

【欧州】【自動車】

Environmental friendly vehicle: EEA report on life cycle GHG emissions finds battery electric cars superior to petrol and diesel cars - under conditions

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【概要 : Summary】

At present, the reduction of oil consumption in the transport sector remains the biggest challenge in the EU. In future, battery-powered electric vehicles (BEVs) are expected to play a greater role in order to reducing the impacts on climate change and to improving air quality. Already under current conditions of energy production and life-cycle preconditions, a typical electric car in Europe is considered to produce less GHG emissions and air pollutants than the conventional Integrated Combustion Engine Vehicles (ICEVs).

However, regarding the life-cycle emissions of vehicles, it is suspected that BEVs are less environmental-friendly, due to the environmental impacts during production of batteries, the production of electricity and the recycling of BEVs. Therefore, the European Environment Agency (EEA) report “Electric vehicles from life cycle and circular economy perspectives” compares the GHG emissions and air pollutants of battery electric cars with diesel and petrol cars over their entire life cycle. The EEA report concludes that the extent to which the GHG emissions advantages for BEVs can be realised could reach 90% during the life-cycle of a BEV compared to an equivalent ICEV, if wind power is used or generating electricity for the BEVs. The BEVs impact on ecosystems and the toxicity of the materials involved could be minimised through a circular economy

approach and reutilisation of materials and improved battery recycling. The reutilisation and recycling of components is a key precondition of a positive result for BEVs.

【記事 : Article】

The EU’s transport sector remains very dependent on oil-derived fuels, which account for 95% of final energy consumption in transport. Road transport is responsible for more than 20% of the EU’s total CO2 emissions. In order to meet the EU’s commitments under the 2015 Paris agreement, the EU’s priorities in the transport sector aim for a transition towards a de-carbonised transport system. The European Commission proposes new targets for the EU fleet wide average CO2 emissions of new passenger cars and vans and to promote clean and energy-efficient road transport vehicles” (COM (2017) 653 final) in the second Clean Mobility package.

The Commission proposal intends to introduce further measures for reducing GHG emissions and BEVs can play an important role to achieve the Low-Emission Mobility in Europe target.

The EEA report analyses the current evidence on electric cars’ impacts on climate change, air quality, noise and ecosystems, compared with conventional petrol and diesel cars (ICEVs). According to the EEA report, the comparative life cycle GHG emissions of BEVs and ICEVs depend on a number of factors, including

the size of vehicle considered, the lifetime mileage, assumptions about the electricity generation mix and whether the ICEV is a petrol or diesel vehicle. The EEA report comes to the conclusion that across its life cycle, a typical electric car in Europe produces fewer GHG emissions and air pollutants compared with its gasoline or diesel equivalent. While in the production phase of electric cars, the emissions are usually higher than in the production of ICEVs, these are more than offset by lower emissions in the utilisation phase of BEVs over time, even when considering the current EU's energy mix. The EEA report concludes that over the entire vehicle life cycle, the emissions of electric cars are about 17-30% lower than the emissions of gasoline and diesel cars. However, as the carbon intensity of the EU energy mix is projected to decrease, the life cycle emissions of a typical electric vehicle could be cut by at least 73% lower by 2050.

However, the largest potential for reducing the GHG emissions between a battery-powered BEV and an ICEV occurs in the in-use phase. In this phase, BEVs can more than offset the higher impact of GHG emissions due to raw materials extraction and production processes of the electric vehicles. However, the extent to which the GHG emissions advantage is realised during the in-use stage of BEVs undoubtedly depends strongly on the electricity mix. The BEVs charged with electricity generated from coal currently have higher life-cycle emissions than ICEVs. However, the life-cycle emissions of a BEV could be almost 90% lower than an equivalent ICEV, when the electricity used by the BEVs is generated from renewable energies like wind power. In future, with greater use of lower carbon electricity in the European energy mix the typical GHG emissions saving of BEVs will increase in comparison to the ICEVs. The positive result for BEVs is possible by also further promoting renewable energy and circular economy, including the shared use of vehicles and product design that supports reuse and recycling. All these measures will help maximise the benefits of shifting to electric vehicles. For local air quality, electric vehicles also offer clear

benefits, mainly due to zero exhaust emissions at street level. However, the EEA report also points out that even electric vehicles emit particulate matter (PM) from road, tire and break wear. Finally, shifting to electric vehicles could also reduce noise pollution, especially in cities where speeds are generally low and traffic often stands still.

However, the result of the comparison is less favourable for electric cars when looking at the current impacts of their production on ecosystems and the toxicity of the materials involved. These impacts are mostly due to the extraction and processing of copper, nickel and other raw materials. However, the EEA report suggests that these impacts could be minimized by a circular economy approach that facilitates reuse and recycling, especially of batteries.

References:

- <https://energyindemand.com/2018/11/23/eea-report-confirms-electric-cars-are-better-for-climate-and-air-quality/>
- <https://www.eea.europa.eu/highlights/eea-report-confirms-electric-cars>
- <https://www.greencarcongress.com/2018/11/201081126-eea.html>, 26 November 2018
- <https://www.eea.europa.eu/publications/electric-vehicles-from-life-cycle>
- <https://www.eea.europa.eu/highlights/eea-report-confirms-electric-cars>, 22 Nov 2018