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Can Electric Transport Transform Kathmandu’s Air?

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Kathmandu’s electric-vehicle transition is easy to see. Battery-powered cars move through intersections once dominated by petrol and diesel engines, charging stations are appearing on intercity routes, and consumers increasingly compare range and charging speed alongside price. For a country that imports petroleum and generates most of its domestic electricity from hydropower, the appeal is powerful.

But the question is larger than how many electric cars are sold. Can electric transport materially improve the air breathed by millions of people in Kathmandu Valley? The answer is yes—if electrification is treated as a public-transport and urban-planning

project. If the city only swaps one private car for another, it will reduce tailpipe pollution while leaving congestion, road danger, tyre dust and unequal access largely untouched.

> Electric transport framework showing emissions, public mobility, charging an
> Guide illustration: Nepal Digest.

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Electric transport: The scale of the air-pollution problem

A 2025 World Bank assessment described air pollution as Nepal’s leading risk factor for death and disability. It estimated approximately 26,000 premature deaths each year, an average loss of 3.4 years of life expectancy and an economic cost exceeding six percent of gross domestic product. Kathmandu Valley and the Tarai were identified as major pollution hotspots.

Those figures concern national exposure and many sources, not vehicle exhaust alone. Industry, household fuels, brick kilns, waste burning, road and construction dust, forest fires and pollution moving across the wider Indo-Gangetic Plain all contribute. Electric mobility cannot solve every source. It can, however, directly reduce emissions where people live, walk, study and work—especially when old diesel vehicles are replaced.

What disappears when a vehicle goes electric

A battery-electric vehicle has no tailpipe. It does not emit nitrogen oxides, carbon monoxide or exhaust particles on the street. In dense corridors where buses, vans and motorcycles repeatedly accelerate, that local benefit matters. Electric motors are also quieter at low speeds, reducing a layer of urban noise.

Nepal has an additional advantage: a power system dominated by renewable hydropower. An electric vehicle charged on this grid can offer substantial greenhouse-gas benefits compared with a fossil-fuel vehicle. The exact result depends on the time and source of charging, battery production, vehicle size and lifetime, but electricity creates a path away from imported petroleum.

What does not disappear

Electric vehicles still require roads and parking. Their tyres and brakes produce particles, though regenerative braking can reduce brake wear. Large batteries add weight. Manufacturing and disposal carry environmental costs. A traffic jam of electric SUVs remains a traffic jam.

This is why counting private EV registrations is a limited measure of success. A better measure asks how many people can reach work, school and services quickly, safely and with low emissions. On that test, one reliable electric bus can matter more than many private cars.

The biggest prize is the public fleet

Kathmandu’s buses and microbuses do difficult work: long daily distances, frequent stops and heavy passenger loads. Their fuel use and exposure to crowded streets make them strong candidates for electrification. Electric buses can reduce operating fuel costs

and remove exhaust from the places where commuters wait and vendors work.

The transition needs more than purchasing vehicles. Operators require financing that reflects the higher upfront cost and lower running cost of an electric bus. Depots need dependable charging and enough grid capacity. Routes need to be rationalised so buses are frequent and easy to understand. Ticketing, maintenance training and service standards must improve at the same time.

The Asian Development Bank’s proposed Sustainable Urban E-Mobility Project reflects this broader approach, combining electric bus fleets with intelligent transport systems, policy support and public-transport modernisation in Kathmandu and Pokhara Valleys. The design recognises that vehicles and systems must change together.

Two-wheelers and delivery fleets cannot be ignored

Motorcycles and scooters are central to mobility in Kathmandu. Their price, agility and convenience make them difficult to replace quickly with buses alone. Electric two-wheelers can reduce local exhaust and noise, but adoption depends on battery confidence, safe charging, repair networks and resale value.

Delivery riders and commercial fleets are a particularly useful starting point. Their predictable routes and high daily use can make operating savings more visible. Fleet charging can be planned at depots, and maintenance data can help the wider market understand battery performance in Nepal’s conditions.

Charging must become ordinary infrastructure

A driver should not need specialist knowledge to find a working charger, understand its price or pay for a session. Nepal Electricity Authority has developed public-charging infrastructure and provides charging-station tools, but the next phase requires reliability, interoperability and transparent maintenance.

Home charging will serve many private owners, while buses, taxis and freight vehicles need faster or depot-based systems. Utilities can encourage off-peak charging to reduce pressure on the grid. Building codes should prepare apartments and commercial parking areas for safe electrical capacity rather than allowing improvised cables to become the norm.

Batteries need a life beyond the showroom

Every growing EV market eventually faces questions about damaged and end-of-life batteries. Nepal needs clear responsibility for collection, transport, testing, second-life use and

recycling. Informal dismantling of high-voltage batteries would create fire, chemical and worker-safety risks.

Importers should disclose battery warranties and replacement costs in comparable terms. Regulators need standards for state-of-health testing so used-EV buyers can assess what they are purchasing. Regional recycling partnerships may be more practical than building every process domestically, but the chain of responsibility must begin in Nepal.

Clean transport also means fewer forced trips by car

Walking is the original zero-tailpipe mode, yet Kathmandu’s footpaths are frequently broken, blocked or absent. Safe crossings, shaded sidewalks and protected cycle connections can replace short motorised trips and make public transport usable. A passenger cannot benefit from a clean bus if reaching the stop is dangerous.

Land-use decisions matter too. When housing, jobs and schools spread without coordinated transport, people become dependent on private vehicles. Compact mixed-use neighbourhoods and dependable mass transit reduce energy use regardless of engine type.

The private-car boom creates a policy trap

Electric cars reduce tailpipe emissions and imported fuel use, which makes their growth valuable. The danger is assuming that cleaner engines solve the larger mobility problem automatically. If private vehicle ownership continues rising faster than road capacity and public transport quality, Kathmandu can become quieter and less exhaust-heavy while remaining deeply congested.

Congestion carries its own economic cost. Workers lose time, buses become unreliable and emergency vehicles move more slowly. Road space is finite, so transport policy eventually has to decide how much of that space should move the largest number of people rather than the largest number of vehicles.

Electric buses have unusually high public value

A private electric car benefits the people inside it and reduces local exhaust around everyone else. An electric bus does the same while carrying many more passengers per unit of road space. That makes bus electrification one of the strongest places to combine climate, air-quality and mobility benefits.

The operational challenge is harder than buying vehicles. Bus operators need finance, depots, charging schedules, trained technicians and route economics that allow the fleet to remain in

service for years. A poorly planned electric bus can become an expensive parked asset; a well-integrated one can replace thousands of daily fossil-fuel passenger kilometres.

The ADB project is still proposed, not completed

As of late September 2026, the Asian Development Bank lists Nepal's Sustainable Urban E-Mobility Project as **proposed**, with concept clearance recorded on 7 May 2026 and fact-finding scheduled for October. The project is designed around electric buses, intelligent transport systems and broader public-transport modernisation in Kathmandu and Pokhara, with a proposed US$100 million loan.

That status matters. The project should not be described as if buses have already been procured or the full programme approved. It is a current policy and investment proposal whose design recognises an important principle: electrification works best when the transport system around the vehicle changes too.

Route reform may matter as much as the drivetrain

Kathmandu's public transport is fragmented across many operators and route licences, which can produce overlapping services in busy corridors and weak coverage elsewhere.

Replacing diesel vehicles with electric ones without improving route planning could preserve the same inefficiencies with cleaner propulsion.

A better system would make routes easier to understand, improve frequency on high-demand corridors and reduce unnecessary duplication. Electrification can then lower emissions inside a network that is already becoming more useful to passengers.

Bus priority makes clean buses more attractive

An electric bus stuck in the same traffic as every private car remains unreliable. Bus lanes, signal priority or carefully designed stops can make public transport faster without adding road space. Faster trips also improve the economics of the bus fleet because one vehicle can complete more useful service during the day.

These measures are politically difficult because they reallocate road space away from private vehicles. Their value should therefore be judged through passenger movement rather than the convenience of one mode alone.

Fare integration can reduce the cost of changing vehicles

Passengers often avoid transfers when every change requires another cash payment or uncertain wait. Integrated ticketing and

coordinated schedules can make a multi-route journey feel like one system rather than several unrelated operators.

This is where digital payment can support transport reform. The technology is useful only if it simplifies travel across operators instead of creating one more separate app or card that works on limited routes.

Taxis are another high-mileage opportunity

Taxis spend far more time on the road than most private cars, which means electrifying them can displace more fuel per vehicle. Drivers also feel operating costs directly, making lower energy and maintenance costs commercially important.

The challenge is charging downtime. Taxi operators need chargers in locations and at speeds that fit working patterns. A cheap charger far from passenger demand may save little once the driver’s lost earning time is included.

Ride-hailing can accelerate fleet adoption

Digital ride platforms can collect detailed information about trip length, idle time and charging opportunities, making them useful environments for EV deployment. Drivers may also be easier to reach with financing or leasing programmes when demand is organised through a platform.

Policy should remain neutral between companies while using the data and predictable utilisation of ride-hailing fleets to accelerate cleaner vehicles where the economics are strongest.

Two-wheelers are essential to Kathmandu’s transition

Motorcycles and scooters occupy a huge share of Kathmandu’s daily traffic. Any clean-transport strategy focused only on cars and buses will therefore miss one of the most visible urban vehicle categories. Electric two-wheelers can reduce exhaust and noise while requiring far less battery capacity than large cars.

Consumer confidence will depend on battery life, service networks and resale value. A market grows faster when buyers know that a damaged battery, controller or charger can be repaired without waiting weeks for imported parts.

Battery swapping is useful in some fleets, not a universal answer

Swapping depleted batteries for charged ones can reduce waiting time, especially for delivery riders or commercial two-wheelers. The model works best when vehicle batteries are standardised enough for one network to serve many users.

Private markets often develop incompatible battery formats, which can limit interoperability. Regulators can encourage safety and technical standards without forcing one business model across every vehicle category.

Charging reliability matters more than charger counts

A map showing many charging stations can create confidence and still fail drivers if stations are broken, occupied or inaccessible. The useful measure is not how many chargers exist but how often drivers can reach one and complete a charging session successfully.

Operators should publish live status where possible, maintain equipment quickly and make prices easy to understand. Reliability becomes especially important on intercity routes where a failed charger can leave few alternatives.

NEA already treats charging as grid infrastructure

Nepal Electricity Authority maintains charging-station information and has updated provisions in its electricity-distribution regulations related to public charging stations. That is a sign that EV charging is moving from a pilot activity toward ordinary power-system planning.

The next challenge is coordination with private networks, apartments, depots and commercial parking. Public charging should complement home and workplace charging rather than carry every vehicle’s energy demand alone.

Apartment charging will become a major urban issue

Detached homeowners can often install chargers relatively easily. Apartment residents depend on shared electrical capacity, parking rules and building management. As EV adoption grows, improvised extension cables and informal arrangements become a safety and fairness problem.

Building standards and condominium rules should clarify wiring, metering, fire safety and the rights of residents to install charging where technically feasible. Planning this early is cheaper than retrofitting crowded parking areas after demand becomes urgent.

Night charging can help use electricity more efficiently

Many private vehicles are parked for long periods overnight, creating an opportunity to shift charging away from the busiest daytime demand. Smart tariffs and managed charging can encourage users to draw power when the grid has more capacity.

This is particularly relevant in a hydropower-heavy system where electricity availability varies by season and time. Transport electrification should be coordinated with the power sector rather than treated as a completely separate transition.

Electricity must remain affordable and dependable

The operating-cost advantage of EVs depends partly on electricity pricing and supply reliability. If commercial charging becomes expensive or unreliable, the economic case weakens for drivers whose decisions are based more on daily cost than environmental preference.

Energy policy therefore becomes transport policy once a significant share of the fleet plugs into the grid.

Battery warranties need comparable language

Consumers struggle to compare EVs when manufacturers describe batteries differently. Some warranties focus on years, others on kilometres or retained capacity. Replacement costs may be difficult to find before purchase.

Clear disclosure of warranty terms and expected battery-health thresholds would make the used market more transparent and

reduce fear around one of the vehicle’s most expensive components.

A healthy used-EV market will matter

Most households will not buy new vehicles forever. As early EVs age, Nepal needs trustworthy ways to assess battery health and remaining useful life. A used vehicle with a degraded battery may still be perfectly suitable for short urban trips if the buyer understands its condition and price reflects it.

Standardised battery-health testing can help banks, insurers and buyers value older EVs more accurately.

Recycling must be planned before volumes become large

Lithium-ion batteries contain materials valuable enough to recover and hazardous enough to handle carefully. Informal dismantling creates fire and chemical risks, while exporting waste without traceability can simply move the environmental problem elsewhere.

Producer responsibility, licensed collection and regional recycling partnerships can create a more credible chain. The important step is assigning responsibility before thousands of batteries begin reaching end of life.

Electric vehicles do not eliminate particulate pollution

Tailpipe emissions disappear, but tyres still shed particles and road dust remains a major source of urban particulate matter. Heavier vehicles can increase tyre wear depending on design and driving pattern.

This reinforces the World Bank’s conclusion that clean air requires action across sectors. Vehicle electrification should be paired with road-dust control, industrial emissions reduction, cleaner household energy and better enforcement on the fossil fleet that remains.

Road dust needs routine maintenance, not only emergency spraying

Dust from damaged shoulders, construction and unpaved surfaces becomes airborne as vehicles move. Electric drivetrains do nothing to solve that source. Street cleaning, construction-site controls and better road maintenance can produce air-quality gains regardless of vehicle technology.

These interventions are less visible than new EV launches and can matter enormously to people walking or waiting beside traffic corridors.

Walking is transport infrastructure

Footpaths are sometimes treated as beautification rather than transportation. In reality, every public-transport journey begins and ends as a walking journey for most passengers. Broken sidewalks, unsafe crossings and parked vehicles on pedestrian space make buses less accessible.

Improving walking conditions can reduce short motorised trips directly and make expensive transit investments more useful.

Cycling needs protected continuity

Painted lanes that disappear at busy intersections do little for people who are not already confident cyclists. A useful network needs protected connections, safe junctions and enough continuity that ordinary commuters can imagine using it.

E-bikes may widen the potential market by making hills and longer distances easier, particularly for commuters who would not choose a conventional bicycle.

School transport is an overlooked target

School buses and vans operate predictable routes, often during the most congested periods of the day. Electrifying them can reduce children’s exposure to diesel exhaust while creating fleets with regular charging schedules.

The transition would still need strong vehicle safety and maintenance standards. Clean propulsion should never become a substitute for basic roadworthiness.

Freight deserves more attention

Urban freight vehicles may be fewer than motorcycles but can travel long distances and use large amounts of fuel. Delivery vans and light trucks with predictable daily routes are candidates for electrification as vehicle options improve.

Heavy freight presents a more difficult challenge because battery weight, charging power and long-distance utilisation change the economics. Different vehicle classes will electrify at different speeds.

The air-quality case remains multi-sectoral

The World Bank’s 2025 assessment estimated roughly 26,000 premature deaths annually from air pollution in Nepal and an economic cost exceeding six percent of GDP. It also emphasised that vehicle emissions are only one part of the problem, alongside industry, household fuels, road dust, forest fires and pollution transported across borders.

Electric transport should therefore be understood as one large intervention inside a wider clean-air strategy, not as a single technological cure.

A practical clean-mobility agenda

1. Electrify high-use buses, taxis, two-wheelers and delivery fleets first.
2. Pair vehicle finance with route reform, service standards and depot charging.
3. Publish reliable charger locations, prices and operating status.
4. Create battery-health, safety, collection and recycling rules before waste volumes grow.
5. Enforce emissions standards on the fossil vehicles that remain.
6. Control road dust, construction emissions, waste burning and industrial sources alongside transport policy.
7. Invest in sidewalks, crossings, cycling links and bus-priority measures.

Electric transport can transform Kathmandu’s air, but technology must serve a transport vision. The cleanest future is not simply a city where every household buys a battery-powered car. It is a city where a child can walk safely, a bus arrives predictably, a delivery rider can charge affordably, and fewer people are forced to inhale exhaust while sitting in traffic. Electrification is the engine of that change; good public policy must provide the direction.

To find and interpret local monitoring observations, read our Kathmandu Valley air-quality guide.

Sources and further reading

- Air Pollution Is the Number One Health Risk Factor in Nepal, World Bank, 2025.
- Nepal: Sustainable Urban E-Mobility Project, Asian Development Bank.
- Nepal Electricity Authority, including public-charging information.

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