Switch to Green Electricity and Steel Could Slash India's Auto Industry Emissions by 87%: CEEW

New Delhi, 23 July 2025: India's automobile industry—the third-largest in the world—could cut its manufacturing emissions by as much as 87 per cent by 2050 through a shift to green electricity and low-carbon steel, according to a new independent study released today by the Council on Energy, Environment and Water (CEEW). The study comes as several leading automakers—such as Mahindra & Mahindra, Tata Motors, TVS Motors, Ford, BMW, Mercedes-Benz, and Toyota—have, over the past two years, ramped up electric and hybrid vehicle production while simultaneously setting ambitious emission reduction targets. These automakers have also committed to the Science-Based Targets initiative (SBTi), aligning with global definitions of net-zero that require full value-chain decarbonisation by 2050. For large Indian auto manufacturers, cleaning up supply chains will not just lower emissions; it will enhance long-term cost competitiveness and position them as preferred international suppliers.

While many of these targets focus on direct factory emissions (Scope 1 and 2) and downstream use-phase emissions, upstream supply chain emissions remain largely overlooked, despite contributing the majority of the sector's carbon footprint. The CEEW study tracks emissions across three scopes: direct emissions from vehicle manufacturing (Scope 1), indirect emissions from electricity use (Scope 2), and upstream supply chain emissions (Scope 3). Scope 3 emissions currently make up over 83 per cent of the auto industry's emissions in India, largely due to the use of coal-intensive steel and rubber in vehicle manufacturing.

Dr Arunabha Ghosh, CEO, CEEW, said, "India's auto industry stands at a turning point. To lead in a low-carbon global economy, we must decarbonise not just the vehicles we drive but the industrial processes that build them. Automakers must clean up how their vehicles are made, what powers their factories, and how their suppliers produce critical inputs like steel and rubber. This is not new—promisingly, most major manufacturers in India are already thinking about these shifts. Now, the push must be to create demand for green materials at scale, lower costs, and deploy cleaner technologies rapidly. The auto sector can emerge as a force multiplier for economy-wide net-zero transitions—but only through collective foresight, investment and innovation."

Emissions intensity is declining—but not fast enough

The CEEW study uses a custom version of the Global Change Analysis Model to project emissions from India's vehicle manufacturing sector under various pathways. It finds that if current business-as-usual (BAU) trends continue, annual vehicle production could rise nearly four-fold—from 25 million units in 2020 to 96 million by 2050. Emissions, however, would only double, reaching 64 million tonnes of CO_2, suggesting a steady decline in emissions per vehicle. Still, the absolute rise in emissions underscores the need for accelerated action. Steel alone would remain the largest source of supply chain emissions, with suppliers expected to rely heavily on coal in this business-as-usual scenario. The study estimates that sourcing low-carbon steel could reduce emissions by nearly 38 million tonnes by 2050.

Green electricity and green steel are essential for deep decarbonisation

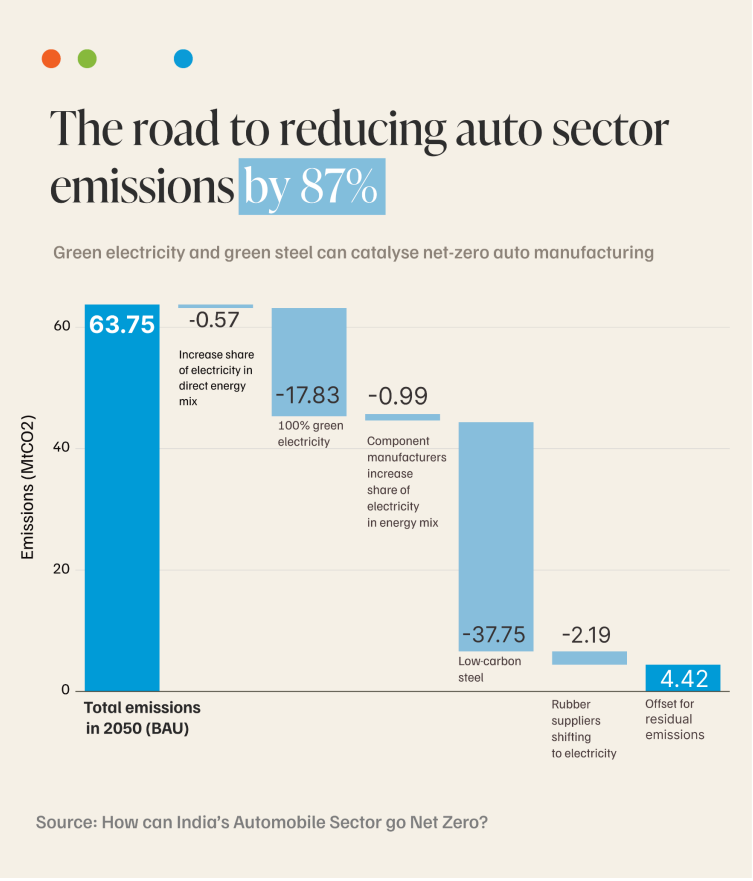
If both OEMs and their suppliers were to aim for net-zero by 2050, annual emissions could fall from the projected 64 $MtCO_2$ (BAU) to just 9 $MtCO_2$—an 87 per cent reduction. This would require OEMs to shift to 100 per cent green electricity—sourced through power purchase agreements (PPAs), renewable energy certificates (RECs), or captive solar—and steel suppliers to use 56 per cent hydrogen-based energy, reducing coal's share to under 10 per cent. In addition, increasing scrap-based steel production to 48 per

cent by 2050 would significantly reduce emissions and resource intensity. The CEEW study also highlights that rubber suppliers must transition to green electricity to clean up Scope 2 emissions.

Dr Vaibhav Chaturvedi, Senior Fellow, CEEW, said, "To align India's automobile sector—central to GDP, jobs, and industrial growth—with a net-zero future, we must go beyond electrifying vehicles. We must decarbonise manufacturing itself. Leading OEMs are already making corporate decisions to stay ahead by decarbonising their operations and supply chains. What's needed now is strong procurement intent, especially through advanced market commitments to secure green steel and other low-carbon materials. The policy landscape may be evolving, but major markets are still pushing hard on green through corporate and investor action. Indian automakers must treat clean manufacturing as a strategic lever—not just for cost control, but to stay competitive in global supply chains."

The CEEW study also examines a high-hybrid scenario, where hybrids dominate in the near term before EVs take off. While this reduces energy demand among component suppliers by 7 per cent, emissions remain slightly higher than in a BAU shift to EVs due to continued reliance on combustion engines. Ultimately, hybrid vehicles are at best a bridge and will need to be reduced to make way for zero-carbon vehicles.

To align the automobile sector with a 2050 net-zero pathway, the CEEW study recommends a two-pronged strategy: accelerate the transition to electric vehicles and decarbonise the full manufacturing value chain. Since 65–80 per cent of a vehicle's lifetime emissions come from its use phase, shifting to EVs remains the most effective way to cut end-use emissions. But deep reductions will only be possible if EVs are manufactured using clean energy and low-carbon materials. This requires coordinated action across OEMs and suppliers—supported by long-term procurement commitments and policy signals that encourage investments.



Read the full study, '***How can India's Automobile Manufacturing Sector go Net Zero? Exploring Decarbonisation Pathways***' by Chetna Arora, Vaibhav Chaturvedi, and Pallavi Das. This study has been supported by the MacArthur Foundation.

***Limitations**: Material demand remains proportional to vehicle production in this analysis, as it does not account for the use of lightweight materials or scenarios where steel requirements per vehicle decrease, which could be considered as future work. This analysis only focuses on manufacturing and upstream suppliers. Downstream emissions were not considered here.*

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About CEEW

The Council on Energy, Environment and Water (CEEW) — a homegrown institution with headquarters in New Delhi — is among the **world's leading climate think tanks**. The Council is also often ranked among the **world's best-managed and independent think tanks**. It uses data, integrated analysis, and strategic outreach to explain — and change — the use, reuse, and misuse of resources. It prides itself on the independence of its high-quality research and strives to **impact sustainable development at scale** in India and the Global South. In over 14 years of operation, CEEW has impacted over 400 million lives and engaged with over 20 state governments. Follow us on X (formerly Twitter) @CEEWIndia or on LinkedIn for the latest updates.