

# Electro-Mobility: A clear solution for sustainable transport and energy

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A EURELECTRIC policy brief

September 2015

***EURELECTRIC is the voice of the electricity industry in Europe.***

*We speak for more than 3,500 companies in power generation, distribution, and supply.*

***We Stand For:***

***Carbon-neutral electricity by 2050***

We have committed to making Europe's electricity cleaner. To deliver, we need to make use of **all low-carbon technologies**: more renewables, but also clean coal and gas, and nuclear. Efficient electric technologies in **transport and buildings**, combined with the development of smart grids and a major push in **energy efficiency** play a key role in reducing fossil fuel consumption and making our electricity more sustainable.

***Competitive electricity for our customers***

We support well-functioning, distortion-free **energy and carbon markets as** the best way to produce electricity and reduce emissions cost-efficiently. Integrated EU-wide electricity and gas markets are also crucial to offer our customers the **full benefits of liberalisation**: they ensure the best use of generation resources, improve **security of supply**, allow full EU-wide competition, and increase **customer choice**.

***Continent-wide electricity through a coherent European approach***

Europe's energy and climate challenges can only be solved by **European – or even global – policies**, not incoherent national measures. Such policies should complement, not contradict each other: coherent and integrated approaches reduce costs. This will encourage **effective investment to** ensure a sustainable and reliable electricity supply for Europe's businesses and consumers.

***EURELECTRIC. Electricity for Europe.***

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The current energy transition is leading to a much cleaner, interactive and customer-friendly power system. As the power sector pursues carbon-neutrality towards 2050, electro-mobility becomes the obvious choice for driving sustainable transport. It is high time that electrification of transport becomes a prominent part of EU policy - and thus takes centre stage on the agenda of the Energy Union, the 2030 framework debates and the review of the EU Transport White Paper.

## I. WHY SHIFT TO ELECTRO-MOBILITY?

- **Reducing CO<sub>2</sub> emissions:** In 2013 alone, the power sector generated 54% of all EU's electricity with low-carbon power and strives for decarbonisation by 2050. Fuelling cars, vans and buses with electricity would thus considerably reduce CO<sub>2</sub> emissions in transport as well. Electric vehicles (EVs) do not produce emissions at the tailpipe, but even when considering the emissions from power plants, they lead to lower CO<sub>2</sub> emissions than conventional cars. With the EU average power sector intensity of 305 g CO<sub>2</sub>/kWh<sup>1</sup> in 2013, an EV consuming 20 kWh per 100 kilometres only emitted 60 g CO<sub>2</sub>/km. This means that already today an EV is well below the 2021 target of 95 g CO<sub>2</sub>/km for new cars.
- **Improving air quality and noise levels in cities:** An electric motor does not release any waste gases or exhaust fumes, thereby EVs can significantly cut the level of air pollutants in cities (especially PM or NO<sub>x</sub>). At the same time, the power sector has drastically reduced its own emissions that affect air quality between 1990 and 2012: SO<sub>2</sub> and NO<sub>x</sub> pollutants fell respectively by 85% and 55%, while emissions of PM<sub>2.5</sub> dropped by 70%. In any case, power plants are normally located far from populated areas and their emissions have a lower health impact than car emissions in cities.
- **Integrating renewables:** EVs will support the power system in its energy transition by maximising the local grid integration of variable renewables. Electric vehicles can play a dynamic part in the electricity system by acting as local storage connected to a smart home charged from customers' own solar panels. This will also facilitate the integration of prosumers in the electricity system while reducing the peak production exported to the grid and flattening the demand curve.
- **Enhancing energy efficiency:** The electric motor is inherently more energy efficient than other engines. In terms of energy consumption, EVs can be three to four times more energy efficient than conventional fuel cars. To illustrate this: already today, in a 100% electrification scenario, electric cars would allow Europe to achieve considerable energy efficiency gains with a net reduction of 137 Mtoe (million tons of oil equivalent) per year in the EU by 2035<sup>2</sup>.
- **Improving energy security:** The EU's transport sector is 94% dependent on oil<sup>3</sup>, with a bill of up to €1 billion per day on oil imports. Using electricity in transport – above all when electricity is increasingly generated domestically e.g. via renewable energy sources in Europe - would help reduce those imports and thereby lower the annual cost of the EU's oil import bill.

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<sup>1</sup> EEA carbon intensity includes both power and heat production, for electricity it is expected to be slightly lower

<sup>2</sup> EURELECTRIC "Smart charging: steering the charge, driving the change"

<sup>3</sup> [http://ec.europa.eu/transport/themes/urban/cpt/index\\_en.htm](http://ec.europa.eu/transport/themes/urban/cpt/index_en.htm)

- **Boosting sustainable growth:** Electro-mobility, including also the deployment of charging infrastructure and the development of new business models, helps to bolster jobs and growth creation in Europe.
- **Lowering the cost of ownership:** The switch to electricity also leads to a reduced cost of ownership for EV drivers mainly due to cost savings on fuel. EV owners can end up paying three times less for their energy consumption over their vehicle's lifetime than owners of a diesel or petrol car. In some cases, EVs could be even cheaper today on a total cost of ownership basis (including government incentives). True cost parity for EVs with conventional cars is however expected by 2020<sup>4</sup>.

## II. CAN THE POWER SYSTEM COPE AND BY HOW MUCH?

- The electricity industry is ready to cope now with transport electrification as **the additional energy demand from electro-mobility is manageable**. Even assuming a scenario where 100% of the cars on Europe's roads were electric today, these vehicles would increase the current electricity demand by about 24% or 802 terawatt hours. There is therefore sufficient spare capacity to meet this additional EV consumption without additional investments in the system (e.g. kilometre of transmission line).
- If the charging process is concentrated in small areas (i.e. clustering) and/or during peak hours, additional investments in the distribution system may be needed, but they can be minimised or eventually avoided with **smart charging**. EURELECTRIC thus recommends such intelligent charging, whereby the vehicles will charge when electricity supply and grid capacity is plentiful. This would also result in improved utilisation of grid and generation assets which will ultimately tend to reduce electricity prices for all customers.

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<sup>4</sup> Will solar, batteries and electric cars re-shape the electricity system?, UBS, August 2014

### III. WHAT IS NEEDED TO GET THERE?

#### 1. Create a comprehensive strategy for electro-mobility

Europe's citizens stand to gain the most from the development of comprehensive strategies for electro-mobility: they can benefit from a cleaner, new and versatile technology that improves not only the environment but also their lifestyle.

- Until now, member states lacked a clear action plan on electro-mobility. But the implementation of the Alternative Fuels Infrastructure (AFI) Directive (2014/94/EU) provides a clear opportunity for this to change. Governments should **develop comprehensive and ambitious national plans** for the development of electro-mobility, including clear targets for recharging infrastructure and EVs, public procurement measures and other implementing mechanisms.
- **Adopt a post-2020 approach for transport decarbonisation.** Electro-mobility has to be part of the agenda. Although missing at the beginning, it is encouraging to see that the European Council of 24 October 2014 requested measures on decarbonising transport, including electric transport<sup>5</sup>. Equally, the Energy Union Strategy's push for electrification of transport and for making Europe "a leader in electro-mobility and energy storage technologies" represents yet another welcoming sign.
- **Define ambitious CO<sub>2</sub> emissions targets for cars and vans.** EURELECTRIC supports the Commission's continued focus on limiting CO<sub>2</sub> emissions standards from passenger cars and vans beyond the 2021 target of 95 g CO<sub>2</sub>/km. The EU needs a strong mechanism to effectively tackle vehicle CO<sub>2</sub> emissions and improve the attractiveness of EVs as a result.
- **Boost customer acceptance through the use of incentives.** A big push for EVs could come from the introduction and maintenance of EV tax exemptions from VAT<sup>6</sup>, purchase tax, annual circulation or car registration charges<sup>7</sup> – all of these can be used for a limited number of years. As for non-financial support, preferential on-street parking for EVs can be very useful in relieving customers' worries on finding unoccupied charging spaces.
- **Lead by example with public procurement.** Public authorities should play an exemplary role by setting specific targets to introduce cleaner vehicles in their fleets. As the share of cars bought by companies can be quite high (about 50% of the passenger cars in Europe), public authorities could also encourage the use of private procurement for commercial fleets. The current lack of context in the Clean Vehicles Directive could be strengthened by linking it to the AFI national plans or even extending its scope to private service companies (e.g. contracting services for public services).

<sup>5</sup> [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/ec/145356.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145356.pdf)

<sup>6</sup> Not widely used besides Norway

<sup>7</sup> This could vary depending on the level of CO<sub>2</sub> emissions

## 2. Adopt a system approach to urban mobility and power systems

As more and more consumers become electricity prosumers and explore new, innovative solutions, there is a need to integrate urban mobility with electricity generation and consumption in the development of smarter cities.

- **Support a holistic approach to fully integrate electro-mobility in urban mobility.** As 70% of energy is consumed in cities, a **smart city approach** including sustainable and intelligent private and public transport is needed. Smart cities projects should be linked to transportation plans without forgetting car-sharing and car-pooling.
- **Expand electrification to the full transport value chain by encouraging manufacturers to extend their offers.** A clean alternative to urban public transport, electric buses are becoming commercially available. In the long term, the partial or full electrification of heavy-duty vehicles and long-haul buses and coach fleets should also be considered.
- **Integrate electro-mobility in an optimal way in the power system.** Smart charging should be incentivised so that charging takes place at times when electricity supply is plentiful – i.e. from excess renewables - and when prices are low. Equally important is the grid friendliness of the charging process taking into account volatile grid capacity on the local level to avoid unnecessary grid extensions. As 90% of the charging is due to take place in homes and workplaces, charging in these locations should become a priority.

## 3. Prioritise charging infrastructure development and investments

Customers need to have the same confidence in EVs as they have in diesel or petrol cars. The provision of charging infrastructure will increase drivers' confidence in the car's range. For electro-mobility to be successful, the development of new business models and new, interoperable, customer-friendly payment and access systems are needed.

- **A combination of both private and public investments** will be needed to tackle the current lack of a clear business model for public charging. With the current low numbers of EVs, **it is very difficult to establish a business case for investment in public charging.** Another reason is the small manufacturing scale of charging points. In some cases, the full cost in kWh for (semi-) and public recharging stations could be almost as high as double the cost of private ones in some cases<sup>8</sup>.
- This should be accompanied by **additional measures** to better foster successful business models. Easier permitting rules or tenancy regulation on charging installation represent some solutions. National authorities should set clear plans for outlining the location of charging points based on traffic movement, people flows and highly-frequented location. Providing drivers with clear information of charging point location is equally important.

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<sup>8</sup> German National Platform for Electric Mobility (Progress Report 2014)

- **Interoperable payment and access system** to enable customer-friendly use of public chargers is key. Payment methods today vary and do not always meet these criteria. It is possible to use long-term subscriptions or short-term “pay-as-you-go” solutions - either based on the time used or on the kWh consumed. These systems should allow for roaming and avoid closed networks.

## **EURELECTRIC, the European power sector association, contributes actively to European Research on e-mobility, in partnering in FP7**



### **ZeEUS (Zero Emission Urban Bus System)**

In January 2014, EURELECTRIC signed up to the Zero Emission Urban Bus System (ZeEUS) FP7 project, one of the largest projects funded by the European Commission on electric buses. Through 8 live operational demonstrations across 6 European countries, the project will evaluate the environmental, economic and societal feasibility of electric bus systems in order to facilitate faster market uptake of electric buses in Europe.



### **Green eMotion**

After four years of promoting the potential of electric cars, the Green eMotion project has come to an end in February 2015. Its biggest achievement was to demonstrate that true EV interoperability works in practice. The project has thus succeeded in demonstrating the technical possibility of so-called “roaming” solutions whereby drivers can charge their cars at any recharging point regardless of the operator. The results can be found [here](#).

## **EURELECTRIC members’ work on electro-mobility:**

A list of electro-mobility projects that EURELECTRIC members are engaged in can be found [here](#).

EURELECTRIC pursues in all its activities the application of the following sustainable development values:

Economic Development

▶ Growth, added-value, efficiency

Environmental Leadership

▶ Commitment, innovation, pro-activeness

Social Responsibility

▶ Transparency, ethics, accountability



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