

***Beyond the Hype: Real Challenges of Electric Vehicles****Clifford John B. Orquia**College of Technology and Engineering, Cebu Technological University-Argao Campus, Argao, Cebu, 6021, Philippines**Corresponding Email: cliffordjohn.orquia@ctu.edu.ph*

Electric vehicles (EVs), which operate partly or entirely on electricity stored in rechargeable batteries, are gaining attention in the Philippines as a cleaner and more sustainable alternative to traditional gasoline-powered cars. These include fully electric models like the Nissan Leaf and BYD Dolphin, as well as locally deployed e-jeepneys and e-tricycles in certain cities. Although EVs present notable advantages, their adoption in the Philippines is hindered by pressing infrastructure, technological, and supply chain issues that limit their practicality for the majority of Filipinos.

One of the most compelling arguments for EVs is their environmental benefit. Unlike internal combustion engine vehicles, EVs produce zero tailpipe emissions, which can reduce urban air pollution (Alanazi, 2023). In Metro Manila, where vehicular emissions significantly degrade air quality, this advantage is crucial. Additionally, EVs reduce dependence on imported oil, enhancing energy security (Lu et al., 2024). Operating costs are generally lower since electricity is cheaper than gasoline, and electric motors have fewer parts to maintain. The Electric Vehicle Industry Development Act (Republic Act No. 11697) further supports adoption through tax incentives and infrastructure development mandates.

Despite these benefits, EVs face considerable challenges in the Philippine context. The most visible issue is the limited and uneven distribution of charging infrastructure. While some malls, office complexes, and commercial areas in Metro Manila offer charging facilities, large parts of the provinces have none. This creates “range anxiety,” the concern that a driver might lose power before finding a charging point. In addition, many urban households live in apartments or dense residential areas without private parking, making home charging difficult to implement.

Battery concerns further limit adoption. The cost of replacing an EV battery can reach hundreds of thousands of pesos, which is unaffordable for most Filipino households (Kevien & Lean, 2023). The country’s hot climate can also shorten battery life and reduce efficiency. Beyond cost and performance, the production of EV batteries depends on mining lithium, cobalt, and nickel, which has environmental and social implications in certain sourcing countries (Juan & Jakob, 2023). Without an effective recycling and disposal system in the Philippines, end-of-life batteries could become a new waste management challenge.



The supply chain dimension adds another layer of vulnerability. Most EVs and components are imported, exposing the local market to global price swings and shipping delays (Uy et al., 2024). The recent semiconductor shortage illustrates the fragility of this dependence. The absence of large-scale local manufacturing or recycling facilities reinforces the country's reliance on foreign suppliers.

These obstacles, while daunting, are surmountable through science-driven policy and innovation. Expanding the charging network to cover major highways, transport hubs, and provincial centers is critical. Integrating solar-powered charging stations could improve resilience in areas with unstable electricity. Research into tropical climate–resilient batteries, combined with early investment in battery recycling facilities, would address both performance and sustainability concerns. On the supply side, fostering local assembly and diversifying import sources within ASEAN could help stabilize access to components.

EVs offer the Philippines a pathway toward cleaner, more sustainable mobility — but only if technological advancement is matched by infrastructure readiness, supply chain resilience, and environmental safeguards. In the Southeast Asian context, where countries are experimenting with EV policies and cross-border technology sharing, the Philippines can leverage regional collaboration to accelerate adoption. Until these science- and policy-backed measures are in place, EVs will remain more a vision of sustainable transport than a widespread reality.

References

- Alanazi, F. (2023). Electric Vehicles: Benefits, Challenges, and Potential Solutions for Widespread Adaptation. *Applied Sciences*, 13(10), 6016. <https://doi.org/10.3390/app13106016>
- Cabarrubias, Kevin & Tolentino, Lean Karlo. (2023). Unlocking the market potential of electric vehicles in the Philippines: A statistical and neural network approach to customer willingness to purchase electric vehicles. *International Journal of Innovative Research and Scientific Studies*. 6. 888-902. 10.53894/ijirss.v6i4.2088.
- Lu P, Hamori S, Sun L and Tian S (2024) Does the electric vehicle industry help achieve sustainable development goals?—evidence from China. *Front. Environ. Sci.* 11:1276382. Doi: 10.3389/fenvs.2023.1276382
- Tan, Juan & Keiding, Jakob. (2023). The cobalt and lithium global supply chains: status, risks and recommendations. 10.22008/gpub/32050.
- Uy, John & Ong, Arvin Kester & German, Josephine. (2024). Marketing Strategy and Preference Analysis of Electric Cars in a Developing Country: A Perspective from the Philippines. *World Electric Vehicle Journal*. 15. 111. 10.3390/wevj15030111.



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