GEODE FACT SHEET

E-Mobility and the Role of DSOs to help Decarbonising the Transport Sector

Introduction

The transport sector is responsible for around a quarter of EU greenhouse gas emissions, making it the second biggest greenhouse gas emitting sector after energy, and is still increasing significantly (20% higher than in 1990). Road transport alone contributes about one-fifth of the EU's total emissions of carbon dioxide (CO2). One key technology to help reach the targets set by the European Commission is to replace fossil motor vehicles by electric vehicles (EVs), provided there is sufficient non fossil power capacity available in the grid. The role of DSOs in E-Mobility is key as it provides a secure and reliable connection to the network, at the request of the customer, thereby enabling to establish a well functioning EVs recharging infrastructure. Furthermore, DSOs are providing not only the connection point, but also ensuring the quality of supply and managing of metering consumption, just as for any other consumer.

POLICY & REGULATORY REQUIREMENTS

- E-Mobility is key for decarbonising the transport sector, provided that there is enough fossil free production capacity available in the grid.
- Building a sufficient number of recharging points with a common technical standard is fundamental for electrifying the transport sector. European DSOs are well placed to facilitate the development of EV recharging infrastructure.
- If the market for developing recharging points does not show enough interest, DSOs should be allowed to carry out this activity until market maturity is achieved, by exemption granted by the National Regulatory Authority (NRA)[1].
- In terms of sector integration, EVs are mobile storage that can help to stabilise a decentralised smart grid and to integrate renewable energy sources.
- DSOs need to have the possibility to influence the charging processes in order to minimise the impact on the distribution grid and safeguard grid stability (smart/coordinated charging).
- DSOs should be allowed to have direct contracts with customers and operators of EVs recharging infrastructure to be able to influence charging processes (procure flexibility services) as an appropriate management tool, due to the local dimension of the DSOs' requirements.
- E-Mobility and modern EVs will help implement autonomous driving and future coordination of traffic, especially in urban areas.
- For a further electrification of the transport sector, European funding programs are appropriate mechanisms to kick-start the development of EVs recharging infrastructure, taking existing best practices into account.

[1] Art. 33 Electricity Directive (EU) 2019/944

Market Models building a re-charging infrastructure

The new regulatory framework provided by the Clean Energy Package, Art. 33 of Recast Electricity Market Directive 2019/944 promotes market principles for building EVs recharging infrastructure in the most cost efficient way. Still, market actors might be mostly interested in deploying recharging infrastructure in urban areas where there is high demand. In rural areas on the other hand, where recharging demand is lower, subsidies will probably be needed and maybe even stronger regulatory instruments, such as regional development plans. Further issues to be addressed are standard solutions and products for the EVs recharging infrastructure.

Possible Market Models:

- **Subsidies:** the infrastructure investment will be subsidised by public authorities until an economically viable number of EVs are on the road and the revenue from customers covers the costs of owning and operating the infrastructure[2].

- **Market driven approach:** In some Member States, such as Germany, DSOs have – in their role as neutral market facilitators – been operating EVs recharging infrastructure as long as this is done in compliance with the condition of non-discriminatory access. In other Member States (e.g. the Netherlands, Ireland and Spain) it is the exception that DSOs run EV charging stations. This will change with the implementation of Art. 33 of the Electricity Directive 2019/944, according to which DSOs will as a rule be prohibited from carrying out such activities – to own, build, manage or operate recharging infrastructure, unless regulators grant exemptions for situations when market actors are not willing to invest.

Technical Barriers and Challenges

- When assessing the impact of EVs on the electricity grid, the expected load (capacity, kW) is the key parameter – and not the energy consumed (kWh). As for the costs of grid integration, this can be illustrated by the principle “slow charging is cheap".

- A high degree of simultaneity of the charging processes – many EVs being charged at the same time – would bring the existing grid to the limit of feasible performance (grid stability). This could happen even with a low penetration of EVs in the event of a geographic accumulation of charging points.

- With an increasing number of charging locations for EVs on the road, it will be necessary to reinforce electricity distribution grids in a well-directed and timely way. There is the option of developing intelligent solutions for coordinated charging strategies which help to minimise the impact on the grid while, at the same time, fulfilling customer needs (“smart charging”).

- Today most EV chargers are added to existing connections. This means that in practice either the existing contract between the customer and the DSO can be used as it is (in case the charger can be added to the existing agreement, within the fuse size agreed upon) or that the contract (and fuse) has to be upgraded by the DSO to match the new loads.

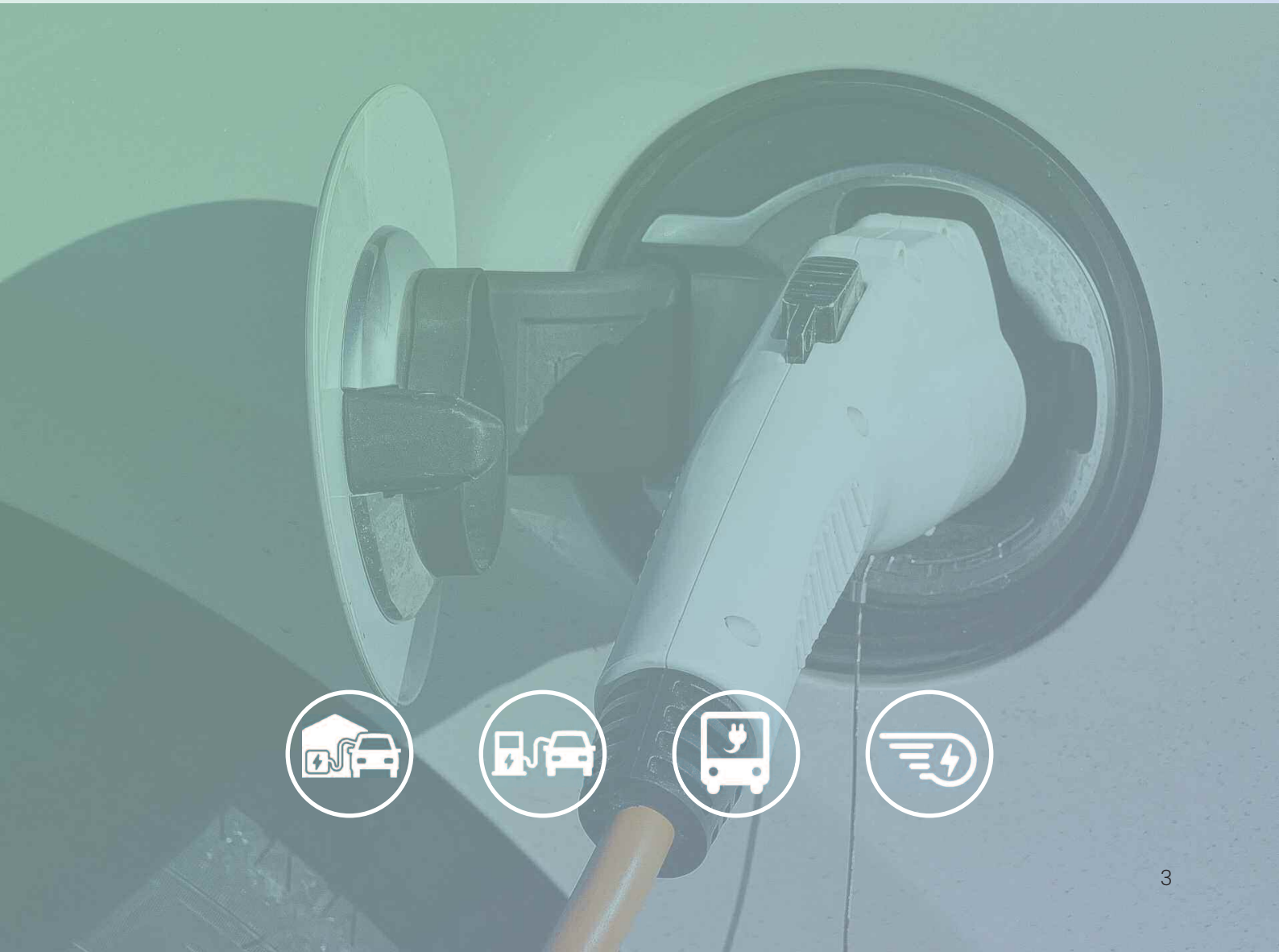
[2] For example, in 2018 in Norway every second new car sold is electric, reaching more than 180.000 – or 10% in market penetration which is the highest across Europe (as compared to 70.000 / 7% in Sweden). In the Norwegian model, the owners/operators compete for subsidies based on criteria for deploying the best and most appropriate public infrastructure.

Economical Barriers and Challenges

- The lack of investments, especially in infrastructure and EVs recharging infrastructure due to high investment costs and expected low utilisation rates, are current barriers in many Member States.
- In most European markets, comparable cars powered by fossil fuels are still cheaper than those powered by electricity – which makes it difficult to set up any market based EVs recharging infrastructure.
- In a number of European countries, new tax legislation is aiming to reduce economic barriers, such as promoting the sales of EVs, or offering better tax deals for companies to switch to electric cars.

ACTIVITIES OF GEODE MEMBERS IN E-MOBILITY

As local energy companies, GEODE's members are highly involved in e-mobility. These activities range from providing public and private EVs re-charging infrastructure to pilot projects for smart charging (time or capacity regulated control of the charge). Find at our website **http://www.geode-eu.org/activities-of-geode-members-in-e-mobility** links to projects and activities of GEODE members.



Annex - Types of charging and Impact on Distribution Networks

Private charging

In this case, the customer connects the EV, behind the meter of the DSO, e.g. via a wallbox, to the house installation. Typical private charging profiles indicate that demand coincides with peak residential demand, as the consumer charges in the evening, e.g. when coming home from work. For distribution networks this can become a challenge to fulfill varying customers' energy requirements at the same time.

Public charging

Public charging is located in public areas and usually owned and operated by market actors – Charging Point Operator [CPO] and/or E-Mobility Service Provider [EMP]. Alternatively, a company or a service provider engaged by these companies could operate a charging station. Typical public charging profiles indicate that demand coincides with peak commercial demand, as the customers charge during the operating hours of business facilities. From the grid perspective, although there are times when energy demand can be shifted to favour network utilisation, consumer behavior suggests that load shifting in public charge points is more difficult to enforce, unless it is absolutely needed due to a grid emergency situation. Also, there is the possibility to limit the capacity, in order to maintain grid stability – for instance, the capacity of some or all recharging points can be reduced during peak hours.

Bus charging in the City

With the third Clean Mobility Package, the European Commission is aiming to speed up the electrification of bus fleets for public transport. The electrification of busses can be realized taking different approaches, either with an overhead line-charging-system (O-Buses), such as for tramways, or buses equipped with batteries. For battery equipped e-busses, a number of questions need to be addressed: Does the interval allow time for charging the batteries at the terminal? Does the electrification of the fleet require additional buses to be made available? Does the altitude profile of the different lines allow electrification (individual assessment necessary)? Are adequate e-buses available on the market? Currently, the use of e-buses in cities is still at an early stage. However, the volume will grow rapidly, which is why the DSO needs to be involved in the planning and implementing process as early as possible.

Fast charging / Ultrafast charging infrastructure on highways

In some countries and also X-border, a comprehensive and fast charging infrastructure along highways is being built to allow travelling over great distances with EVs. Fast chargers with 50kW and more can recharge car batteries in short time. In general, the timing of the charging is difficult to forecast. Close cooperation of the charging station operator with the connecting DSO is necessary to allow the development of smart solutions for the benefit of all participants.