

Tackling Barriers to Zero-Emission Road Transport in the UK

Dr Muhammad Shafique

Policy Context: The road transport sector is vital to the UK's economic prosperity. Accounting for [roughly 30% of greenhouse gas emissions in 2024](#), road transport decarbonisation is essential to achieving the UK's 2050 net zero target. At the core of this transition is the [zero emission vehicle \(ZEV\) mandate](#) requiring an increasing percentage of vehicles to have zero tailpipe emissions towards a target of 100% by 2035.

Key Findings: Current policy does not fully address the infrastructure requirements nor the environmental impact of the full lifecycle of zero tailpipe emission vehicles - Battery Electric Vehicles (BEVs) and Fuel Cell Electric Vehicles (FCEVs).

Policy Advice: Rapid decarbonisation of road transport through BEV and FCEVs deployment should be supported by accelerated integrated infrastructure investment and address systemic barriers in grid capacity, hydrogen supply, vehicle supply chains and lifecycle emissions accounting.

Research findings

- For BEVs, the rollout of public charging infrastructure will need to accelerate if it is to meet the [UK's estimated requirement of 300,000 public charge points by 2030](#). Infrastructure investment is not keeping pace with the ZEV mandate. There are [significant regional disparities in charger availability](#). As of 2025, [the UK has only around 12 public hydrogen refuelling stations](#), with many regions lacking coverage entirely, substantially hindering widespread FCEV adoption.
- The UK lacks mandatory standardised life cycle carbon accounting for vehicles and components, limiting supply-chain transparency. While BEVs eliminate tailpipe emissions, [their manufacturing global warming potential is estimated to be around 40% higher than that of comparable internal combustion engine vehicles](#). This is [primarily driven by lithium-ion battery production, which accounts for approximately 25–50% of total production-phase emissions](#). FCEVs have zero tailpipe emissions, but their lifecycle emissions [vary widely depending on hydrogen production, storage and distribution pathways used](#).
- [Fuel production, supply chains, and infrastructure significantly influence total road transport emissions](#), reinforcing the need for decarbonisation policies that go beyond tailpipe emissions. For BEVs and FCEVs, upstream emissions from electricity generation, battery manufacturing, and hydrogen production significantly influence overall lifecycle carbon impacts and may pose a challenge to achieving the UK's 2050 net-zero target if these are not sufficiently decarbonised.

Policy Recommendations

- **Introduce binding spatial targets for EV charging rollout under central government.** Local authorities should be required to integrate EV charging into local development plans using accessibility metrics (e.g. chargers per capita, per km²) and develop a national “one-stop” permitting system to streamline site approval and utility coordination.
- **Accelerate hydrogen corridor development through coordinated national infrastructure planning.** Expand hydrogen refuelling via national infrastructure strategy, co-investment and subsidies. Introduce tax credits for green, renewable hydrogen production and develop regional hydrogen hubs using hydrogen pipeline and storage networks to deliver higher reduction emissions benefits.
- **Introduce mandatory, standardised lifecycle carbon accounting for all vehicle types and components to improve supply-chain transparency and enable comparable emissions assessment across each vehicle.** Implement embodied carbon thresholds for vehicle manufacturing and strengthen low-carbon procurement standards to incentivise cleaner battery and hydrogen supply chains. These measures are essential to address higher upstream emissions in BEVs and variable lifecycle emissions in FCEVs (hydrogen production and supply chain), ensuring alignment with whole-system transport decarbonisation objectives.
- **Adopt a whole-system transport decarbonisation framework based on full lifecycle emissions assessment, moving beyond the current focus on tailpipe emissions alone.** Incorporate emissions from fuel production, vehicle manufacturing, supply chains, and infrastructure into regulation, planning, and investment decisions to ensure a more accurate assessment of total climate impact. Prioritise policies that reflect full lifecycle environmental performance of transport vehicles and support cost-effective and low-emission decarbonisation pathways .

Work with me

[Dr Muhammad Shafique](#) is Lecturer in Civil Engineering at Brunel University of London. He is an expert in lifecycle sustainability assessment and circular economy of emerging products and technologies, and in engineering solutions that accelerate the UK's transition to net-zero transport.

Contact Dr Shafique at muhammad.shafique@brunel.ac.uk if you would like to learn more about tackling barriers to zero-emission road transport in the UK and his broader research, invite him to speak at your event, or ask for advice or guidance in assessing sustainability and circularity of approaches for net-zero transport.

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