

Brussels, 24 March 2015

E-mobility and Smart Charging

EXECUTIVE SUMMARY

In its Energy Union Communication, the European Commission announces determined action towards achieving an energy efficient, decarbonised transport sector and European leadership in electro mobility and energy storage technologies. It promotes a gradual transformation of the entire transport system, as well as the increased development and deployment of the necessary alternative fuels infrastructure, such as refuelling and recharging stations. Europe's engineering industries represented by Orgalime are ready to support such a transformation and have provided their recommendations for a rapid and successful implementation of the Directive 2014/94/EU on the Deployment of Alternative Fuels Infrastructure¹, which we support as a key policy instrument in this area, including for the promotion of smart charging.

Orgalime's believes that the basic infrastructure for charging electrical vehicles is already available unlike for other alternative fuel technologies. Nevertheless, the electrical infrastructure needs some adaptations to be prepared for mass deployment of electrical vehicles. Our industries possess system level expertise in all parts of the E-mobility value chain to integrate electrical vehicles into modern infrastructures, offering convenient solutions for customers.

Charging an electrical vehicle (EV) is similar to any other electrical load for the grids but it needs to be managed to avoid increasing peak load. Smart charging functions are a key enabler for energy management in homes and buildings as well as in public charging stations. Moreover, when the smart charging system is embedded into a smart grid, it will facilitate a balanced integration of renewable energy into the electricity grid and help to limit peak demand of electricity for EV.

Member States, we therefore believe, should take fully into account smart charging (as defined by the CEN-CENELEC-ETSI smart charging working group) for electric vehicles and its functions regarding the deployment of recharging infrastructure for both, public and private users, when implementing Directive 2014/94/EU and when establishing any new government scheme under the future Energy Union.

Orgalime's key recommendation is to ensure that investment made in the next few years, as a result of Directive 2014/94/EU and Member States' initiatives, are conducted wisely and in the knowledge and recognition of the growing potentials and benefits of energy management and of the need to minimise the impact of EV charging on the grid when the growth of EVs reaches a critical level. This can be done by building business cases now, which will drive future investment.

In the present position we therefore provide more details into our views so as to underpin our recommendation.

¹¹ Please see: [Orgalime Position Paper on Transposition and Implementation of the Directive 2014/94/EU](#)

Orgalime, the European Engineering Industries Association, speaks for 41 trade federations representing some 130,000 companies in the mechanical, electrical, electronic, metalworking & metal articles industries of 23 European countries. The industry employs some 10 million people in the EU and in 2013 accounted for more than €1,700 billion of annual output. The industry accounts for over a quarter of manufacturing output and a third of the manufactured exports of the European Union.

DETAILED COMMENTS AND SUGGESTIONS OF EUROPEAN ENGINEERING INDUSTRIES ABOUT PRIORITIES FOR THE SMART CHARGING OF ELECTRIC VEHICLES

1. Introduction

People's mobility needs require new solutions and a system of different mobility options that can be individually combined. Cities need an improved network of intelligent transport systems that are accessible, secure, reliable and sustainable, especially in congested urban areas. E-mobility is one of the key solutions for our modern times.² Orgalime therefore fully supports the EU's Energy Union Communication that requires "the integration of electric vehicles in urban mobility policies and in the electricity grid, both as energy consumers and potential storage facilities."³

Orgalime's believes that the basic infrastructure for charging electrical vehicles is already available in the electric grid unlike for other alternative fuel technologies. Yet, the infrastructure needs some adaptations to be prepared for mass deployment of electrical vehicles and charging infrastructure itself must integrate smart charging capability.

The electrical engineering industries are the only industrial sector involved that possesses system level expertise in all parts of the electro-mobility system chain – from power generation, transport and distribution of electric power and batteries, to the control-and-drive elements fitted to vehicles.

We also support the EU Energy Union's commitment that Europe needs indeed to speed up electrification of its car fleets and other means of transport to break the oil dependency and decarbonise transport. Our industries are champions in developing the required technologies and are ready to support the EU to become a leader in deploying electro-mobility and energy storage technologies. This clearly acknowledges E-mobility as a strong use case of smart grids in the future, which we welcome.

The electric car is indeed part of the new world of energy. Electric vehicles and the electric charging infrastructure must be regarded as part of this whole new system. An EV could also be used as an electrical storage, even providing a practical means to use overproduction of renewables when it occurs, which is already the case in some Member States and will occur more and more often in Europe, and will provide flexible services to the grid, in EV to home or EV to grid configurations. Our industries are therefore ready to integrate electric vehicles into modern infrastructures, offering convenient solutions for customers.⁴

Respective policies in relation to electrical vehicles need to focus in particular on their seamless and intelligent integration into smart grids and their attractiveness to the customer. Smart grid solutions have significant potential to optimise the whole energy system from production to distribution and consumption of energy, in the field of electricity, heating and transport.

E-mobility, as such, is a new concept of mobility, including driving new behaviours for electric vehicles, electric bicycles and a new infrastructure, which together give Europe an opportunity to combine the strengths of different transportation modes. Sustainable mobility action plans developed and extensively implemented throughout Europe in the framework of smart cities strategies should include the possibilities offered by E-mobility.

In conclusion, smart mobility innovations should be supported. Moreover, innovation is key to find solutions and new business models that deliver the best mobility services with the minimum impact on the environment and in support of an energy transition process.

² [Electra II - 'The Smart World'](#)

³ COM (2014) 80

⁴ [Orgalime Position Paper on Integrating e-vehicles into modern infrastructures](#)

2. Smart charging

Orgalime supports the definition of smart charging adopted by the CEN CENELEC ETSI Smart Charging Working Group:

‘Smart Charging is the communication of information and services between E-Mobility and smart grid technologies, and associated actors. Smart Charging of an electric vehicle is when the charging cycle can be altered by external events, allowing for adaptive charging habits that result in more grid friendly behaviours and more efficient management of power demand and energy used during the charging process.’

Orgalime also supports the defined scope encompassing ‘value added services’, such as the location and reservation of charging spots. Developing an interoperable back office system will be essential in ensuring the accessibility of public recharging points.

3. Orgalime’s general views on E-mobility and smart charging of electric vehicles

The overall driver for smart charging is to minimise the peak load on electricity networks. The grid can cope with the existing levels of EVs on the system today, but if we consider the trajectory for the growth in EV and plug-in hybrid vehicles and the infrastructure requirements for this going forward, the impact on peak electricity load could be significant, if the appropriate management systems are not in place.

Furthermore barriers to the implementation of fast charging infrastructure is already evident on the market today. The connection of larger loads may already require some network upgrades and the cost of which undermines the business case for the operation of charging infrastructure until the growth in EVs reaches a critical level.

Building a business case for smart charging infrastructure both, at domestic and public level, can therefore provide a more attractive proposition to a potential owner and operator of charging infrastructure.

Orgalime calls on regulators to consider this in order to ensure that the infrastructure installed following the implementation of the Directive, is fit for purpose and will help to promote and support a long term market for the operation of charging infrastructure. We give some examples below for both, domestic and public smart charging:

Domestic smart charging

Smart charging will be essential in ensuring that Plug-In-Vehicle-Recharging occurs as much as possible off peak, during periods of low electricity demand or even of overproduction. This will also ease the integration of renewable energy sources and will minimise the potential impact of clusters of electric vehicles on local distribution networks, and overall peak electricity demand.

Orgalime supports the move to dedicated smart domestic charging modes, recognising that this will allow for ‘smarter’ recharging capabilities, in line with the objective of improved energy management. It is widely recognised that the majority of electric vehicle charging will take place at home and therefore poses a potentially high load on the domestic electricity supply system. This emphasises the need of developing an efficient and smart home charging system. This could lead to smart energy use by applying building automation and control systems to expand integration opportunities for storage or distributed energy resources and optimise the total costs of ownership.

Orgalime agrees that interoperability between mode 3 recharging equipment and other energy management and back office systems will be key to ensuring that smart charging is facilitated.

This includes interoperability between actors, E-mobility and smart grid technologies.

This is especially so for domestic recharging systems. With the installation of smart meters, opportunities for demand side response (DSR) will open up and peak load shifting should be facilitated through the connection of low carbon technologies, including the electrical vehicle recharging point. The market needs for domestic smart charging should therefore be assessed to ensure the future interoperability of the EV recharging systems with other smart technologies and in-home control systems.

Real time consumption and energy price data can be made available to the consumer through smart metering, and charging solutions on the market today are being designed with the capability to read and respond to this data should the customer allow. We can already provide simple static tariffs for EV owners and associated timers on charging to ensure this takes place off peak. However, it must be recognised that peak demand will change considerably in the future as a result of other low carbon technologies or the implementation of distributed generation. We need to build an infrastructure that is flexible at both, the customer end and on the grid.

Public smart charging

Barriers to public infrastructure could emerge, especially for faster DC chargers, due to reinforcement requirements on the grid as a result of connection. Orgalime therefore suggests to consider business cases to alleviate the reinforcement requirement on the grid as a result of installations, and consequently reducing the cost at installation. This would also provide in the longer term opportunities for owners and operators of charging infrastructure. Energy storage on the grid is a way to mitigate this impact of fast charging.

Indeed business models could be made more viable through the adoption of storage technologies along with charging stations.

In this context, we raise that the re-design of the electricity market model as announced under the Energy Union Communication will be essential to reap these opportunities through the establishment of a future energy retail model that facilitates greater involvement of energy end users and distributed generation in a truly consumer centric, competitive energy market.

We highlight the links of this work to the EU Smart Grid Task Force Expert Group 3, which has recently provided recommendations on the regulatory and commercial requirements for flexibility and Demand Side Response.

Orgalime wishes to emphasise that the technology to enable the grid integration of EV charging solutions is available today. However, the commercial and regulatory arrangements must be put in place to enable the flexibility of EV charging and to open opportunities for the consumer and operator of storage solutions to gain some benefit from their investment in smart charging.

This EG3 report of the EU Smart Grids Task Force in our view represents a starting point for the Energy Union follow up. However, Orgalime believes that in several critical areas more innovation and evolution in the market would be feasible from a technology perspective and will become necessary in order to exploit the full potential of flexibility, in the area of E-mobility. For example, we cite the need for more transparency in constraint management, a broader perspective on incentives clearly beyond traditional investments, more harmonisation for the assessment of Demand Side Flexibility potentials or other actors than DSOs as data managers and generally the creation of a more competitive electricity market design with fully empowered consumers.

4. Orgalime's views on smart charging in relation with the implementation of Directive 2014/2014/EU

In Article 4 of the Directive, Member States are asked to set national targets to ensure that an appropriate number of recharging points accessible to the public are put in place by 31 December 2020.

Orgalime believes that Member States should give a clear investment signal for both, private and public investors: this is required to drive a significant deployment and for our industry that develops and manufactures the technologies. Moreover, an ambitious number of recharging points would increase confidence of electric vehicle users and is crucial for further development of the market for electricity as one of the alternative fuels.

For sizing the infrastructure, it is usually agreed that there need to be, on average, two charging points per electric vehicle and that the large majority of these points will be private. As a consequence, there should be typically two public charging points per ten vehicles, which is consistent with the indication given in recital 23 of the Directive of "at least one (public) recharging point per ten cars.

As for the estimated 90% of private charging points, Orgalime advises strongly that Member States should take fully into account smart charging for electric vehicles, when drawing up their national plans for the deployment of recharging infrastructure for both, public and private users (see our detailed views in the Orgalime Position Paper⁵ on the transposition and implementation of the Directive.

5. Data security

Data Security will be an important element to the smart grid and therefore any smart charging system. Ensuring that consumer data is communicated on secure networks for domestic and public recharging will be essential in building consumer acceptance of smart charging.

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⁵ [Orgalime Position Paper on Transposition and Implementation of the Directive 2014/94/EU](#)