The potential of electric vehicles to reduce European GHG emissions

An analysis of use of electric vehicles compared to gasoline vehicles shows that electric vehicles have the potential to reduce European greenhouse gases by as much as 60%. This shows a consistent decarbonisation trend of the electricity mix in Europe.

Environmental policies to reduce transport sector greenhouse gas (GHG) emissions and diversify energy sources, often promote the use of alternative fuels (including electricity). In order to quantify possible GHG and energy savings, policy makers need to consider sound and shared scientific methodologies allowing comparisons among “cleaner” (with a lower carbon intensity) and conventional technologies.

An updated Well-To-Wheels methodology using 2013 statistical data was used to calculate the carbon intensity (CI) of the European electricity mix and provide electricity consumption in European Union (EU) Member States. The effect of cross-border trading of electricity on the CI of supplied and consumed electric energy in the various member states was calculated and analyzed.
Compared to 2009 JEC WTW data sets, the 2013 CI of the EU electricity mix is 18% lower. On average, the CI of electricity used in EU at low voltage in 2013 was 447 gCO2eq/kWh. This shows a consistent decarbonisation trend of the electricity mix in Europe.

Results calculated for combustion emissions only are in line with the International Energy Agency’s (IEA) input data and the IEA CO2 emission calculations. These results are available as a IEA-consistent data set. Conversely, results including upstream emissions are consistent with the JEC WTW methodology used as one of the reference inputs to the EU regulatory framework.

The study concludes that in 2013 battery electric vehicles (BEV) were able to achieve GHG savings in the range of 50-60% in the EU compared to conventional vehicles. Assuming a continuing decarbonisation trend of the EU electricity mix, BEVs are expected to have lower GHG emissions than conventional gasoline vehicles for the foreseeable future.

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