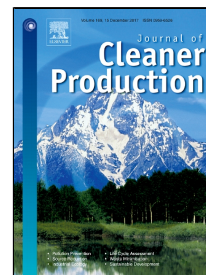


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A more realistic approach to electric vehicle contribution to greenhouse gas emissions in the city

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# A more realistic approach to electric vehicle contribution to greenhouse gas emissions in the city

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## HIGHLIGHTS

- Carbon emissions generated when driving an electric vehicle are evaluated.
- Evaluation methods based on current drive cycle tests are far from reality.
- A new and more realistic method, based in real-world data, is proposed and compared to current approaches.
- Higher carbon emissions are obtained with the proposed real-world driving method.
- A case study of a route in Madrid is presented. The results show a clear difference between current methods and the proposed one.

## ABSTRACT

Transport electrification through battery electric vehicle (BEV) powertrains is currently regarded as a solution for clean mobility, perfect for metropolitan decarbonization, with high impact and short-term feasibility. However, it is necessary to consider that this technological deployment will constitute only a partial solution for the problem regarding the availability of automotive fuel and its impact on air quality. Suitability of electric powertrain as a substitute for the Internal Combustion Engine Vehicles (ICEVs) is not under discussion, nor its main environmental potential benefits (no contribution to pollution, no emissions of particles or nitrogen oxides) at a local level, but the generation of electricity to be stored in the batteries pollutes the environment during its production at power plant level. Global Zero-Emissions (ZE) transport solution goes through supplying electricity using renewable energy sources (such as wind, solar and geothermal), together with a change in social habits. In this paper, the use of electric vehicles and its influence in greenhouse gas emissions (GHG) inventories is analyzed. Calculation of the GHG emissions associated to the use of BEVS is put under question, and a new approach for assessing realistic GHG emissions at power plant level puts in evidence the inaccuracy of the existing methods.

## KEYWORDS

Greenhouse gases, energy, battery electric vehicle, inventory, route, simulation

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