

Indeed, with a unique and unenviable incongruity, Europe has been working hard developing electric mobility relying on a standard for electric vehicle plugs and sockets which specifies three types of non-interoperable plugs. Ending the nonsense, the European Commission announced that the 'Type 2' plug is the mandated common standard.

These bold mandates together ensure that a critical mass of charging points across Europe will be reached quicker, and eliminate the idiosyncrasy associated from not knowing whether a given vehicle is able to effectively charge at a particular charging station. However, harmonising physical connectivity is just one piece of a much larger and more complex overall jigsaw puzzle. A fundamental enabler of the electric mobility markets development and growth is to ensure that recharging your plug-in electric vehicle is as convenient as fuelling a gas-powered vehicle today.

Infrastructure

A significant number of companies and organisations, from global corporations to innovative start-ups, are hard at work developing services for PEV drivers, deploying charging infrastructure, and overall, each working on products and services that will make driving and charging an electric vehicle truly convenient.

A key issue is how to facilitate interoperability across the entire electric vehicle ecosystem, which encompasses actors from a wide range of sectors,



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from power utilities to car manufacturers, from industrial equipment manufacturers to software development powerhouses, and includes many innovative start-ups developing a range of complementary products and services, aimed at improving the electric driving experience.

Why are interoperable ICT standards important to eMobility?

In life and in business, being able to effectively communicate with each other is the single greatest enabler of our ability to effectively address common challenges. This seemingly obvious truth carries its full weight in the electric vehicle ecosystem where actors from different industry sectors, each using its own standards, systems, protocols and languages, are finding it today difficult, if not impossible, to bridge the gap towards compelling products and services that bring PEV driving the convenience needed to break the vicious circle.

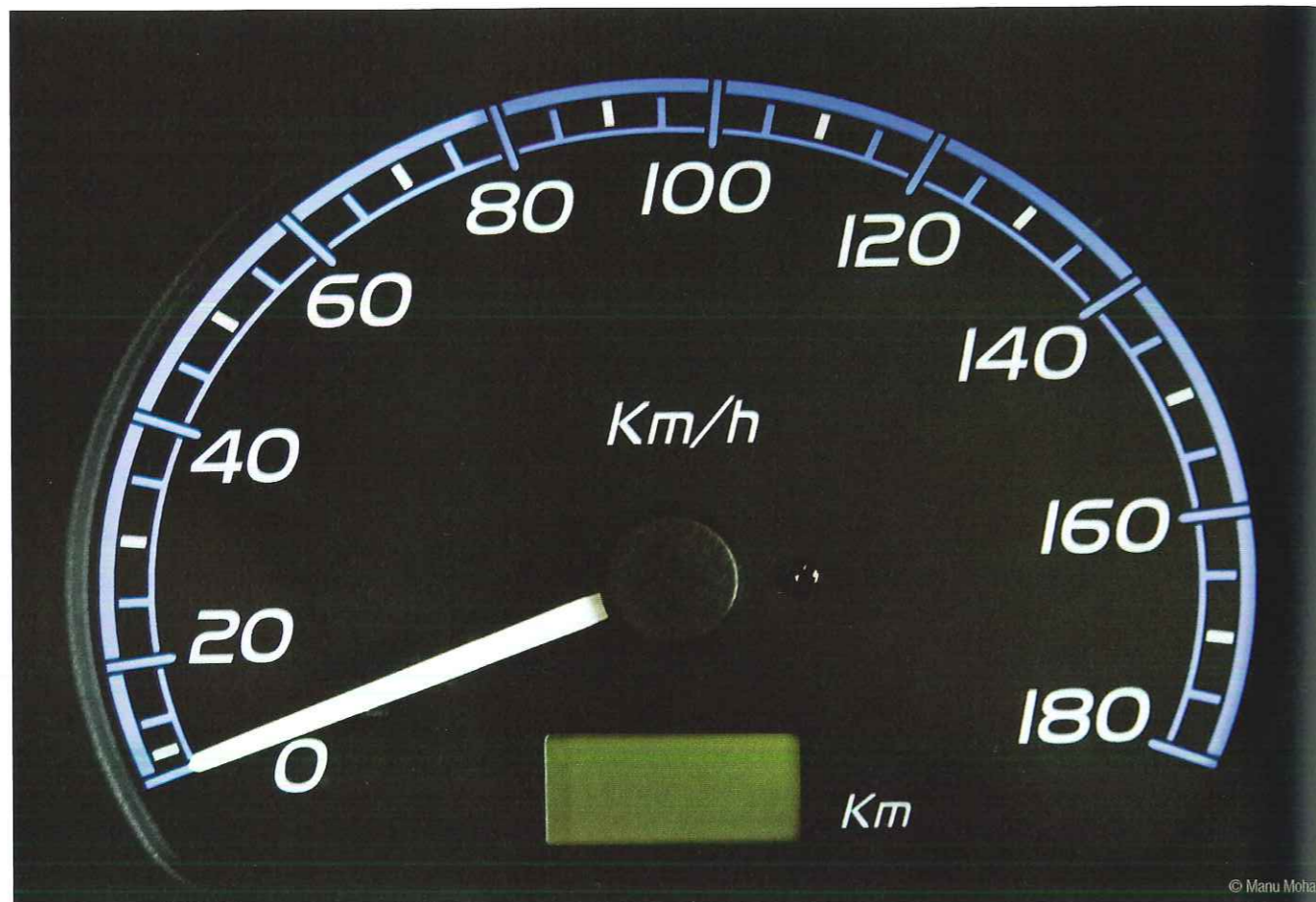
As opposed to traditional fuelling stations, where the current depot model and fast refuelling times allow quick turnaround and servicing of a large number of vehicles in the same location, electric refuelling of PEVs today requires a ubiquitous and distributed model, with many more charging locations conveniently located 'everywhere' to

fit where each PEV driver parks. Even at the fastest charging rates available today, a PEV can only pack up 4km per minute of charging, as opposed to 700km per minute of refuelling for an average diesel vehicle. To ensure true convenience, PEV drivers must be able to recharge wherever they park, and achieving an adequate PEV charging infrastructure therefore requires many actors to deploy systems and interconnect them for search, access, roaming and payment.

Attractive and compelling

Unfortunately, today, exchanging data as simple as an identifier uniquely determining a charging location remains a challenge, if not downright impossible. Exchanging the same data between different actors in the ecosystem requires developing a different interface for each actor and proves an unsolvable equation in terms of scalability, flexibility and cost of maintenance.

Harmonisation of such simple data and interfaces is a necessary minimum in order to enable offering PEV drivers any of the wide array of potential convenience – and value-adding services which will make the switch to electric driving a much more attractive and compelling proposition. Without common, harmonised data identifiers, for instance, it will be impossible for a PEV driver to roam from his home-charging network to another one for which he does not have a contract. For PEV drivers, the ability to know ahead of time where charging is available at a specific time, whether it will fit the needs and preferences of a given driver, and to roam from one charging network to another, are absolutely critical as this is the only way the type of ubiquitous and conveniently accessible infrastructure can be achieved. Without this, regardless of how well incentivised the roll-out of PEV charging infrastructure is, it



cannot be utilised to its full potential unless we get the basics right from a data interfaces and identifiers perspective.

As the IEC standard for electric vehicle charging plugs and connectors clearly showed, standardisation is simply not enough. Interoperability within and in between standards is needed to create the platform for innovative business and service offerings to emerge and therein attract end users to the potential benefits of switching to a more sustainable mode of personal transportation.

Considering the need to provide streamlined products and services to end users in an ecosystem requiring cross-sector implementations between industries with heterogeneous objectives, systems, needs, and constraints, the benefits for interoperability can be easily outlined:

- Reducing the operational costs and complexity to setup interconnectivity amongst actors and platforms – to thrive, the ecosystem requires mixed models, systems and players. This is not only true today; it is also a requirement for sustaining development in the foreseeable future and in the long-term;
- Enabling 'best-of-breed' services – each business wants and needs to have the flexibility to define its own model. Competition benefits not only the end user but also the ecosystem in general. The quicker and larger the market offering services to PEV drivers, the quicker and broader PEV acceptance; and
- Insuring speed, flexibility, and scalability.

Why eMI³?

Recognising that the ecosystem is at a fundamental crossroads in its development, and that the quasi absence of common ICT interfaces to exchange data amongst all the actors of the ecosystem is a critical issue that must be addressed together, a collective of 41 (and growing) organisations, joined forces and formed eMobility ICT Interoperability Innovation; eMI³.

Representative of the current state of the electric vehicles market, with both significant and small-size players, the collective is driven by the common vision and belief that, harmonising the way ICT data is exchanged between the various platforms used by each and all of the actors, will inevitably:

- Remove key obstacles to, and drive faster the development of a larger global eMobility market;
- Drive global growth and utilisation of PEV-related products and services; and
- Increase the convenience and adoption rate of electric vehicles.

Convinced that openness and striving to provide 'best-in-breed' services and convenience to electric vehicle drivers will break the vicious circle, eMI³ has set forward with a fivefold mission to:

- Enable global PEV services interoperability by harmonising existing ICT data and protocols, and proposing new ones where none are yet defined;
- Harmonise, promote and improve cross-sector implementation;
- Co-ordinate and build upon the work of existing PEV initiatives and projects;
- Strive to rapidly grow a large market by supporting all required business processes to ease and speed-up the introduction of new services and provide a richness of compelling services to PEV users; and
- Liaise and co-ordinate with other EV organisations and initiatives to maximise interoperability and minimise effort.

Focusing on ICT data attributes, interfaces and application-level protocols supporting all required business models and platforms of the stakeholders within the EV market, eMI³ initially intends to focus on unique identifiers, data models, attribute lists and data structures including those to enable interoperability of market places, clearing houses and important existing European initiatives such as Green eMotion, MOBI.E Europe, Stitching e-laad, Hubject, or GIREVE to name a few, as well as actively working with North American counterparts such as the Electric Vehicle Supply Equipment (EVSE) section of the National Electrical Manufacturers Association (NEMA).

A point worth noting is that eMI³ does not intend to work or interfere with the definition of market models, roles, business-to-business or business-to-consumers services or products. eMI³ strongly believes that leaving as much freedom to the market and its players to define, innovate and provide best-in-breed services and products, while providing the key tools for all to be able to exchange and speak a common language, is the best approach to quickly and efficiently enable the largest eMobility market possible.

The overall objective of eMI³ is to harmonise the ICT data definitions, formats, interfaces, and exchange mechanisms to enable a common



language among all ICT platforms. Although eMI³ intends to facilitate and promote their implementation, eMI³ core objectives lie in the development, publication, sharing and promotion of ICT standards.

- The initial objective of eMI³ has been the development and adoption of transparent and open processes, striving for wide inclusion of all actors and strong representation of the current state of the eMobility market;
- In the medium-term, eMI³ aims at supporting and further developing interoperability of the current major PEV initiatives and PEV market ramp-up by developing initial eMobility ICT data standards to be jointly implemented; and
- The long-term objective is to promote adoption and involve more partners, striving to achieve widespread international harmonisation and globally accepted and implemented ICT standards for the PEV markets.

The collective behind eMI³ is committed to working together and leveraging its initial successes in creating a truly open forum dedicated at accelerating the PEV uptake, and appropriately complementing the investments being made by member states through the recently announced European Clean Fuel Strategy as well as other similar initiatives internationally.

eMI³ started as a 15-member-interest group based on an initial letter of intent signed 8 October 2012. Since January 2013, eMI³ has been developing as an innovation project platform hosted by ERTICO (the platform for Intelligent Transport Systems and Services in Europe). As of 17 May 2013, the eMI³ member count has already reached 41 and continues to grow.



eMI³ Collaborators

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