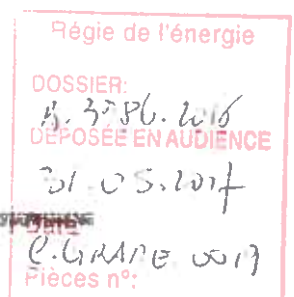




Overview of the Electric Vehicle market and the potential of charge points for demand response

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2 Demand response potential for charge points

2.1 Hypothesis

High power chargers, including those suitable for use with electric vehicles (EV), have the potential to present a substantial and growing load on the electricity network, which is suitable for demand response. More specifically:

- The take up forecasts and government ambition for EVs are large.
- There is emerging evidence of a preference to home-charge at peak network load times.
- Technical potential exists to shift these loads and provide frequency response.

2.2 Summary of relevant evidence

2.2.1 International outlook for EVs uptake

In the last 10 years vehicle electrification has gained global attention in light of increasing and volatile oil prices, deteriorating urban air quality, and climate change. After the mass production of EVs began in 2010, stock levels globally have amounted to over 665,000 vehicles (as of end of 2014) representing 0.08% of total passenger cars³ [1]. The Electric Vehicle Initiative⁴ seeks to facilitate the global deployment of at least 20 million passenger car EVs, including plug-in hybrid and fuel cell electric vehicles, by 2020 [2].

The electric vehicle market at present is heavily dependent on "early adopters" keen to try out new technology or reduce their emissions, and on government incentives offered in markets such as China, Netherlands and Norway. The US currently has the highest proportion of EV stock accounting for 39% in 2014, followed by Japan with 16% and China with 12% [1].

Box 2.1 EV uptake and DSR in selected countries

USA – California

In the U.S., a federal tax credit for EV purchases offers buyers up to \$7,500 toward the cost of a new vehicle⁵. California also provides vouchers up to \$45,000 for EV fleet purchases, and rebates up to \$2,500 for individual EV purchases, subject to programme funding limits. The Californian energy supplier Pacific Gas & Electric provides EV owners the option of taking a tiered residential rate or a special time of use rate, based on whether or not they have a separately metered charging station. Southern California Edison offers flat-rate, time-of-use (TOU) pricing for separately-metered charging stations. In the city of San Diego specifically, which has a fleet of 3,300 EVs in use and 400 public charging stations, the TOU tariffs provided by the local energy supplier have caused more than 80 percent of electric vehicle charging to be scheduled between midnight and 5 a.m. This has led to more efficient use of generating capacity.

China

China is expected to become the world's biggest electric car market this year, with sales estimated at 220,000 to 250,000 vehicles, based on the Chinese Association of Automobile Manufacturers surpassing the US⁶. The market is growing quickly because of generous subsidies and incentive programmes (including tax incentives and exemptions from restrictions designed to reduce traffic

³ Statistics based on 16 key countries participating in the Electric Vehicle Initiative

⁴ The Electric Vehicles Initiative (EVI) is a multi-government policy forum dedicated to accelerating the introduction and adoption of electric vehicles worldwide. EVI is one of several initiatives launched in 2010 under the Clean Energy Ministerial, a high-level dialogue among energy ministers from the world's major economies. EVI currently includes 15 member governments from Africa, Asia, Europe, and North America, as well as participation from the International Energy Agency (IEA)

⁵ http://www.theicct.org/sites/default/files/publications/EVpolicies_final_July11.pdf

⁶ <http://www.reuters.com/article/us-autos-china-idUSKBN0TP0IQ20151206>