

## Electromobility in the EU

### State of Play and Way Forward

June 2015

#### Why the EU needs EVs?

Currently, passenger cars alone are responsible for over 15% of total CO<sub>2</sub> emissions in the EU. The global car fleet is predicted to double from 800 million to 1.6 billion vehicles by 2030. In view of goals to decarbonise transport, meet climate change objectives and reduce air pollution, this calls for technological advancements to ensure sustainable mobility in the long term. There are a variety of clean vehicle technologies and fuels in development and use, but electric vehicles (EVs) represent one of the most promising technologies for cutting CO<sub>2</sub> emissions, reducing oil imports and improving local air quality. Additionally, EVs will help to increase the predictability of the electricity sector, as EV batteries can be reused to store and manage wind and solar-based electricity.

According to a recent report of the International Energy Agency, three-fourths of global car sales will need to be in EVs or plug-in hybrids by 2050 if the transportation sector is to do its part in avoiding an increase in global average temperatures of more than 2 °C: the

recommended threshold to avoid irreversible climate change.<sup>1</sup>

**Did you know?** In 2030 there will be 1.6 billion cars on the roads – this will outnumber the current number of cattle (1.4 billion) – which themselves currently make up a mass twice that of the world's population.<sup>2</sup>

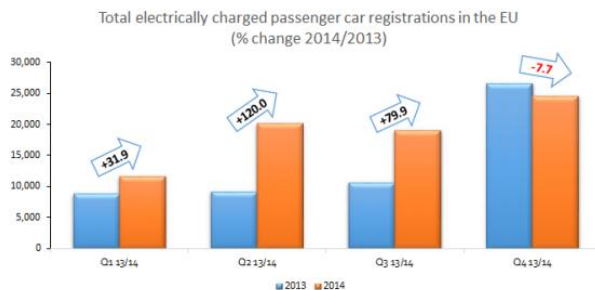
Fortunately, the EU has made some progress in the right direction. In 2014, 75,331 new EVs were registered in the EU, amounting to a 36.6% rise compared to 2013. This expansion has been primarily driven by the UK, who saw the largest increase over the year by 300.8%, followed by Germany whose EV sales increased by 70.2% and France who saw a 29.8% increase. In Norway, on the other hand, the total number of registered EVs reached 50,000 in April 2015, thereby meeting its set EV target two years ahead of planned schedule. The graph below illustrates the overall increase in EV registrations in the EU from

<sup>1</sup>[http://www.iea.org/topics/transport/subtopics/electricvehicles/initiative/EVI\\_GEO\\_2013\\_FullReport.pdf](http://www.iea.org/topics/transport/subtopics/electricvehicles/initiative/EVI_GEO_2013_FullReport.pdf)

<sup>2</sup><http://www.economist.com/blogs/dailychart/2011/07/global-livestock-counts>

2013 to 2014. EV registrations have also more than doubled, rising from 11,304 in the first quarter of 2014 (Q1) to 24,630 in Q1 of 2015.<sup>3</sup>

NEW ELECTRIC VEHICLE REGISTRATIONS  
IN THE EUROPEAN UNION<sup>1</sup>



What is more, the newly elected European Commission (EC) has placed particular emphasis on promoting electromobility. EC President Jean-Claude Juncker, revealed a €315 billion investment package to boost Europe's economy, making specific reference to EVs and energy efficiency industries as proposed beneficiaries of this package. Furthermore, the recently adopted *Energy Union Strategy* calls on EU Member States to speed up the electrification of transport by ensuring EVs' full integration in urban mobility policies and in the electricity grid, both as energy consumers and potential storage facilities.<sup>4</sup>

**Despite these positive trends, EVs still account for just 0.3% of the total market of around 12.55 million passenger cars sold during 2014 in the EU.**<sup>5</sup> This is largely due to a number of actual or perceived technological, financial, market, and policy challenges. This brief outlines these and proposes ways forward to boost EV deployment, while drawing on the Norwegian success story.

<sup>3</sup>[http://www.acea.be/uploads/news\\_documents/ACEA\\_Electric\\_Vehicle\\_registrations\\_Q4\\_2014-2013.pdf](http://www.acea.be/uploads/news_documents/ACEA_Electric_Vehicle_registrations_Q4_2014-2013.pdf)

<sup>4</sup>[http://eur-lex.europa.eu/resource.html?uri=cellar:1bd46c90-bdd4-11e4-bbe1-01aa75ed71a1.0001.03/DOC\\_1&format=PDF](http://eur-lex.europa.eu/resource.html?uri=cellar:1bd46c90-bdd4-11e4-bbe1-01aa75ed71a1.0001.03/DOC_1&format=PDF)

<sup>5</sup><http://www.acea.be/statistics/tag/category/key-figures>

## Current regulatory landscape

Over the past years we have observed the emergence of a number of initiatives at the European level seeking to improve EU car fleet emissions performance and promote the wider uptake of EVs. In 2009 *Regulation (EC) 443/2009* was introduced, setting out emissions performance standards for new passenger cars, as part of the EU's integrated approach to reduce CO<sub>2</sub> emissions from light-duty vehicles. This regulation is the cornerstone of the EU's strategy to improve the emissions performance of newly sold vehicles on the European market and sets a limit of 130 g/km to be achieved by 2015. From 2020 this level is to be reduced to 95 g/km. In addition, each manufacturer has a specific, binding CO<sub>2</sub> target.<sup>6</sup> If the average CO<sub>2</sub> emissions of a manufacturer's fleet exceed its limit value, the manufacturer has to pay an excess premium for each vehicle registered. In view of the *2030 Climate and Energy Package* adopted in October of 2014, the EC is set to review the legislation and if necessary make proposals for CO<sub>2</sub> emission targets for new vehicles for the post-2020 period. In 2013, a target of 68-78 CO<sub>2</sub>/km was proposed for the year 2025, with the final decision to be reached by 2016.

According to the recent report of the European Environment Agency (EEA), entitled *EEA Dataset on CO<sub>2</sub> Emissions from Passenger Cars*, efficiency of passenger cars and vans in the EU has improved over the past years. The report shows that the average passenger car sold in 2013 emitted 126.7 g/km, which is already below the legal threshold for 2015. Also the majority of manufacturers have achieved their CO<sub>2</sub> emission targets set for 2013.<sup>7</sup> The attainment of emission performance targets ahead of set deadlines can be attributed to technological improvements and

<sup>6</sup>[http://ec.europa.eu/clima/policies/transport/vehicles/cars/documentation\\_en.htm](http://ec.europa.eu/clima/policies/transport/vehicles/cars/documentation_en.htm)

<sup>7</sup><http://www.eea.europa.eu/data-and-maps/data/co2-cars-emission-7>

higher sales of EVs and less carbon-emitting vehicles. These in turn have been triggered by a number of policies and initiatives adopted by the EC.

In June 2009 the EC released its Communication on "*A sustainable future for transport: Towards an integrated, technology-led and user friendly system*", thus launching a debate on the main challenges and opportunities for the transport sector in the next 20 to 40 years.<sup>8</sup> Its key message was clear: the 21<sup>st</sup> century will most likely see the replacement of internal combustion engine (ICE) vehicles with EVs. With growing recognition of EVs' importance, in April 2010 the EC adopted its *European strategy on clean and energy efficient vehicles*, laying out a plan for encouraging the development and eventual widespread use of clean and energy efficient vehicles. The strategy recognises the need for common requirements for EVs in order to facilitate legal certainty for industry and protect consumers. Common standards were acknowledged as imperative to allow all EVs to be charged and to communicate with the electricity grid anywhere in the EU.

In September 2014 the EU adopted *Directive 2014/94/EU* on the deployment of alternative fuels infrastructure (or simply, the "AFI Directive").<sup>9</sup> This new law aims to ensure that the EU meets its 10% renewable transportation target by 2025 and contributes to the attainment of the 60% emission reduction target from transport by 2050. The Directive mandates the building-up of alternative fuels infrastructure, to be implemented by means of Member States' national policy frameworks. The Directive also provides for harmonised technical specifications for charging infrastructure as well as for user information requirements. Member States are to set and publicly disclose their targets and policies on

alternative vehicle infrastructure by the end of 2016. Moreover, each Member State would need to meet a minimum set of re-charging requirements for electric, hydrogen and compressed natural gas (CNG) vehicles, as well as adopt a single set of standards for re-charging stations, in order to ensure Europe-wide compatibility. These measures aim to help facilitate the development of clean fuels and lower their costs, primarily by **establishing a Europe-wide market instead of fragmented national ones**. By the end of 2020 "an appropriate number" of publicly accessible re-charging points are to be made available, to ensure smooth auto circulation.

### What is the way forward?

Despite the recognition of EVs as a crucial component in decarbonising transport, no EU Member State has witnessed the same rate of uptake of EVs as in Norway, where one out of every four new cars sold is an EV. EVs' wider penetration in Europe will require close cooperation between all stakeholders involved, namely EU Member States' public authorities, vehicle manufacturers, infrastructure and energy suppliers, as well as citizens. Each one of these has different motivations and faces different challenges and constraints.

#### *Bellona recommendations to public authorities*

Public authorities are crucial in promoting wider EV uptake. As evidenced in the Norwegian case, substantial taxing differences need to be established in order to incentivise the purchase of EVs vis-à-vis ICE cars. A recently published report by Transport & Environment confirms the importance of an appropriate taxation framework in facilitating EV uptake. For instance, despite taking into account CO<sub>2</sub> emissions, the UK's road tax, also called the vehicle excise duty (VED), has failed to provide a strong enough price signal to change consumers' behaviour. VED payments for

<sup>8</sup> [http://ec.europa.eu/transport/themes/strategies/doc/2009\\_future\\_of\\_transport/2009\\_comm\\_future\\_of\\_transport\\_policy\\_en.pdf](http://ec.europa.eu/transport/themes/strategies/doc/2009_future_of_transport/2009_comm_future_of_transport_policy_en.pdf)

<sup>9</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0094>

ICE cars have not been sufficiently different from the ones for EVs to induce a change in consumer behaviour.<sup>10</sup> **Bellona therefore calls** on public authorities to ensure substantial tax differences are established between ICE cars and EVs in order to incentivise the wider uptake of EVs.

‘Cost saving’ has been quoted as the key motivation for purchasing an EV in Norway. The substantial cost difference achieved between EVs and ICE vehicles in Norway is, however, largely due to already high tax levels for the latter. In countries where a potential tax difference is less pronounced, operational cost savings can prove equally incentivising. In addition to providing substantial taxation differences, Norway has reduced operational costs of EVs, by granting free parking and re-charging, and privileged access to bus lanes. The granting of such privileged access in cities should however, be accompanied by time or other limits to avoid problems of congestion of such zones and inadvertently inconveniencing public transportation. The combination of the above measures have rendered EV prices comparable and even relatively lower than similarly sized fossil fuel models in Norway. In addition, it is important to note that EVs have substantially lower running costs, even in electricity markets with significantly higher prices than Norway.

As the technology improves and prices lower further, EVs will become more competitive in an increasing number of segments, thus boosting sales further. Until that point, however, public authorities would have to provide incentives strong enough to give EVs a competitive edge in a market segment large enough to attract suppliers.

Public authorities also play a crucial role in ensuring investment in visible and accessible infrastructure which generates confidence among

the public to purchase EVs. Consumers’ confidence would be undermined by the actual or perceived lack of and incompatibility between re-charging points. In order to boost consumer confidence and overcome the ‘range anxiety’ barrier to EV uptake, **Bellona calls** for the timely and ambitious implementation of the recently adopted AFI Directive, which sets common technical standards for the building of re-charging stations for EVs as well as a minimum number of re-charging stations per Member State. The AFI Directive is an important step in the right direction as the establishment of a Europe-wide market for EVs instead of fragmented national ones would further lower costs and help to eliminate consumer anxieties.

**Bellona calls** on Member States to ensure the EV re-charging stations are fuelled by renewable energy sources or to clarify plans for achieving this. Moreover, when preparing their National Plans, Member States should incorporate measures to promote smart charging of EVs to allow them to effectively integrate into the power system so as to facilitate the reliability of supply and smooth EV mobility. Authorities should put in place measures to incentivise EV owners to re-charge their vehicles at night time, in order to avoid grid overload and power shortages, and to make use of times of lower energy prices. The above listed measures will act to stimulate consumer confidence and thereby demand, which in turn will ensure manufacturers’ confidence in the market and thus supply.

The right incentives would vary depending on the country in question, but in general tax reductions and usage incentives have tended to be more effective than direct subsidies.

Besides building consumer confidence, public authorities are key to creating a regulatory framework to induce car manufacturers to invest in EVs. This would necessitate ambitious CO<sub>2</sub> emission targets for vehicles for the post-2015

<sup>10</sup> <http://www.transportenvironment.org/publications/co2-emissions-new-cars-europe-country-ranking-2013>

period. In view of the recent agreement on a *2030 Climate and Energy Framework* for Europe, as well as the attainment of vehicle CO<sub>2</sub> emission targets ahead of set deadlines, **Bellona calls** for tightening of the emissions performance targets in the upcoming review process of *Regulation (EC) 443/2009*. **Bellona regards** a target of 70g/km for 2025 as the absolute minimum level of ambition the EU should aim for. A tighter target for CO<sub>2</sub> standards would encourage greater investment in both more efficient ICE vehicles and EVs.

### ***Bellona recommendations to vehicle manufacturers***

Incumbent vehicle manufacturers are under pressure. On the one hand, they must comply with emission performance targets set by the EU, and on the other hand, they must withstand competition from new market entrants with advanced EV technologies. This requires manufacturers to accelerate R&D efforts to remain competitive in the growing EV market. **Bellona recommends** that investments be directed in particular towards further improving the reliability and durability of batteries and super-capacitors, reducing battery weight and volume, as well as charging infrastructure. To that end, long term alliances need to be established between vehicle- and battery manufacturers. Moreover, **Bellona calls** on manufacturers to ensure that batteries produced are suitable for use and re-use for flexible electricity storage to variable renewable power.

### ***Bellona recommendations to European leadership***

The creation of the Energy Union is one of the key priorities identified in Juncker's *Political Guidelines*, the *EU Strategic Agenda* and the *Commission Work Programme for 2015*. **Bellona calls** on European leadership to undertake necessary measures to ensure the

recommendations set out in the EU's *Energy Union Strategy* are followed through.<sup>11</sup> These include ensuring electrification of transport is a high priority in the envisaged Energy Union, with full integration of EVs in urban mobility policies and in the electricity grid, both as energy consumers and as potential storage facilities.

**Bellona commends** the recent adoption by the US state of California of the first ever regulation mandating utilities to buy over a gigawatt of energy storage services by 2020, and **calls** on the EU to incentivise the use of active charging and energy storage management. Charging infrastructure needs to be made compatible with advanced micro-grid solutions (AMS), smart grids, renewables production and energy storage.

The EC needs to ensure that the focus of *Horizon 2020* funding moves beyond demonstration, to EV deployment efforts. The EU should focus this funding on the development of cost-effective battery technologies.

### ***Summary of Bellona's Recommendations:***

**Public authorities should** 1) provide sufficient financial incentives, through substantial taxing differences, to stimulate EV demand; 2) direct investment in visible, accessible and EU-wide compatible re-charging infrastructure; and 3) facilitate an EV-friendly regulatory environment, by tightening emission performance standards for vehicles;

**EV manufacturers should** 1) direct investments towards the further improvement of the reliability and durability of batteries and super-capacitors, reducing battery weight and volume, as well as charging infrastructure; and 2) ensure the suitability of batteries for use and re-use for energy storage purposes;

**European leadership should** 1) make cost-saving and environmental benefits of EV-ownership clear to consumers; 2) ensure electromobility is a high priority in the envisaged Energy Union; and 3) incentivise the use of active charging and energy storage management.

<sup>11</sup> [http://ec.europa.eu/priorities/energy-union/docs/energyunion\\_en.pdf](http://ec.europa.eu/priorities/energy-union/docs/energyunion_en.pdf)

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