PRESS RELEASE: *BEVs can slash emissions by 38%; more savings possible with a cleaner grid: New Study*

A joint new study by IIT Roorkee and ICCT finds that battery electric vehicles (BEVs) in India emit up to 38% less gCO_2e/km than ICE in passenger cars segment, but three factors (grid carbon intensity, lab test assumptions, and real-world driving conditions) together drive nearly 75% of car emissions variability. Differences in grid mix and efficiency can swing emissions by up to 368 gCO_2e/km, which is equivalent to the carbon footprint of driving two to three petrol cars for every kilometre.

New Delhi, India, June 5, 2025: New study by the Indian Institute of Technology (IIT) Roorkee and the International Council on Clean Transportation (ICCT) reveals that battery electric vehicles (BEVs), consistently outperform internal combustion engine (ICE) and hybrid electric vehicles (HEVs) in terms of life-cycle greenhouse gas (GHG) emissions.

By comparing six previously conducted life-cycle greenhouse gas (GHG) emission assessments of passenger cars in India, the study identifies three key factors that significantly influence life-cycle assessment (LCA) outcomes:

- Grid carbon intensity (**the emissions from electricity used to power BEVs)**
- Test-cycle energy consumption (**lab-based estimates of fuel and electricity use)**
- Real-world energy consumption adjustment factor (**how real-life conditions differ from lab tests)**

The study finds that BEVs in India emit up to 38% less CO_2e per kilometre compared to ICEVs in the passenger cars segment, with the potential for even greater savings if India's power grid becomes cleaner. Differences in grid mix and real-world driving conditions can swing life-cycle emissions by up to 368 g CO_2e/km, which is roughly equivalent to adding the emissions of two to three petrol cars for every kilometre driven.

Released on World Environment Day (June 5), the report highlights how addressing emissions from India's passenger vehicle fleet is a critical step toward broader climate and sustainability goals. The findings from the report underline the importance of tackling transport-related emissions to complement efforts in restoring ecosystems and mitigating climate change impacts

Key Findings:

BEVs are clear winners in this review in terms of emissions reduction potential, provided that the evolving grid mix is accurately considered and representative vehicle models are used. Their advantages are best captured when analyses avoid unrealistic energy consumption assumptions and reflect real-world performance.

Don't wait for a clean grid: The study warns against delaying BEV adoption in anticipation of a cleaner grid. ICE vehicles purchased today will remain on the

roads for 10-15 years, emitting consistently, while BEVs benefit from gradual grid improvements.

Bridging the lab-to-road gap: HEVs show the highest discrepancy between test-cycle and real-world fuel use. Applying real-world correction factors is crucial for accurate emissions accounting. BEVs consistently demonstrate the highest energy efficiency in practice. Stringent fuel efficiency standards and real-world adjustment factors, especially for BEVs where charging losses are often overlooked, are crucial to ensuring cleaner, more energy-efficient vehicles on Indian roads.

Biofuels' hidden impact often ignored: Many studies fail to include land-use change in their assessments, underestimating emissions from biofuels. For example, diesel production emissions varied widely from 8 to 22 grams of CO_2- depending on whether land-use change was considered.

Policy Recommendations:

The study outlines actionable strategies for policymakers:

- **Accelerate BEV adoption i**n parallel with continued grid decarbonization efforts, while accounting for regional grid variations.
- **Strengthen fuel efficiency standards** and enforce **real-world adjustment factors** to close the gap between lab results and on-road performance.
- **Mandate on-board fuel and energy consumption meters (OBFCMs)** to improve transparency and data accuracy across all vehicle types.
- **Incorporate land-use change impacts** in biofuel life-cycle assessments to avoid underestimating their environmental cost.

"Electric vehicles are more efficient than internal combustion engine (ICE) vehicles and become increasingly cleaner as India's power grid decarbonizes. Delaying the adoption of battery electric vehicles (BEVs) risks locking in long-term emissions from ICE vehicles.**"- Amit Bhatt, India Managing Director, ICCT.**

"Our findings recommend that future life-cycle assessments in India account for the evolving electricity grid over a vehicle's lifetime, real-world energy use, and land-use emissions from biofuels to better inform clean transport policies. It shows that what we assume today shapes the climate impact tomorrow" **- Sunitha Anup, Researcher, ICCT (Co-author of the research)**

"India's road transport decarbonisation pathway toward its net-zero target is incomplete without the accelerated adoption of battery electric vehicles (BEVs). To fully realise their emissions reduction potential, assessments must account

for the evolving grid mix and reflect the government's ongoing efforts to decarbonise the electricity sector"- **Namita Singh, Researcher, ICCT (Co-author of the research)**

About the Study

This research was conducted jointly by IIT Roorkee and the International Council on Clean Transportation (ICCT). It is one of the first meta-analyses of life-cycle GHG emissions for passenger vehicles in India, synthesizing six prominent studies to provide a comprehensive view of emission drivers and mitigation pathways. Read more here:

About ICCT

The International Council on Clean Transportation (ICCT) is an independent research organization providing first-rate, unbiased research and technical and scientific analysis to environmental regulators. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, in order to benefit public health and mitigate climate change. Founded in 2001, we are a nonprofit organization working under grants and contracts from private foundations and public institutions

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