



INDIA'S ROADMAP TO A SUSTAINABLE FUTURE WITH EVS AND RENEWABLE ENERGY

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Photo: Clean energy sources. Credit: Getty

India has [set ambitious targets](#) for EV adoption and renewable energy integration, aiming to [achieve](#) 30% EV market share by 2030 and 500 GW of renewable energy capacity by the same year. It is rapidly transitioning toward a sustainable future, with electric vehicles (EVs) and renewable energy at the forefront of its strategy. The country added [over 2 million](#) electric vehicles in 2024, a 25% increase from the previous year. Yet, its EV adoption still lags behind regions like China, where over 11 million electric cars were sold and nearly half of all new cars were electric. In India, electric cars accounted for just 2% of total

car sales, compared to 45% in China and 17% in Vietnam. Its total installed power capacity reached 470 GW by [February 2025](#), with renewables accounting for 35.65%, including over 102 GW of solar and nearly 48 GW of wind. Despite targeting 500 GW of non-fossil capacity by 2030, India still faces severe air pollution, with 13 of the world's 20 most polluted cities and Delhi as the most polluted capital.

The country's automotive sector is [witnessing](#) unprecedented growth in EV adoption, driven by government policies like Faster Adoption and Manufacturing of Electric Vehicles ([FAME II](#)), technological advancements, and partnerships with [industry leaders](#) such as Maruti Suzuki, Tata Motors, and Mahindra & Mahindra. These collaborations are enhancing EV production and [integrating](#) innovations like battery energy storage systems (BESS) through alliances like Oil and Natural Gas Corporation (ONGC) and Tata Power Renewable Energy Ltd. Meanwhile, India's ambitious renewable energy targets, such as 500 GW of non-fossil fuel capacity by 2030, are being bolstered by investments from companies like ONGC and National Thermal Power Corporation (NTPC) Green Pvt. Ltd., reinforcing the synergy between clean mobility and green energy.

Low-carbon energy is critical for India's economic and environmental resilience, especially as climate risks threaten sectors contributing to a third of its GDP. [EVs play a pivotal role](#) in reducing greenhouse gas emissions, cutting oil imports, and improving air quality for millions. By [aligning](#) its EV push with renewable energy initiatives, India is crafting a roadmap that not only addresses domestic challenges but positions itself as a [global leader in clean technology](#) and climate action. This integrated approach underscores how EVs are central to India's sustainable growth strategy.

Current State of Sustainability in India

India has made [significant strides](#) in renewable energy. Its total installed capacity has reached 470 GW by February 2025, and 35.65% comes from renewable sources. Solar power has emerged as a [frontrunner](#), surpassing 102 GW of installed capacity and contributing 21.8% to the country's total power mix. Wind energy has also shown [remarkable growth](#), with 47.96 GW of capacity installed by November 2024. These advancements align with India's [ambitious target](#) of achieving 500 GW of non-fossil fuel capacity by 2030. However, the country still faces significant environmental challenges, particularly air pollution.

[As of 2025](#), 13 of the world's 20 most polluted cities are in India, with Delhi remaining the world's most polluted capital city.

To address these challenges and promote low-carbon energy, the Indian government has implemented [various initiatives and policies](#). The 2025-26 budget demonstrates a strong commitment to green energy. For instance, increased allocations for schemes like the PM Surya Ghar Muft Bijli Yojana aim to provide free electricity to 10 million households through rooftop solar installations. Additionally, the government has introduced policies such as Renewable Energy Purchase Obligations (RPOs) and the [Green Energy Corridor](#) initiative to strengthen grid infrastructure, which will be crucial for supporting the growing EV charging network. The National Electric Mobility Mission Plan (NEMMP) 2020 and state-level EV policies have further incentivized EV manufacturing and adoption. These efforts, combined with investments in research and development for emerging technologies like green hydrogen and advanced battery technologies, underscore India's integrated approach to achieving its renewable energy targets and transitioning to a sustainable transportation ecosystem.

Challenges and Opportunities

The adoption of EVs in India faces [several challenges](#). High upfront costs remain a primary barrier, with [EVs generally priced higher](#) than their internal combustion engine (ICE) counterparts. Despite recent reductions in battery costs, which have fallen by over 80% in the past decade, the initial investment for [EVs still deters](#) many potential buyers.

The limited charging infrastructure is another major hurdle. As of early 2025, India has approximately 10,000 public charging stations, a number that falls short of the government's target of 100,000 stations by 2030. This [scarcity of charging points](#), particularly in rural and semi-urban areas, contributes to range anxiety among consumers. Additionally, battery technology poses challenges in terms of range, charging time, and performance in extreme weather conditions, which are common in many parts of India.

However, these challenges are accompanied by significant opportunities for growth in the EV sector. Government incentives play a crucial role in promoting EV adoption. Extended until 2024 with a budget of USD 1.035 billion, the FAME II scheme [offered](#) substantial subsidies for EV purchases across various categories. Many state governments have also

introduced their own EV policies that provide additional incentives such as road tax exemptions and subsidies on charging equipment. These policies are [attracting foreign investment](#), as shown by global automakers and tech companies' increased interest in India's EV market. For instance, [Tesla has recently announced plans](#) to set up a manufacturing facility in Gujarat. Volkswagen Group has also committed to investing €1 billion, focusing on EVs in its India operations.

Technological advancements [present another area of opportunity](#). Indian companies are investing heavily in R&D to develop EV technologies suited to local conditions. Tata Motors, for example, has [developed the Ziptron powertrain](#) technology specifically for Indian roads and climate. Start-ups like Ather Energy and Ola Electric are innovating in areas such as battery swapping and fast-charging technologies. The government's push for domestic battery manufacturing through the Production Linked Incentive (PLI) scheme is expected to reduce battery costs further and enhance the competitiveness of Indian-made EVs. Moreover, the integration of renewable energy with EV charging infrastructure presents an opportunity to create a sustainable transportation ecosystem. Projects like solar-powered charging stations and vehicle-to-grid (V2G) technology are gaining traction, offering potential solutions to grid stability issues while promoting clean energy use in the transportation sector.

Future Prospects and Next Steps

To meet these goals, the government has implemented various initiatives, including the FAME II scheme and the PLI scheme for EV and battery manufacturing. Some states, like Delhi, have even more aggressive targets, with the proposed EV [Policy 2.0 aiming](#) for 95% electric vehicle registrations by 2027. These efforts are already showing results, with India's EV adoption rising from 0.7% of total motor vehicle sales in 2020 to 6.3% in 2024, and nearly 5 million registered EVs on the roads.

Technological innovations are [expected to play a crucial role](#) in boosting EV adoption. Advancements in battery technology, such as increased energy density and faster charging capabilities, are making EVs more practical for commercial use. The [integration of renewable energy](#) with EV charging infrastructure, including solar-powered charging stations and vehicle-to-grid (V2G) technology, presents opportunities for creating a sustainable transportation ecosystem. Additionally, the

government's focus on domestic battery manufacturing and recycling through initiatives like the Battery Waste Management Rules and Advanced Cell Chemistry Production Linked Incentives is expected to improve battery sustainability and reduce costs. These technological advancements, combined with the growing charging infrastructure and decreasing EV prices, [are likely to accelerate EV adoption](#). They will also contribute significantly to India's sustainability goals by reducing greenhouse gas emissions, improving air quality, and enhancing energy security.

and consumers, India can solidify its position as a global leader in clean technology, driving a future that is both economically and environmentally sustainable.

To accelerate India's transition to a sustainable future powered by EVs and renewable energy, several strategic steps can be taken. First, it is crucial to enhance the charging infrastructure through public-private partnerships and incentivizing businesses to install charging points in rural and semi-urban areas. Additionally, investing in R&D for advanced battery technologies suited to Indian conditions and strengthening domestic battery manufacturing through initiatives like the PLI scheme can reduce costs and enhance self-reliance. Integrating EVs with renewable energy by promoting smart grids and vehicle-to-grid (V2G) technologies can enhance grid stability and clean energy utilization. Furthermore, consistent policy support across central and state governments, combined with public awareness campaigns to educate consumers about the benefits of EVs, will be essential for stimulating demand and ensuring long-term growth in the sector. By addressing these areas, India can effectively leverage EVs and renewable energy to achieve its sustainability goals and emerge as a global leader in clean technology.

The Bottom Line

India's journey toward sustainability is intricately tied to the adoption of electric vehicles and the expansion of renewable energy. As the nation pushes forward with ambitious clean energy targets and EV policies, the integration of these sectors will be crucial for reducing emissions, enhancing energy security, and improving air quality. While challenges such as high upfront costs, limited charging infrastructure, and battery technology constraints persist, strategic investments, policy support, and technological advancements offer promising solutions. To ensure sustained progress, it is essential to continue investment in EV innovation, expand renewable energy-powered charging infrastructure, and strengthen policy frameworks. By fostering collaboration among industry leaders, policymakers,