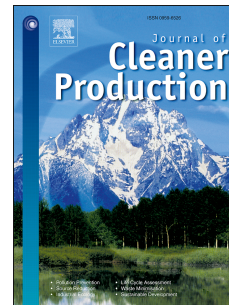


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Electric vehicles and India's low carbon passenger transport: A long-term co-benefits assessment

Subash Dhar, Minal Pathak, Priyadarshi R. Shukla



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Abstract:

Electric vehicles have attracted the attention of India's policy makers as clean technology alternatives due to their multiple advantages like higher efficiency and lower air pollution in short to medium term and reduced CO₂ emissions as electricity gets decarbonized in the long-run under low carbon scenarios. This paper uses an energy system model ANSWER-MARKAL to analyse the role of electric vehicles (EV) in India. The modelling assessment spans the period 2010 to 2050 and analyses future EV demand in India under three scenarios: i) a 'Reference' scenario which includes the continuation of existing EV policies as outlined in India's Intended Nationally Determined Contribution (INDC); ii) a 'EV policy' scenario which, in line with India's INDCs, follows targeted supply-side push policies for EVs, but without the budget constraints; and iii) a 'low carbon' scenario which uses an exogenous price for CO₂ in line with the global target of 2°C temperature stabilization. The scenarios analysis delineates penetration of EVs and their co-benefits as well as co-costs. The co-benefits relate to local air quality, national energy security and CO₂ emissions in India whereas the co-costs (risks) are related to sourcing of raw materials for batteries and battery reprocessing and disposal.

The findings show that: i) in the reference scenario, the EVs 2-wheelers will achieve a significant share by 2050. Electric 4-wheelers though would have a small share even in 2050; ii) EV push policies though lead to significant diffusion of electric 2-wheelers in India by 2030. These policies enhance diffusion of electric 4-wheelers only if financial incentives are sustained in the long-term, iii) the application of global carbon price on the Indian economy in the 2 ° C stabilization scenario increases competitiveness of EVs and results in near total share of electric

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