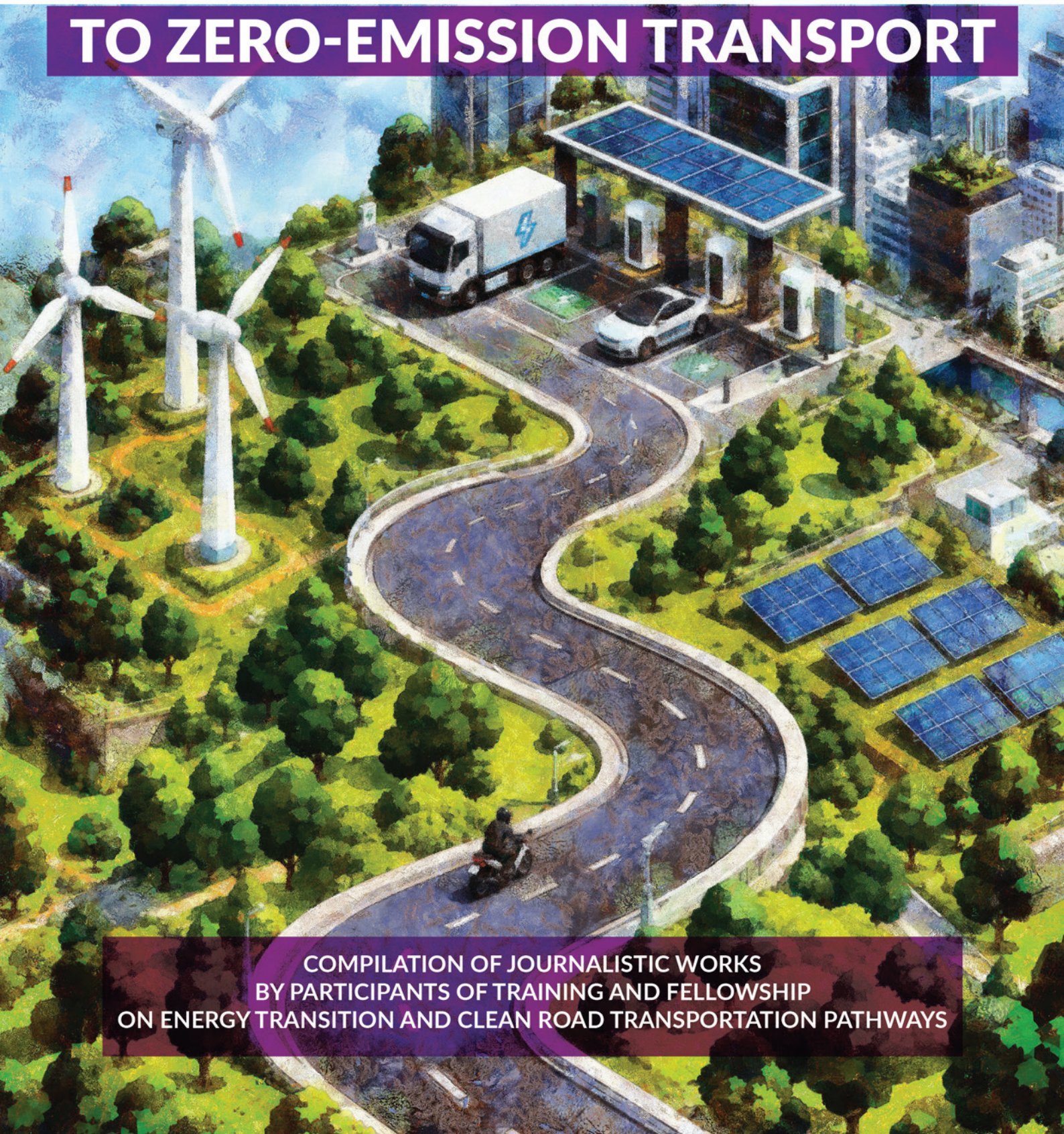
PAVING A GREENER PATH: INDONESIA'S LONG JOURNEY TO ZERO-EMISSION TRANSPORT



COMPILATION OF JOURNALISTIC WORKS
BY PARTICIPANTS OF TRAINING AND FELLOWSHIP
ON ENERGY TRANSITION AND CLEAN ROAD TRANSPORTATION PATHWAYS

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The Alliance of Independent Journalists (AJI) Indonesia
October 2026

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Foreword

This is the story behind the transition to electric vehicles

The energy transition is never just about swapping out one technology for another. It is not simply trading fossil-fueled engines for electric batteries. More than that, it is a sweeping shift that touches every corner of human life, our environment, the economy, public policy, and the future of the automotive industry.

As the climate crisis becomes increasingly evident, moving toward low-emission transportation is a vital step toward breaking our reliance on fossil fuels and curbing greenhouse gas emissions.

Indonesia holds a strategic position in this journey. As one of Southeast Asia's largest motor vehicle markets and a leading global nickel producer, the country has immense potential to build a robust electric vehicle ecosystem. The government has introduced various policies and incentives to accelerate electric vehicle adoption, expand charging infrastructure, and attract investments in battery and vehicle manufacturing.

Yet, a wave of critical questions remains. How truly prepared is Indonesia to leap into electric mobility? Can EVs genuinely solve our emission reduction goals if our power grid is still heavily reliant on coal? What are the human costs and impacts on everyday people, particularly low-income communities, transport workers, and families living near mining regions? And to what extent can government policies ensure that this transition remains just, inclusive, and truly sustainable?

The Alliance of Independent Journalists (AJI) Indonesia believes this shift must be viewed holistically, starting from the energy sources we rely on, vehicle and battery manufacturing processes, infrastructure development, shifting public behavior, all the way into the management of waste and environmental impacts across the entire lifecycle of the vehicle.

The collection of reporting compiled in this book is part of an effort to broaden public understanding of Indonesia's transition toward electric vehicles. Through journalistic

work supported by the International Council on Clean Transportation (ICCT), various dimensions of this shift are explored, ranging from policy and technology to economic, social, and environmental implications.

It is our hope that these reports provide a more comprehensive and data-driven understanding that remains grounded in the everyday realities of the community.

The greatest challenge in covering the energy transition lies in the deep complexity of its interconnected issues. On one hand, electric vehicles offer a pathway to curb urban air pollution and transport sector emissions. On the other hand, building this ecosystem demands mineral supplies, clean energy, robust infrastructure, substantial investment, and transparent, responsible governance. Consequently, journalism must move beyond celebratory narratives of technology and investment, actively shedding light on the friction points, gaps, and unintended consequences arising from every policy choice.

Reporting on electric vehicles must also place people at the center of the story. Shifts in transportation systems directly impact online motorcycle taxi drivers, public transit operators, automotive workers, consumers, and families living near mining zones and power plants. Their voices and experiences are vital to ensuring that the energy transition does not solely serve industries and investors, but delivers genuine benefits to the wider public.

With no intention of presenting a single, definitive conclusion on electric vehicles, this compilation of reporting invites readers to view the energy transition through multiple lenses, understanding both its progress and its challenges while weighing the choices available. The success of the energy transition is measured not merely by the number of electric vehicles on the road, the volume of incoming investment, or the industrial capacity built. That success is also determined by the extent of actual emission reductions achieved, the cleanliness of the energy consumed, and how fairly the benefits and burdens are distributed.

Ultimately, the energy transition is a long journey that demands collaboration among the government, industry, academia, civil society, media, and the public. Journalism carries the responsibility of ensuring this journey unfolds with transparency, accountability, and an unwavering commitment to the public interest.

May this compilation serve as a valuable reference, enrich public discourse, and foster a more critical understanding of Indonesia's transportation trajectory. Because the future of electric vehicles is not just about the machines we drive, but about the energy we generate, the environment we live in, and the justice we fight for on behalf of future generations.

Happy reading.

Nany Afrida
President of AJI Indonesia



Sanya Dinda

Sanya Dinda started working at ANTARA in 2021, covering economic issues, particularly macroeconomics and banking. Three years later, she began her assignment in the video desk to cover various daily events.

The Green Metamorphosis of Jakarta Public Transport

Sanya Dinda

Jakarta and air pollution have long been intertwined, with vehicle exhaust accounting for over half of the city's pollutants. Today, however, a green metamorphosis is underway as Transjakarta transitions its fleet from fossil-fueled buses to electric vehicles. Beyond slashing carbon emissions, this initiative is also eliminating the deafening noise pollution that has long plagued the capital. Demonstrating serious commitment, Transjakarta aims to deploy 10,000 electric vehicles on the road by 2030. Just how ready is Jakarta to navigate this sweeping transformation?

The number of electric buses keeps climbing each year. Of the 5,000 large buses and 3,000 Mikrotrans units currently in operation, 500 are electric. State-owned enterprise Perum DAMRI operates 321 of the electric buses. Dedi Nata, General Manager of Perum DAMRI's Workshop Unit, noted that these electric buses require around 1 hour 30 minutes of charging time to achieve a driving range of up to 250 km.

Nanik Zaeniwati, a Transjakarta electric bus driver, highlighted that electric buses operated by DAMRI are much more environmentally friendly. "No emissions and no engine noise. This is where our responsibility as drivers is put to a test. We must be more careful and stay constantly alert because these buses are completely silent on the outside," she noted.

Currently, the Jakarta government holds an ambitious target to deploy 10,000 electric public transport vehicles. To date, there are 156 public electric vehicle charging stations (SPKLU) across seven depots managed by the transportation operators. Moving forward, authorities will map out charging station locations to support an environmentally friendly public transportation ecosystem.

However, this green revolution leaves behind one major piece of unfinished business: waste. The more electric vehicles are produced, the greater the pile of expired batteries will be in the future.

Yet, Transjakarta is now partnering with brand agency providers to prevent a new ecological disaster. This partnership aims to ensure that used batteries can be properly processed and do not become a ticking time bomb of hazardous and toxic waste (B3).

Transition to achieve zero-emission public transport in Jakarta takes time. Efforts to increase the number of buses are only one piece of the puzzle. The true challenge is to maintain the reliability of charging facilities and ensure that battery waste does not become a ticking time bomb for environmental sustainability, because the luxury of clean air and blue skies in Jakarta should not come at the cost of future ecological damage.

This video report was published on ANTARA News on September 18, 2026. It is accessible through the following link:



https://m.antaranews.com/video/5746069/metamorfosis-hijau-transjakarta?utm_source=antaranews&utm_medium=mobile&utm_campaign=latest_category

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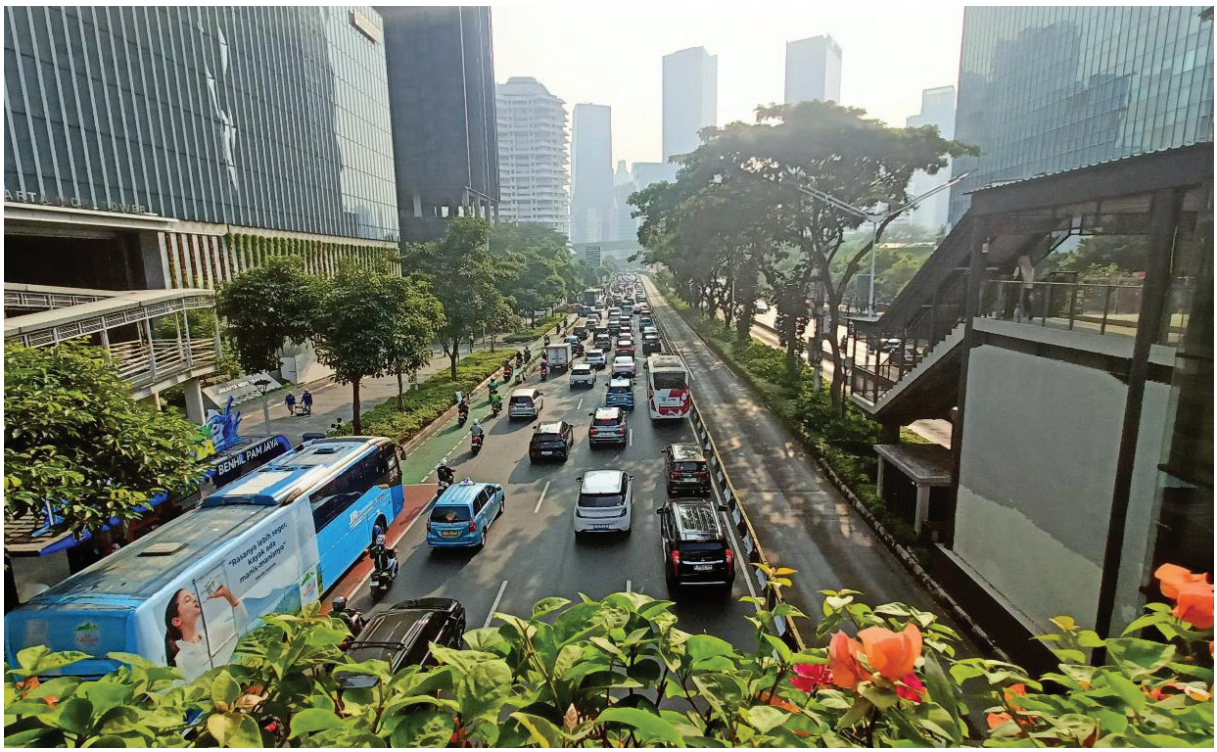


Albertus Krisna

Albertus Krisna is a geographer who has built his career at Kompas Daily (Kompas.id) since 2012. He earned his educational background in geography from a bachelor's degree in Cartography and Remote Sensing at Gadjah Mada University in 2007. Born in Yogyakarta, he began his journey in journalism at the Research and Development (Litbang) Department of Harian Kompas. He has been involved in various research activities ranging from the Jakarta Flood Survey, the National Socio-Economic Survey, the National Leadership Survey, the 2014 Presidential Election Quick Count, to the 2017 Jakarta Gubernatorial Election. He joined the Data Journalism Team at the Harian Kompas Newsroom since its formation in 2020. To this day, various data-driven coverages initiated by Krisna and his team regularly fill the in-depth reporting section in Kompas Daily and Kompas.id. He has also produced a number of coverage articles based on map processing or spatial journalism, starting with "Millennials Increasingly Struggle to Reach Their Dream Homes" published in 2021, "8.8 Million Greater Jakarta Residents Grapple to Access Public Transportation" in 2022, "Priority Watersheds Not Yet Fully Addressed" in 2023, and most recently "Sumatra's Forests Vanish" at the end of 2025.

Jakarta's Deafening Streets: Can Electric Vehicles Turn Down the Volume?

Albertus Krisna



Noise pollution along the capital's main thoroughfares has exceeded acceptable thresholds. The silent glide of electric vehicles remains drowned out by the overwhelming roar of conventional engines and blaring custom exhausts."

No morning on Jalan Jenderal Sudirman, Central Jakarta, is truly peaceful. Amid suffocating smoke and seas of people on Tuesday, August 11, 2026, this major thoroughfare was packed with relentless noise pollution.

Horns blared aggressively, brake discs shrieked against one another, and engine roars overlapped with the piercing din of modified motorcycle exhausts. The chaotic face of the capital was vividly painted by its noisy streets.

Such inner-city street noise has practically become a daily reality for Erik (56). "My ears never ring or get dizzy. I'm used to it," joked the street vendor from Majalengka, West Java, when *Kompas* met him on Wednesday, August 12, 2026.

Six days a week, nearly 12 hours a day, from around 10:00 AM to 10:00 PM, his body is forced to swallow Jakarta's clamor. Ironically, Erik firmly believes in a streetwise rule: if the atmosphere is quiet and still, his goods won't sell.

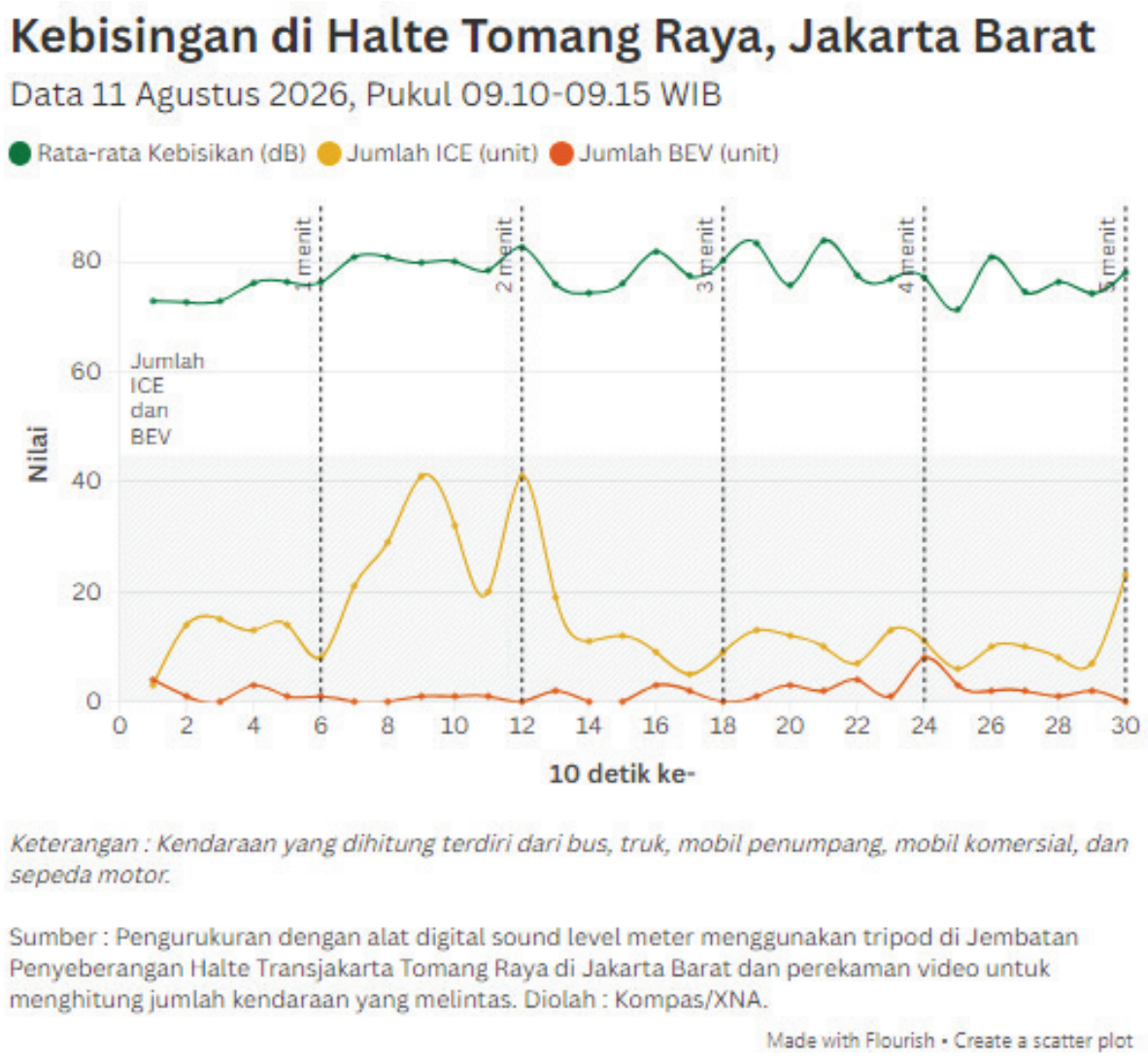


Erik (56) was hawking his goods when Kompas met him across from the Bendungan Hilir Bus Stop, Central Jakarta, on Wednesday (Aug 12, 2026). Every day, Erik sells light snacks around Jalan Jenderal Sudirman, Central Jakarta, from morning until night. (Photo by Kompas/ Albertus Krisna)

Erik's attitude of making peace with street noise seems to mask ecological violations. After all, the noise pollution surrounding him is scientifically real. The average noise level exceeded 74.1 decibels (dB). This is the result recorded by Kompas when measuring the noise pollution using a digital sound level meter from the pedestrian overpass at the Bendungan Hilir Transjakarta Bus Stop on Tuesday morning (8/11/2026), between 8:00 and 8:05 AM.

The figure recorded during just a five-minute observation surpassed the city's noise threshold. Referring to Environment Minister Decree No. 48/1996, premium commercial and office districts like Sudirman must strictly maintain a maximum noise limit of 65 dB. This fact underscores that Jakarta's airspace is polluted not only by exhaust emissions, but also by clamor.

Noise is defined as unwanted sound from an activity over a certain period. Exposure to noise above threshold limits can slowly impact human health and damage the comfort of living spaces. The state responds to this threat through legal instruments in the form of noise level standards, which are the benchmark limits for the maximum sound permitted for release into the environment.



Noise at the Tomang Raya Bus Stop, West Jakarta
Note: Vehicles counted include buses, trucks, passenger cars, commercial vehicles, and motorcycles.

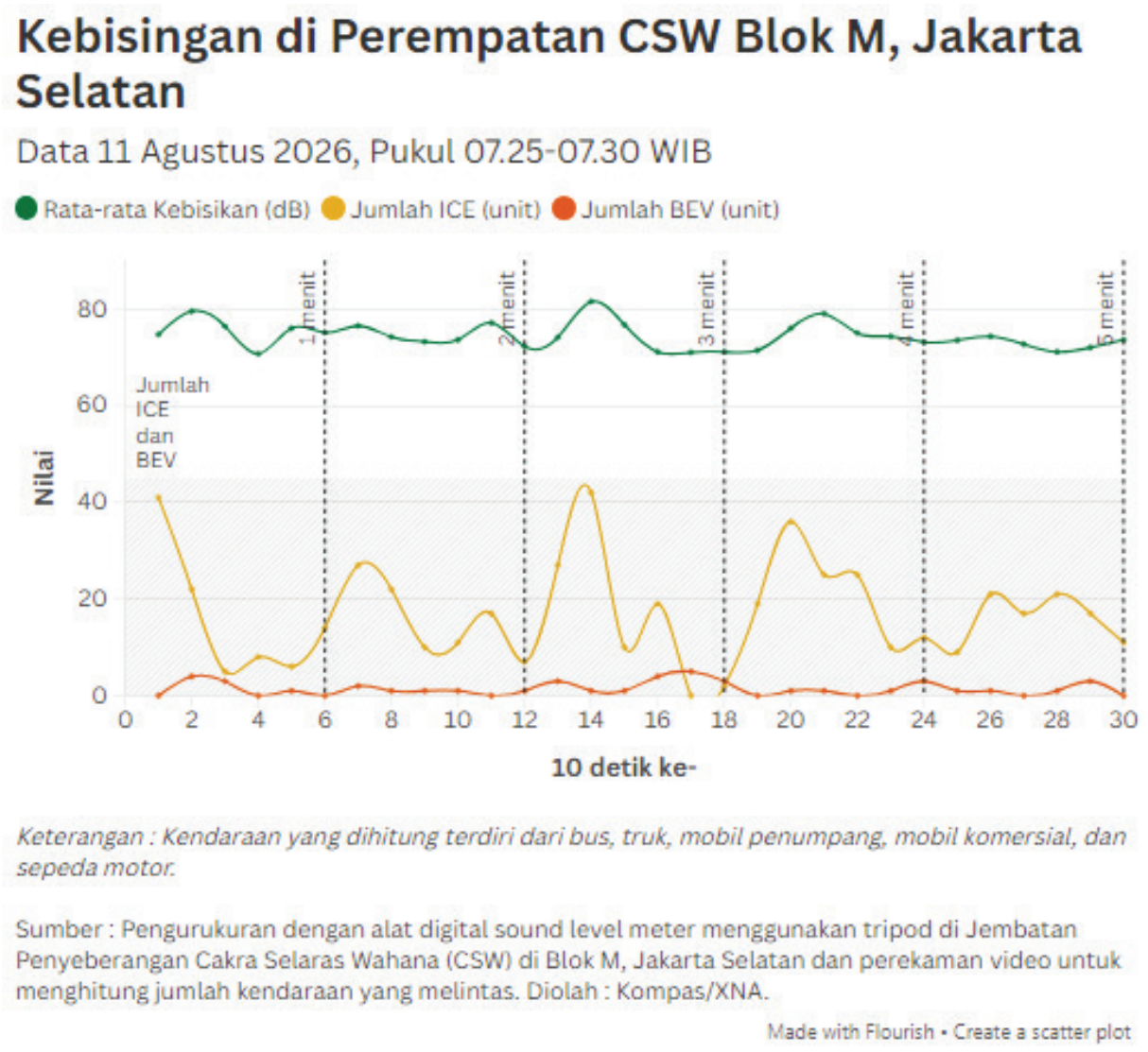
Areas with Severe Noise Pollution

In fact, Benhil bus stop is not the only severe noise hotspot in Jakarta. *Kompas* also measured noise levels for five minutes on the same day between 7:25 and 9:10 AM in

three other locations. The results showed that average noise levels reached 77.5 dB at the Tomang Raya Transjakarta bus stop, 75.8 dB at the Gambir Station pedestrian overpass, and 74.2 dB at the CSW Blok M intersection.

Unlike Erik, Andi (39), a sanitation worker in the CSW Blok M area, initially felt overwhelmed by the street clamor when he first started battling the roads for a living. Over time, after seven years, his body was forced to get used to it.

"When I first started working, I was quite shocked because I used to work in an office. But until now, thank God, I've never had any hearing problems," he shared.



Noise at the Tomang Raya Bus Stop, West Jakarta
Note: Vehicles counted include buses, trucks, passenger cars, commercial vehicles, and motorcycles.

Despite claiming to be used to the noise, Andi's ears are not impervious to the street's torment. He admits that his patience is frequently strained by the blaring of custom exhausts, particularly the exhaust pipes of large motorcycles that routinely pass through the Blok M asphalt every weekend. Because his days off rotate unpredictably between Saturday and Sunday, Andi has no choice but to swallow the clamor of these high-volume engines at least one day every weekend.

Andi's complaints are backed by data from Decibel Shield, a noise-level measurement app available for free on iPhones or directly via web browsers. In Decibel Shield's report this year, Jakarta was ranked 14th among the 50 noisiest cities in the world. During the day, noise pollution levels in Jakarta fluctuate between 70 and 84 dB, dominated by motorcycle roars, traffic din, and pounding loudspeakers. The number one noisiest city is Dhaka, Bangladesh, with noise levels of 78–95 dB, followed by Moradabad, India, at 75–92 dB; Delhi, India, at 75–90 dB; Cairo, Egypt, at 75–90 dB; and Mumbai, India, at 74–88 dB.



Andi (39, left) and Nuryanto (43) were in a city park across Blok M Plaza, South Jakarta, when Kompas met them on Wednesday (August 12, 2026). Both of them work as janitors in the Blok M area. (Photo by Kompas/ Albertus Krisna)

Health Threats

Jakarta's noise levels, which far exceed this quality standard, are a "red alarm" for public health. The "used to it" response from roadside workers like Andi actually conceals a hidden health threat. Dr. Kristiawan Abri Roosadi, an Ear, Nose, and Throat (ENT) specialist

at Mitra Keluarga Hospital Cikarang, warns that the human ear has a tolerance threshold. Ideally, sound exposure should not exceed 80–85 dB, and even then, only for a maximum duration of 8 hours a day.

The pounding noise that exceeds this limit slowly erodes the inner ear organs, which stretch from the cochlea to the auditory nerve tissue. "The first sign is certainly a feeling of fullness in the ear. If left unchecked, they begin to hear uncomfortable sounds, one of which is ringing or tinnitus," Kristiawan explained on Tuesday (August 18, 2026).

Unfortunately, urban residents frequently ignore these early warning signals. Yet, if they continue to neglect tinnitus until pain arises, their ear organ will be structurally damaged. "While it's still in the early stages, when the ear feels full, it can usually recover on its own by resting at home. However, if it continues to be ignored until the organ is injured, at this stage, the damage will be irreversible," Kristiawan elaborated.



Noise measurement at the pedestrian overpass of the Bendungan Hilir Transjakarta Bus Stop, Jalan Sudirman, Central Jakarta, on Tuesday, August 11, 2026.



Noise measurement on Jalan Medan Merdeka Timur, Central Jakarta, on Tuesday, August 11, 2026.

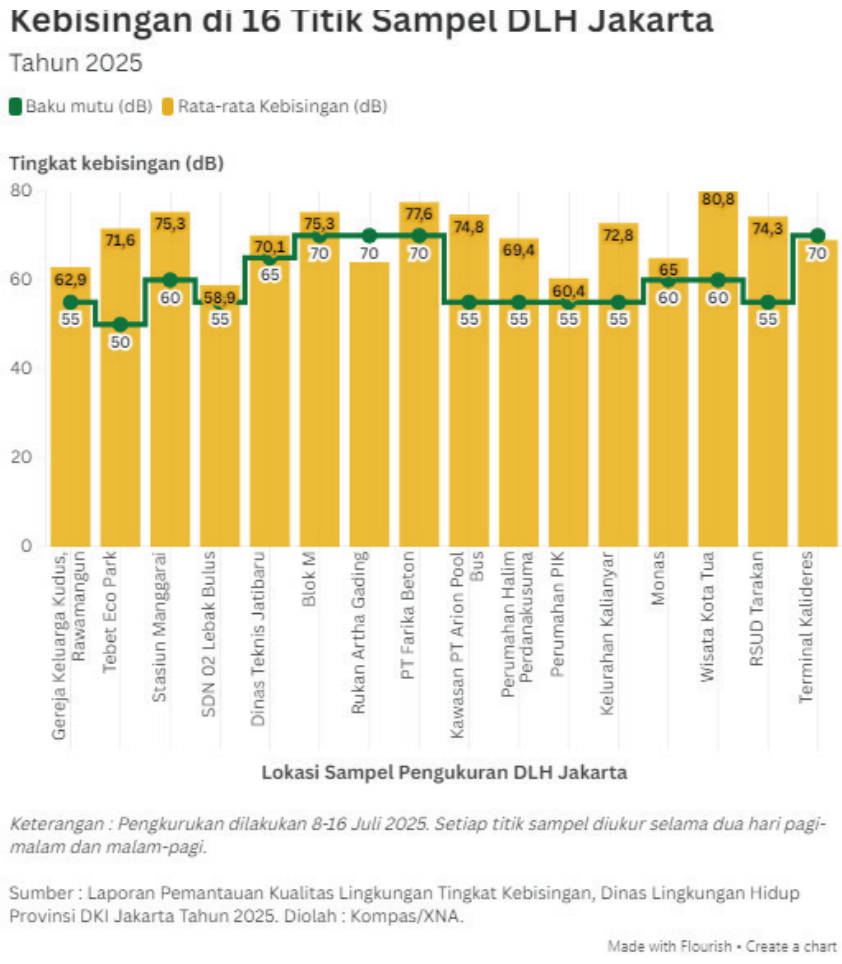


Noise measurement at the pedestrian overpass of the Tomang Raya Bus Stop, West Jakarta, on Tuesday, August 11, 2026. (Photos by Kompas/Albertus Krisna)

Motorized vehicles

Noise pollution points to a single main "suspect": motorized vehicle traffic. The 2025 report from the Jakarta Provincial Environmental Agency (DLH) reveals alarming figures. Out of 16 measurement sample locations, 14 exceeded the noise quality standard limits. Even more unsettling, a poll in the report confirms that at nine of those 14 red-zone locations, the acoustic terror predominantly stems from the roar of vehicles on the highway.

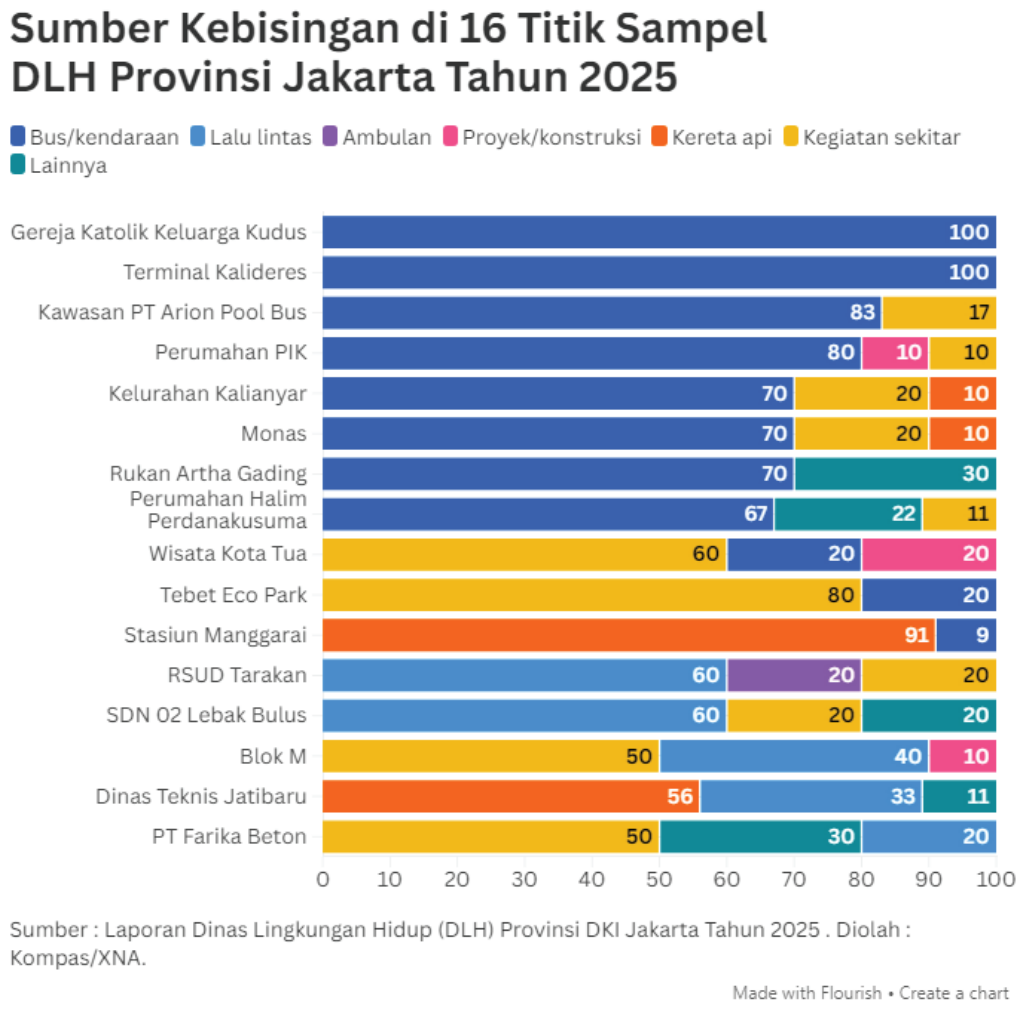
The most heartbreaking irony is recorded at Tarakan Regional General Hospital (RSUD Tarakan) in Central Jakarta. An area that should be a quiet sanctuary for healing instead records an average daytime and nighttime noise level of 74.3 dB. This figure is far above the noise quality standard for hospital areas, which should be at 50 dB. Based on questionnaires distributed to residents around the hospital, 60% of this noise pollution is contributed by street traffic, while the remainder is evenly split between the wailing ambulance sirens (20%) and crowd commotion (20%).



Noise Levels at 16 DLH Jakarta Sample Sites in 2025
Note: Measurements were conducted from July 8–16, 2025. Each sample point was measured for two days, morning-to-night and night-to-morning.

Rather than subsiding, the tormenting noise pollution in Jakarta is growing increasingly ferocious. Compared to data in 2024 and 2025, noise levels increased in 11 out of 14 sample locations. The sharpest spike happened in a public space that should be tourist-friendly: the Old Town Tourism Area. At this location, noise skyrocketed by 14 dB, jumping from 66.8 dB in 2024 to 80.8 dB in 2025. The Blok M commercial district followed in second place, climbing from 65.2 dB to 75.3 dB, an increase of 10.1 dB.

The root cause of this encroaching clamor is inextricably linked to rising vehicle ownership. According to data from the Indonesian Police's Traffic Corps as of August 25, 2026, the total number of vehicles in the area of Jakarta Police (comprising Jakarta, Depok, Tangerang, and Bekasi), has exceeded 25.4 million units. The street landscape is crowded with 20.2 million motorcycles (79.8%), followed by 4.1 million passenger cars (16.2%), with the remainder made up of freight trucks, buses, and special-purpose vehicles. These tens of millions of engines are what contribute to the ringing in residents' ears.



Sources of Noise at 16 Sample Sites of DLH Jakarta in 2025

The trail of internal combustion engine (ICE) machinery as a trigger for noise pollution is not just an assumption. *Kompas* data analysis revealed a fairly strong correlation between conventional vehicle volume and noise fluctuations along two of Jakarta's main arteries. At the CSW Blok M intersection, for example, the movement of 530 ICE vehicles yielded a noise correlation figure of +0,49. An identical pattern was recorded at the Tomang Raya Transjakarta bus stop; the passage of 489 conventional vehicles triggered a correlation of +0,44.

The cause-and-effect rule is clear. The more densely gasoline and diesel engines crowd together, the higher the decibel torment produced. This was captured during observations at CSW Blok M. Within seconds, when passing vehicle volume surged from 27 to 42 units, the noise meter needle immediately moved from 74,1 dB to 81,5 dB.



Vehicle Population in Jakarta 2026 By Type and Powertrain

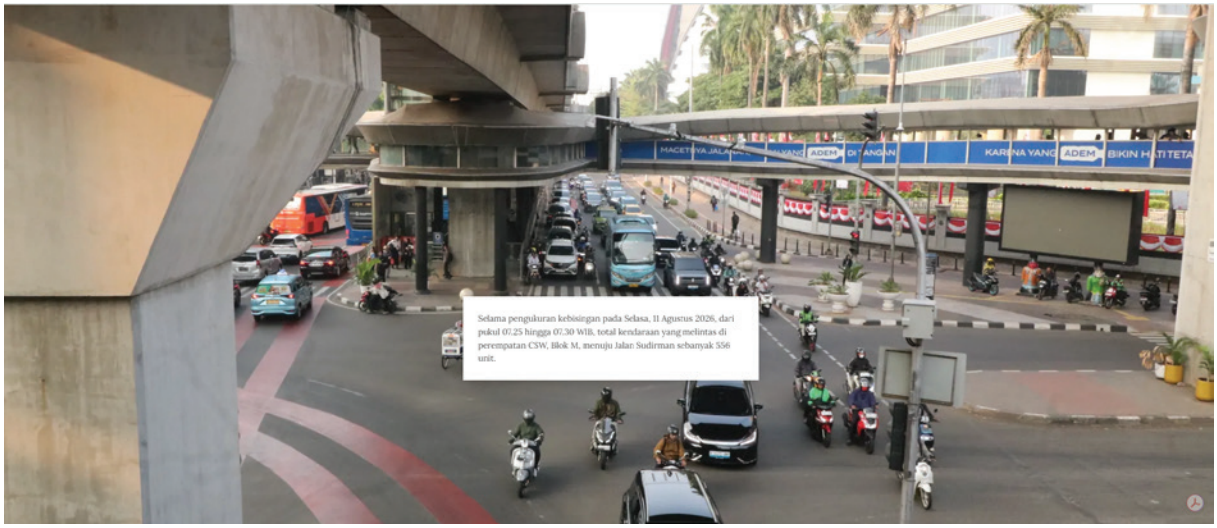
Electrification of Transportation Modes

Amidst the dense noise pollution caused by conventional engines, the recent wave of vehicle electrification is being touted as an antidote to quiet the city's streets. However, can the electrification trend really save urban residents' hearing? The answer is not yet. Even though this region serves as the epicenter for battery-powered electric vehicles (BEVs) in Indonesia, their population remains vastly disproportionate. According to Jakarta Police data, electric vehicles in their administrative jurisdiction number only 322,485 units.

On paper, this figure seems decent. However, when juxtaposed against the total overall vehicle count, its proportion is a mere 1.27%. The breakdown of penetration remains heavily unbalanced. Out of all passenger cars, only 4.16% are BEVs. Among all buses, a mere 1.04% are BEVs. Meanwhile, in the motorcycle category, just 0.74% are BEVs.

BEVs genuinely offer a luxury that has long been robbed from city streets: silence. Without mechanical vibrations from internal combustion engines, the massive adoption of BEVs would theoretically dampen traffic noise pollution.

This assumption was scientifically proven by Sabine Wurzler et al. (2016) in the journal "Regional and Local Effect of Electric Vehicles on Air Quality and Noise." The study concluded that compared to conventional internal combustion engine (ICE) cars, BEV noise can be reduced by up to 5 decibels (dB) at a maximum speed of 30 kilometers per hour, and by 3 dB at a speed of 50 km/h.







However, restoring the city's silence requires an extreme scale of electrification. An insignificant number of electric vehicles will certainly not change the situation much. This reality is clearly captured in the simulation by Ziqin Lan et al. (2018) through their journal article, "Study of the Traffic Noise Source Emission Model and the Frequency Spectrum Analysis of Electric Vehicles on Urban Roads in China."

In their simulation, converting 100% of the light-vehicle population to BEVs can reduce noise by up to 7.1 dB. Meanwhile, a 100% conversion of heavy vehicles to BEVs reduces it by 7.3 dB.

Actually, the Indonesian government has established regulations to accelerate the adoption of electric vehicles since 2019, starting with the issuance of Presidential Regulation Number 55 of 2019 concerning the Acceleration of the Battery-Based Electric Motorized

Vehicle Program, which regulates the roadmap for domestic component levels as well as fiscal and non-fiscal incentives. This policy was revised four years later with Presidential Regulation Number 79 of 2023.

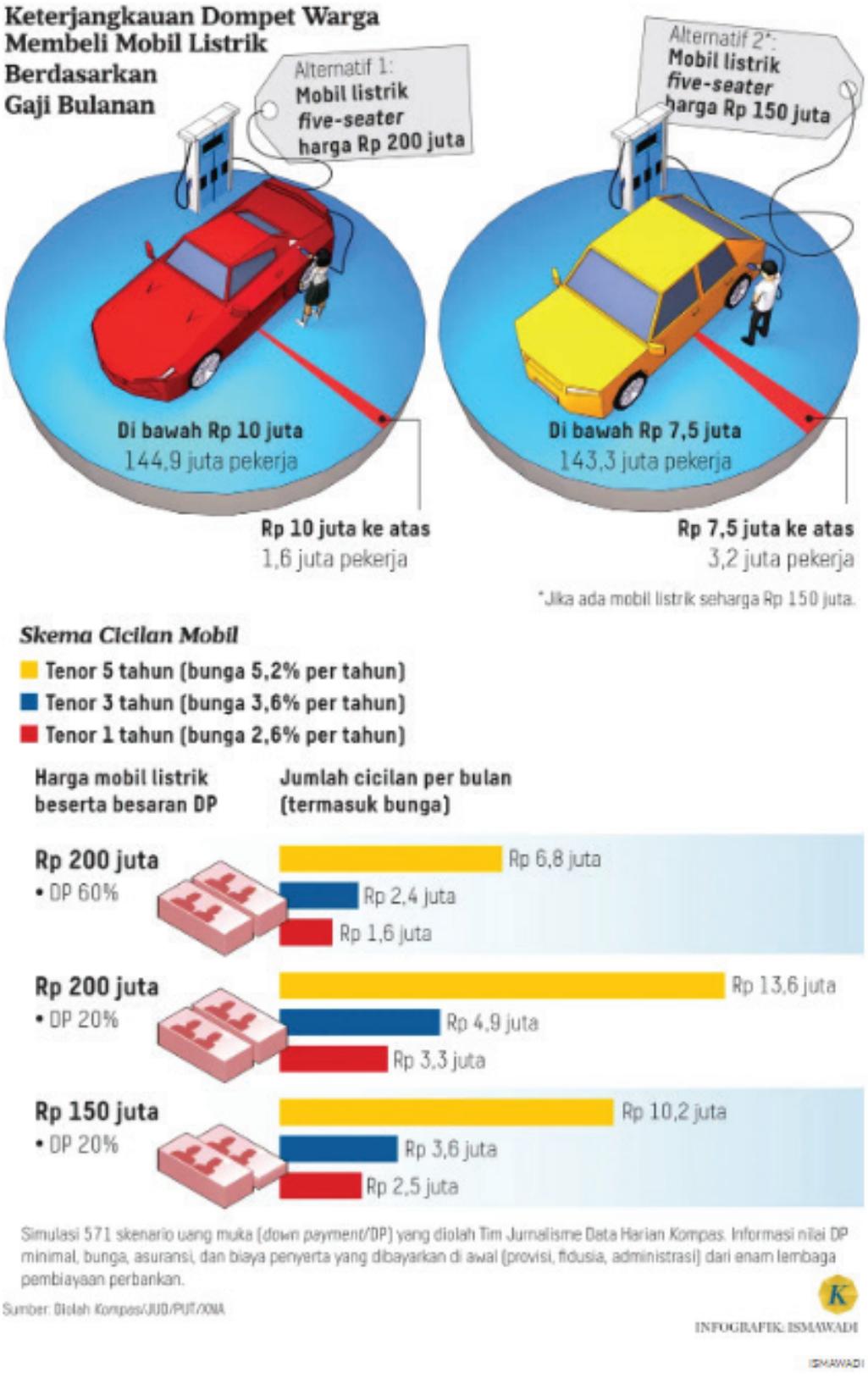


The first "Indomobil Expo" special exhibition featuring electric vehicles took place in Senayan, Jakarta, from May 5–17, 2026. (Photo by Kompas/Albertus Krisna)

Unfortunately, these various incentives are not yet balanced with purchasing power. The relatively high average price of BEVs in the country still categorizes these zero-emission vehicles as exclusive luxury goods. Data analysis by the *Kompas* Daily Data Journalism Team in early June 2026 revealed that only 1.1%, or approximately 1.6 million people out of the total workforce in Indonesia, possess the financial capacity to afford an electric car.

They belong to the worker bracket earning at least Rp10 million per month. This figure represents the lower threshold considered "comfortable" for purchasing a five-passenger electric car priced around Rp200 million. The problem is that within this price range, the selection of BEV units on the market remains extremely limited.

The financing scheme is also quite strict. If a prospective buyer dares only to allocate a maximum installment of 20% of their salary, they must make a massive down payment of up to 60% of the car's price. This does not even include auxiliary costs, merely to lock in an installment of Rp1.76 million per month for five years.



Affordability of Electric Cars Based on Monthly Salary.
Simulation of 571 down payment (DP) scenarios processed by the Kompas Daily Data Journalism Team. Information covers minimum DP, interest, insurance, and upfront auxiliary fees (provision, fiduciary, administration) from six banking financing institutions.

This reality seems to be an irony: some incentives ultimately end up being enjoyed by middle- to upper-class consumers. Andi Rachman, Head of the Non-Governmental Economy Sub-division at the Ministry of Finance, underscored three fundamental anomalies of the current electrification wave.

"First, is the energy from PLN already clean? Second, subsidies are instead flowing to the middle and upper classes. And third, Indonesian consumers so far are merely being pushed to become a market for BEV products," Andi stated while speaking at the Clean Energy and Land Transportation Transition Training and Fellowship organized by the Alliance of Independent Journalists (AJI) Indonesia and The International Council on Clean Transportation (ICCT) in Jakarta on Saturday, July 25, 2026.

The Solution for Encroaching Noise

Even so, Jakarta cannot rely entirely on electrification. Yogi Ikhwan, Head of the Public Relations Section for the Jakarta Environmental Agency (DLH), reminded that the noise pollution ecosystem was shaped by variables that were far more complex than just engine roars.
"Electric vehicles are one of the efforts that can contribute to reducing noise from vehicle engine sources. However, urban noise levels are not only determined by vehicle engine noise. Traffic volume density, tire noise, horns, heavy vehicles, community activities, public transportation, and commercial activities also exert an influence," Yogi explained in his written response to *Kompas* on Thursday, August 13, 2026.

Quieting Jakarta's noise demands an integrated management scheme. The transition to zero-emission vehicles must be accompanied by precise traffic management. These interventions range from speed limits, strict crackdowns on modified exhaust pipes, mandatory vehicle noise testing, to urban spatial modifications through the construction of noise barriers and the thickening of tree vegetation.

Senior Researcher International Council on Clean Transportation (ICCT) Indonesia, Aditya Mahalana, explained that the government has set noise quality standards through the Ministry of Environment and Forestry Regulation Number 56 of 2019. Unfortunately, this regulation meets the same shortcomings as the rule on exhaust emission standards: only fierce on paper but powerless in enforcement.



Motorcycles have become the premier mode of transportation for many Indonesians. Near or far, destinations can be easily reached with this mode. One such scene unfolds during morning school drop-offs and pick-ups in Cisauk District, Tangerang Regency, Banten, on Friday morning, October 3, 2025. (Photo by Kompas/Albertus Krisna)

Aditya emphasized that public education to prevent removing factory-standard mufflers, especially on motorcycles, is quite crucial. "However, if noise levels still do not decrease, the ultimate solution is limiting vehicle numbers and pushing citizens to use public transportation," he elaborated on Tuesday, September 1, 2026.

Toward a quieter Jakarta, the transition to an electric ecosystem has become a necessity. However, it is not a cure-all solution. The city also needs to curb private vehicles, restrain the arrogance of horns on the road, and make mass transit the leading mode of transportation, for the residents' ears are already too tired to be continuously tortured.

This article was published on Kompas.id on September 16, 2026. It is accessible through the the following link:

https://www.kompas.id/artikel/jakarta-kelewat-bising-kendaraan-listrik-jadi-solusi?open_from=Terbaru_Page

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Erik Alfian

Erik Alfian has been working as a journalist since 2012. He is interested in writing about a wide range of issues, ranging from politics, law, crime, and sports to the environment and energy transition. Since 2025, he has been working as a freelance journalist for Kompas.com, covering the Balikpapan region, East Kalimantan.

Balikpapan Struggles to Electrify Public Transit amid Fleet, Landscape Hurdles

Erik Alfian



The Balikpapan City Trans (Bacitra) bus serves passengers in Balikpapan. Amid plans to electrify public transportation, Bacitra is being prepared as part of the mobility system's shift toward lower-emission transit. (KOMPAS.com/Erik Alfian)

Glowing bright red amid lines of private vehicles, a Balikpapan City Trans bus slowly navigated the streets on Wednesday afternoon, August 5, 2026. The bus fittingly traversed the thoroughfares of *Kota Beriman*, a moniker for Balikpapan that stands for *Bersih, Indah, Aman, Nyaman* (Clean, Beautiful, Safe, and Comfortable).

Since its launch in July 2024, the bus called Bacitra, a short form of Balikpapan City Trans, has been more than just a new mode of transportation. It is the stalwart of the public

fleet in Balikpapan, a buffer city supporting the development of the Nusantara Capital City (IKN).

Inside the bus, Cut Asri chatted cheerfully with her young child while occasionally talking with her work colleague. For her, the air-conditioned red bus is no longer just an alternative, but a reliable workhorse for her daily mobility.

“Ever since fuel prices went up, I chose to take Bacitra. It’s probably been about a year now,” Cut said.

The woman, who works at the Balikpapan City General Election Commission, said the clean, smoke-free condition of the bus is the reason she remains loyal to Bacitra. The drivers, who do not need to speed to chase daily earnings, also make the journey much more comfortable.

In addition, the predictable arrival times or headways provide added value for her. Now, she can reallocate the money that she previously spent on fuel for her household needs.
A similar experience is shared by Alea, a student at the State Vocational High School 1 (SMKN 1) Balikpapan.

Before using the subsidized bus, Alea had to shell out up to Rp60,000 for a round trip from her home to her school on Jalan Marsma R. Iswahyudi in South Balikpapan.

“Riding Bacitra is much more cost-effective, especially since it’s still free right now. Hopefully, the routes can be expanded to East Balikpapan in the future so that it passes by my school,” Alea said.

However, that fare-free ride will not last forever. The Ministry of Transportation’s operational subsidy, which has kept the service running since 2024, is set to expire in July 2027, exactly three years after Bacitra’s launch.

Ahead of this handover period, Balikpapan faces more than just the challenge of mass transit sustainability. The next question is where Bacitra’s development is heading, including the potential transition to battery-powered electric vehicle (EV) fleets.

Alea, who owned an electric motorcycle, expressed enthusiasm for Bacitra adopting a battery-powered fleet.

Electrification of Mass Transportation

Chaerul Qalbi AM, a Mechanical Engineering lecturer at the Kalimantan Institute of Technology (ITK), believes that the energy transition in the land transportation sector is more rational if it begins with public transit rather than private vehicles.

Private vehicles possess random movement patterns. This condition demands a dense network of Public Electric Vehicle Charging Stations (SPKLU).

“If my car battery drops to 30%, I need to know where the nearest charging station is to power up,” he said.

Meanwhile, public transport such as Bacitra features fixed routes, designated stops, and more predictable schedules, making it a more measurable option to kick off the process.

“Buses are the easiest. They have clear start and stop points. Therefore, we can estimate, for instance, whether the battery capacity is sufficient for two corridor loops, after which it enters the depot for a recharge. From there, we can calculate the fleet and infrastructure requirements,” he explained.

For Chaerul, electrifying Bacitra is not merely about replacing a vehicle’s energy source. The presence of public transportation that is comfortable and subsidized can reshape citizens’ mobility habits. Once people switch to mass transit, private vehicle use will decrease. The same goes for underage students riding motorcycles to school.

Conventional public minivans (*angkot*) also hold strong potential for electrification and integration as feeder modes connecting to Bacitra’s main corridors, similar to the Transjakarta and JakLingko scheme.

“Any mode with fixed shelters and routes is undoubtedly easier [for electrification]. Balikpapan, with its relatively compact area, is highly ideal. If Bacitra and its feeder minivans are comfortable, residents will surely embrace public transportation,” he noted. Challenging Hilly Terrain for Electric Bus

Balikpapan, however, presents its own unique challenges.

According to Chaerul, the city's hilly road contours can drain battery power much faster, especially when buses are carrying maximum passenger capacity.

"This topography directly correlates with battery capacity requirements. The specifications must be higher. For instance, Corridors B and C, which feature more inclines along the routes, will require larger battery capacity compared to Corridor A," he said.

Chaerul added that electric buses also hold strong potential for long-distance routes along the Balikpapan - Samarinda and Balikpapan - IKN toll roads.

These geographic realities show that electrifying Balikpapan's transport system involves much more than simply swapping fossil-fuel vehicles for battery-powered ones. Battery requirements, route layouts, operational patterns, and charging infrastructure must all be developed in tandem.

Charging Infrastructure on the Rise

PLN's East Kalimantan and North Kalimantan (UID Kaltimra) regional unit has recorded a surging number of electric vehicle charging transactions year after year.

In 2023, PLN recorded a mere 23 EV charging transactions across East and North Kalimantan. That figure spiked to 19,162 transactions by 2025.

The upward trend continued into 2026. By July, PLN UID Kaltimra recorded a cumulative total of 27,356 charging transactions, with energy sales exceeding 668 kWh.

The unit's General Manager Muchamad Chaliq Fadli noted that Balikpapan currently hosts 12 Public Electric Vehicle Charging Stations (SPKLU). Of these, nine are located in public spaces and accessible 24 hours a day.

"Overall, as of July, we are operating 81 EV charger units across the Kaltimra region," Chaliq stated.

Charging facilities are no longer confined to PLN offices, but have expanded to shopping malls and public spaces, including Mall BSB, Plaza Balikpapan, Bank Mandiri, the Balikpapan City Hall, Monpera Park, and the East Kalimantan Police Traffic Directorate Headquarters.

Throughout 2026, PLN UID Kaltimra added four fully operational EV charger units.

“We are continuously mapping and planning potential additions for SPKLU locations across Balikpapan and Kaltimra, taking into account EV user growth and local grid readiness,” Chaliq said.

Preparing Public Transit Depots

To support the development of electric public transport, PLN said it is ready to provide infrastructure and incentive backing.

This includes setting up dedicated charging depots specifically for city buses.

“The support we can provide is through reductions in Connection Fees (BP) and Subscription Guarantees (JL) in accordance with applicable regulations. This applies to SPKLU/SPBKLU business entities as well as to owners of private electrical installations for public transport,” Chaliq explained.

Power demands and system readiness for city bus fleets will be tailored through technical studies assessing the locations and operational needs of Bacitra.

Alongside depot preparation for public transport, PLN is also mapping distribution grid readiness in residential areas.

The habit of EV owners charging vehicles at home during peak evening hours is being addressed through routine neighborhood transformer reinforcements.

For fast charging and ultra-fast charging needs, PLN continues to strengthen its grid to support commercial heavy vehicles. Data from the Indonesian National Police Traffic Corps (Korlantas Polri) notes that 48 electric freight vehicles have begun operating in Balikpapan.

PLN also reported growing private investment interests through franchise partnerships for SPKLU development.

Transportation as the City's Heartbeat

Ultimately, technological and infrastructural readiness must go hand in hand with the long-term sustainability of the public transit system.

Murni, Head of the Balikpapan Regional Development, Research, and Planning Agency (Bappeda Litbang), emphasized that mass public transit is a non-negotiable basic necessity. A growing volume of private vehicles unaccompanied by new road expansions will only lead to higher fuel consumption, increased pollution, and a decline in residents' health quality.

"Transportation is the heartbeat of the city. Balikpapan's vision as a global city naturally requires safe, comfortable, inclusive, and affordable public transit services for its residents," Murni said.

Bacitra, she noted, serves as Balikpapan's stepping stone toward building a more integrated transit system.

Therefore, even though the initial trial period nears its end, the city government has affirmed its commitment to maintaining and expanding the service.

However, the municipal government will not manage Bacitra independently. A "buy the service" (BTS) scheme is viewed as the most realistic option.

Under this arrangement, operators are responsible for fleet provisioning, daily operations, and routine maintenance, while the government covers operating costs per kilometer based on agreed calculations.

"Based on studies from several cities implementing BTS, such as Jakarta and Surakarta, efficiency gains can reach 40% to 50%. We are not burdened by complicated asset management and maintenance. Much like renting a municipal official car, maintenance remains the vendor's responsibility," Murni explained.

The government is also drafting regulations to ensure a smooth handover of Bacitra from the Ministry of Transportation to the Balikpapan administration, with an approximately Rp17 billion budget already prepared.

Growing Ridership

The rising number of Bacitra passengers encourages the Balikpapan city administration to maintain and expand this service.

The city's transportation agency recorded a steady increase in Bacitra ridership over the past two years, especially in Corridor A, the busiest line that serves the Semayang Port - Plaza Balikpapan - Sultan Aji Muhammad Sulaiman Sepinggan Airport route.

"Corridor A generates the highest volume because it passes through Balikpapan's primary office and business districts," said Muhammad Islamiawan, the agency's Acting Head of Transport.

In a single month, this corridor along Jalan Jenderal Sudirman drew up to 86,000 passengers in June 2026. Since launching in July 2024, cumulative ridership for Bacitra has surpassed 3.79 million.

Awan added that there are currently 24 buses operating across three main corridors.

Corridor A runs from Semayang Port to Plaza Balikpapan and SAMS Sepinggan Airport. Corridor B connects Batu Ampar Terminal to Plaza Balikpapan via Muara Rapak, while Corridor C links Batu Ampar Terminal to Plaza Balikpapan along Jalan MT Haryono.

Looking ahead, the planned fare for Bacitra has been set at Rp4,500 per person. Meanwhile, students, senior citizens over 60, and passengers with disabilities will be charged a reduced rate of Rp2,000 per tap, which includes a 90-minute transfer window.

These rates are significantly lower than the unsubsidized fare, which ranges between Rp12,000 and Rp 14,000 per person.

"We have already submitted this tariff proposal to the central government and are simply awaiting final approval," he noted.

Alongside preparing for the handover from the Ministry of Transportation, the agency is drafting plans to expand Bacitra's reach. This includes extending service to Jalan Soekarno-Hatta Kilometer 23 in North Balikpapan, Kampung Baru Terminal and Kariangau Ferry

Port in West Balikpapan, and a projected terminal in Teritip, East Balikpapan, targeted for 2029.

Transition Goes Beyond Changing Engines

While modernizing its transit system, the Balikpapan city administration has pledged not to marginalize conventional public minivans.

The administration will integrate roadworthy minivans to be feeder modes connecting commuters to Bacitra's primary corridors. In the initial phase, the integration system would offer a daily subsidy scheme of Rp100,000 to Rp150,000, but some minivan drivers apparently disagree. The Transportation Agency affirmed it will continue pursuing a persuasive, business-to-business (B2B) approach with operators.

Ultimately, the transport transition is not solely about swapping out a fleet's energy source. The urban mobility network must also successfully link feeder transport with main transit corridors.

Meanwhile, discussions concerning the bus fleet electrification, aligned with the regional medium-term development plan, have begun to take shape.

Even so, the city administration is maintaining a realistic stance, insisting that supporting infrastructure and ecosystems, such as charging stations, must be fully mature before transitioning entirely to electric buses.

"In principle, Bacitra's system must be thoroughly prepared. Once the electrical infrastructure is ready, the administration can simply adjust the electric bus renewal in the agreement contracts with operators. Most importantly, this mass transit service must continue running on time and delivering comfort to the people of Balikpapan," he concluded.

Two Electric Buses for the Trial Run

The push to electrify Bacitra is entering a more concrete phase.

The Balikpapan Transportation Agency plans to expand its public transit fleet by introducing the eco-friendly, electric-powered buses. Therefore, the agency has submitted

a proposal to procure these zero-emission vehicles for inclusion in the city's 2027 budget. This is a preparatory step ahead of the official handover of Bacitra management from the Ministry of Transportation to the Balikpapan city government in July 2027.

Following this transition period, the local government will assume full responsibility for operating the mass transit through the Buy the Service framework.

M. Fadli Pathurrahman, Head of the Balikpapan Transportation Agency, explained that the city government initially plans to bring in two electric buses.

These vehicles will serve as a trial run to measure efficiency and reliability and calculate the operating costs in Balikpapan.

"Bringing in eco-friendly electric buses reflects the Mayor's efforts to realize Balikpapan's vision as a smart city," Fadli said.

Flat Routes for the Initial Stage

Based on mapping and technical analysis, Balikpapan's topography, dominated by hilly terrain covering up to 85% of the city, presents a unique challenge for electric buses. Not every road corridor can be traversed optimally, said the city's transportation agency.

Steep gradients risk draining battery power faster and require stronger engine performance, unlike conventional buses.

Consequently, the agency has mapped out flatter routes for the initial deployment of electric fleets.

"Electric buses will likely operate on a limited scale along flatter routes, starting from Lapangan Merdeka to the SAMS Sepinggan Airport area. Additionally, the seating capacity of these fleets is designed to be slightly larger than standard buses," Fadli explained.

Testing Cost Efficiency

The city administration is also mindful of the differences in cost structures between fossil-fueled fleets and battery-powered vehicles.

These variances encompass everything from charging infrastructure setup to routine maintenance.

Financial factors are precisely why the municipal government is avoiding a hasty, large-scale procurement.

By operating just one to two units initially, the administration can comprehensively assess energy consumption efficiency and potential savings from tax exemptions and EV vehicle levies.

"Just one to two units for now to start operations. We want to see the extent of comprehensive efficiency, both in terms of fuel savings and significantly lower tax schemes," Fadli concluded.

This addition of electric buses is expected to serve as a foundational stepping stone for Balikpapan's public transit transformation, while supporting the integration of the Nusantara Capital City (IKN) buffer zone into a sustainable transport ecosystem.

As Balikpapan Tests, IKN Prepares the System

Balikpapan's efforts to refine Bacitra and prepare electric bus trials become increasingly relevant amid IKN's ongoing transformation as the new capital.

This is because IKN's transport development does not stop at the core government center. The IKN authority is also establishing regional connectivity linking the new capital with Balikpapan and Samarinda.

This means the low-emission transport transition pioneered by Balikpapan through Bacitra has the potential to run parallel with the development of electric vehicle-based transport systems in IKN.

Agung Indrajit, Deputy for Green and Digital Transformation at IKN Authority, stated that the authority has begun drafting a transport roadmap toward an electric vehicle-based system.

This agenda relies not only on adding electric buses, but also on formulating regulations, developing charging infrastructure, supplying renewable energy, and integrating transport

networks across Balikpapan, Samarinda, and IKN.

Currently, three electric buses are already operating within IKN.

“We have not set a fixed target for the fleet size by 2029 because additions will be tailored to urban activity growth, including civil servant relocations, the opening of toll corridors, and IKN’s operation as the Political Capital by 2028,” Agung told Kompas.com on Friday, September 9, 2026.

Agung explained that IKN’s transport roadmap is directed toward building a service-based public transit system scaled to urban development phases, in compliance with the Presidential Regulation Number 63 of 2022 concerning the Details of the Nusantara Capital Master Plan.

“The IKN authority also has short- and long-term mobility planning through KIAT, or the Indonesia-Australia Partnership for Infrastructure, including urban bus systems for corridors within and between planning areas,” he added.

Currently, OIKN is still drafting studies on vehicle operational cost adjustments and a master agreement to ensure EV bus operations align with the city’s scale, fiscal capacity, and service standards.

The system will also feature bus stop route maps, digital arrival information kiosks, and wayfinding information systems.

“We are focusing on building an efficient and sustainable transport system integrated with urban planning,” Agung said.

Under this concept, the majority of trips within IKN are designed to rely on active mobility, such as walking and cycling, alongside public transit. Remaining trips will be served by zero-emission vehicles.

Curbing Fossil-Fuel Vehicles

Alongside the development of electric transport, the IKN authority is also preparing a Circular Letter on Low- and Zero-Emission Vehicles.

In the initial phase, this regulation will govern the transition to EVs and restrict internal combustion engine (ICE) fossil-fuel vehicles within the authority's official fleet.

"Expanding restrictions across all of IKN will be carried out once the legal instruments for a special regional government administration [Pemdasus] are in place," he said.

According to Agung, the EV transition strategy relies on more than just restricting fossil-fuel vehicles.

Urban design is also geared toward encouraging public EV transport through the construction of accessible transit hubs, Park and Ride facilities, and regional transit integration.

Charging Stations and Clean Energy Targets

To date, 12 Charging Stations (SPKLU) are operating in the IKN, comprising seven fast-charging units and five medium-charging units.

Further establishment of charging stations will keep pace with growing demand, expanding to public transport depots, residential areas, commercial complexes, and transit hubs.

The IKN authority will coordinate with the state electricity company PLN and the Deputy for Infrastructure to ensure availability.

Energy sources for electric vehicles also form a core part of IKN's long-term targets.

Securing new and renewable energy is a key performance indicator for the IKN authority and a master plan mandate under the IKN Law, specifically, ensuring the new and renewable energy capacity meets 100% of IKN's energy needs and achieves net-zero emissions by 2045.

Currently, a 50 MW solar power plant (PLTS) is operational to support IKN's energy needs, including EV charging stations.

"In the Electricity Supply Business Plan, the IKN authority also notes that Kalimantan's renewable energy potential, particularly the Kayan Hydropower Plant, reaches 9,000 MW. IKN's electricity demand in 2045 is projected to reach 1,113 MW," he elaborated.

One Region, Three Systems to Connect

At this exact intersection, IKN's transport transition agenda directly converges with the direction of transportation development in Balikpapan.

IKN's transport development is likewise oriented toward a regional scale.

The initial phase is carried out through the Balikpapan-Nusantara bus service connecting IKN with the Batu Ampar Type A Terminal, SAMS Sepinggan Airport, and Semayang Port in Balikpapan.

The construction of the Balikpapan-Nusantara Toll Road is also planned to link directly with the Balikpapan-Samarinda Toll Road.

Meanwhile, the IKN authority has initiated the development of Park and Ride facilities at three locations, one of which supports passenger transfers from the toll exit into IKN.

The subsequent phase involves providing EV-based public transit and developing multimodal transport.

These plans form part of the Tri-City Development Plan (TCDP), a strategic development framework encompassing Balikpapan, Samarinda, and IKN.

Charging stations to support intercity EV public transit will be built across hub facilities, including by developing bus interchanges.

However, unifying the transport systems of these three regions brings a massive task ahead.

"Yet to this day, there are still no specific agreements with the city administrations of Balikpapan and Samarinda regarding fleet provisioning or the EV ecosystem. Coordination so far is maintained through the TCDP regional framework," Agung stated.

The challenge lies in building shared standards and joint planning concerning interoperability, fleet and infrastructure specifications, and transport sector investments to prevent infrastructure disparities across the three areas.

Ultimately, the low-emission transport transition in Balikpapan and IKN cannot be measured solely by the number of electric buses or available charging points.

Balikpapan has begun preparing two electric buses to test efficiency and fleet capability against hilly terrain.

Meanwhile, three electric buses are already operating in IKN amidst ongoing regulatory drafting, infrastructure development, energy expansion, and regional transport systems. Out of the three electric buses and 12 charging stations currently available, the IKN authority still has a slate of tasks to complete, ranging from formulating regulations and operational standards to developing regional connectivity.

The long-term direction is set: meeting 100% of IKN's energy needs through renewable sources and driving toward net-zero emissions by 2045.

"The next challenge is ensuring that the development of fleets, infrastructure, energy, and connectivity across the three cities proceeds within a mutually connected plan," he concluded.

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https://regional.kompas.com/read/2026/09/10/072758278/balikpapanikn-siapkan-transportasi-ev-tantangannya-menyatukan-infrastruktur?page=all#page4



https://eksposkaltim.com/berita/bacitra-setelah-2027-uji-bus-listrik-hingga-integrasi-transportasi-balikpapanikn-18477.html

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Mutiara Ananda

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Can Bogor's Minivan Owners Afford the Leap to Electric?

Mutiara Ananda



Public minivan Route 02 serving the Sukasari–Bubulak line is waiting for passengers at the Bogor City Square. (Photo by Mutiara Ananda)

Public minivans, or locally called *angkot*, older than 20 years are facing a major crackdown. Based on Bogor Mayor Regulation Number 11 of 2026, vehicles past this age limit are barred from operating and require fleet renewal. The policy has been actively enforced across the city since June 2026.

In a video posted on the Bogor City Transportation Agency's official Instagram account, officers were seen stopping a minivan on Route 01 in the Baranangsiang area. Upon finding out the vehicle was a 2004 model, officers peeled off the route number sticker and spray-painted a cross (X) on the vehicle body to mark that the vehicle was no longer allowed to operate.

Dody Wahyudin, the agency's head of transport, confirmed that the actions stem from Bogor Mayor Regulation Number 11 of 2026. Under the crackdown, minivans exceeding their service age are marked with an 'X' alongside the confiscation of their route-permit documents.

"So, *angkot* that have exceeded their technical age are marked with an X, and we confiscate their documents because the route permits belong to the government and are reclaimed by the state," Dody said on Wednesday, September 3, 2026.

That 2004 model is just one of thousands of vehicles facing similar rules.

Bogor has 25 *angkot* routes serving various areas across the city. These include 19 municipal routes (AP) and 6 suburban routes (AK), connecting residential neighborhoods, activity hubs, markets, terminals, and the city's border areas.

Subagyo (68), an angkot driver, was already waiting for passengers at the Sukasari Public Minivan Terminal in Bogor, West Java. One by one, passengers began boarding the Route 02 Sukasari–Bubulak minivan he drives. That morning, most of the passengers were women. The clock read 5:30 AM, the hour that marks the start of Subagyo's daily routine at the terminal.

Some were housewives heading to the market to shop, while others were making their way to Bogor Station to catch an electric commuter train (KRL) to work. For them, the *angkot* serves as a vital first leg of their journey, keeping them moving before Bogor truly wakes up for the day.

Subagyo has spent more than three decades working as an *angkot* driver, making him intimately familiar with his passengers' patterns. From behind the wheel, he has witnessed how the minivan remains an essential part of daily life for residents who rely on accessible public transport.

"You can't really count the passengers in the morning. It gets busy early, from 4:00 to 5:00 AM, especially for those heading out early," Subagyo told *Bincang Perempuan* at the Sukasari Terminal on Monday, August 8, 2026.

Yet the vehicles that transport these passengers every morning now find themselves caught in the middle of a major shift. The Bogor City Government is pushing for fleet

modernization through Bogor Mayor Regulation Number 11 of 2026 concerning the Rationalization, Renewal, and Elimination of Public Motorized Vehicles on Established Routes. This regulation serves as a core policy framework for Bogor's *angkot* revitalization, including strict age limits for operating vehicles.

For drivers like Subagyo, this transition is about much more than simply swapping an old vehicle for a new one. The issues of cost, daily income, and the sustainability of their livelihoods are all on the line.

On the other hand, for women who rely on *angkot* every day, newer vehicles do not automatically solve all their needs. Safety, comfort, vehicle condition, and cabin air quality all play a crucial role in shaping their daily mobility.

Women and the Angkot: Driving their Daily Mobility

For women who rely on public transport, a commute is never just about moving from one place to another. The *angkot* is woven into their daily routines, carrying them to campus, workplaces, markets, or community activities. Yet, the experience inside is not always the same. Waiting times, vehicle conditions, interactions with fellow passengers, and a sense of safety all shape how women experience daily mobility on the public minivans.

This lived experience is shared by Balqis (22), a student at a private university in Bogor who has long relied on *angkot* for her daily travel. Every day, she takes an *angkot* from her home in Cigombong to her campus in Ciawi, a trip that takes about 20 minutes. When heading into downtown Bogor to meet friends, Balqis again depends on *angkot*, this time traveling from Ciawi to Baranangsiang. For her, the minivan is a convenient and accessible mode of transport for various daily needs.

However, traveling by *angkot* does not always go smoothly. One of Balqis's biggest frustrations is the drivers' habit of idling while waiting for passengers. The wait times are not always a brief 5 to 10 minutes, but can stretch up to 30 minutes. Conditions inside the vehicle also leave much to be desired. Stuffy heat and cigarette smoke from the driver are elements that she finds deeply disruptive.

"There's no air conditioner, it's hot, and sometimes it gets more uncomfortable if the driver smokes," Balqis told *Bincang Perempuan* on Tuesday, August (8/11/2026).



Inside a Route 02 angkot (Sukasari–Bubulak), where women make up the majority of passengers during the morning commute. For many residents in Bogor, public minivans remain a vital first leg of their daily journey. (Photo by Mutiara Ananda)

Another layer of discomfort stems from buskers boarding the *angkot*. During a single trip, Balqis might encounter more than one busker, sometimes multiple times along the route. She noted that some buskers can react aggressively when passengers refuse to give money.

"Sometimes when you don't give them money, some buskers get angry right back at you," Balqis continued.

This situation often leaves Balqis feeling compelled to carry loose change whenever she travels by *angkot*, even though giving money to buskers is absolutely not an obligation.

Beyond comfort issues, Balqis has also faced experiences that compromised her sense of safety as a woman. On one occasion, while she was seated in the passenger cabin, an older man sat up front next to the driver. Throughout the journey, the man repeatedly stared at her through the rearview mirror. Balqis felt his gaze locked onto her the entire time, growing increasingly uneasy as the trip wore on.

When it came time to pay her fare, the man reached out to collect the money, brushing

his hand against hers in the process. The incident left Balqis startled and shaken with a lingering fear she still remembers vividly.

"At that time, I ended up crying and shaking; I was so terrified," she recalled.

Ever since that incident, Balqis admits she has become much more vigilant inside public minivans, especially when traveling at night or when male passengers outnumber women.

However, that does not mean every woman shares a negative experience when riding the *angkot*. Anisa (33), for instance, continues to rely on public minivans as part of her daily routine.

"In a day, I usually take the *angkot* twice, to get to work and back home," Anisa said on Tuesday (8/11/2026).

For her, the *angkot* offers convenience because its routes can reach locations much closer to her final destination. She doesn't need to endure long, additional walks after stepping off the vehicle, making the *angkot* a practical choice for her daily mobility.

A different perspective comes from Dian (42). She used to rely on public transport, including *angkot*, but her mobility is heavily shaped by the needs of her 18-year-old child, who is a person with a disability. According to Dian, traditional *angkot* are poorly equipped for passengers traveling with a wheelchair.

"Whenever I travel with my child, I have to bring a wheelchair," Dian said on Wednesday (8/12/2026).

Therefore, she prefers ride-hailing services like GrabCar or GoCar. For Dian, transportation is not just about vehicle availability; it is about whether a mode of transit can accommodate family members with specific mobility needs.

These three experiences highlight how diverse passengers' needs are when using public transport. For Balqis, the core issues revolve around wait times, comfort, interactions with buskers, and personal safety. Anisa values the flexibility of the *angkot*, while Dian requires accessible alternatives when traveling with her child. These variations show that service quality is defined not only by the vehicle itself, but by the specific conditions and needs of its passengers.

These lived experiences unfold against the backdrop of a broader reliance on public transport by women in Bogor. A 2025 study by the Indonesian Land Transportation Polytechnic (PTDI-STTD) surveying 124 respondents on the Route 07 *angkot* (Bogor Station–Warung Jambu) revealed that passengers on this route are predominantly women. These findings in Bogor echo a wider trend seen in Jakarta: 2024 Transjakarta data cited by ITDP Indonesia shows that approximately 60 percent of Transjakarta passengers are women.



Women Dominate Transjakarta Ridership
Approximately 60 percent of Transjakarta passengers are women.

These figures show that women's mobility needs are critical priorities in public transport discussions. When women make up a major share of public transit users, their requirements for safe, comfortable, accessible, and efficient journeys must be central to designing transport services.

Therefore, as the government pushes for *angkot* modernization and begins introducing electric minivans, the transition should not stop at swapping fossil-fuel engines for electric power. For female passengers, newer and cleaner vehicles do not automatically solve all their daily mobility challenges. The actual in-cabin experience, ranging from personal safety and comfort to interactions with other passengers and ease of reaching destinations, remains a critical factor that requires attention.

For Balqis, the idea of an electric *angkot* is appealing because she imagines a much more comfortable travel experience. Having endured the heat, cigarette smoke, and various discomforts inside conventional minivans, she hopes vehicle modernization will also transform the passenger experience.

"It would be so interesting if there were electric *angkot*. What I hope for most is more designated stops, and if possible, expanding the routes all the way to Cigombong [in Bogor Regency]," Balqis said.

Modernizing *Angkot* Amid a Changing Landscape

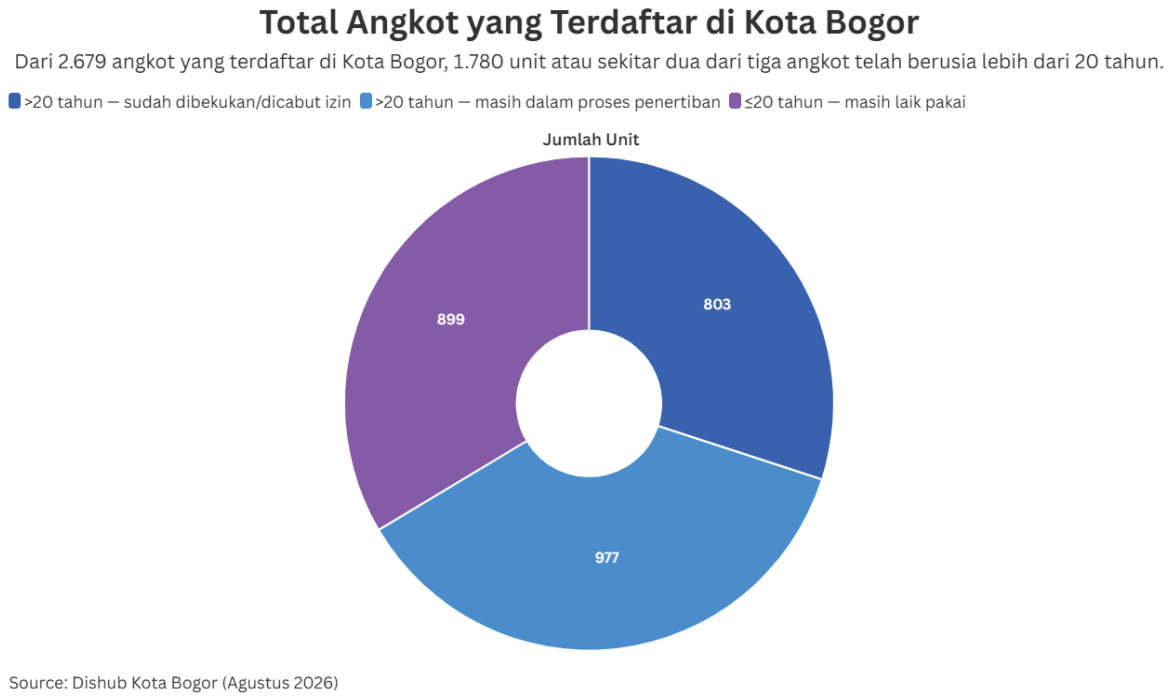
Balqis's vision of electric *angkot* that are safer and more comfortable for female passengers is not yet a reality. In Bogor, the transformation currently underway is not a complete transition of all minivans to electric vehicles, but rather the restructuring and fleet modernization of vehicles that have exceeded their age limit.



List of 25 angkot routes in Bogor City. (Infographic by Mutiara Ananda)

Beneath this network of routes, as of 2026, there are 2,679 *angkot* units in operation. However, the majority of the fleet has exceeded 20 years of service. A total of 1,780 units, or roughly 66%, have surpassed this age limit, while the remaining 899 units are still within the allowable operational age. Since enforcement actions began on June 15,

2026, 803 angkot units over 20 years old have had their operations suspended and route permits revoked, while another 977 units remain in the process of restructuring and fleet modernization.



Total Registered Angkot in Bogor City

Dody stated that *angkot* owners have been given until December 2026 to complete fleet modernization. During this period, vehicles that have exceeded the 20-year age limit are strictly prohibited from operating on the streets.

"That means these vehicles are essentially no longer allowed to operate on the road," Dody said when interviewed by *Bincang Perempuan* on Friday, August 14, 2026.

According to Dody, fleet restructuring is also necessary because the current number of *angkot* exceeds travel demand. The Bogor City Transportation Office notes that the average load factor, or the rate of passenger occupancy, stands at only 32 to 41 percent. This means that on any given trip, an *angkot* is filled to only about a third of its capacity, whereas an occupancy rate of 70 percent marks the operational break-even point.

"This means the figure of 2,679 [total *angkot*] represents an oversupply," Dody said.

Even so, implementing the regulation still faces hurdles on the ground. Some owners reportedly want to keep operating minivans that have passed the age limit because these vehicles remain their families' primary source of income.

"They [drivers and *angkot* owners] still need to make a living to pay for their children's schooling and put food on the table, especially given the difficult economic conditions," he explained.

On the other hand, the reduction of *angkot* fleets in Bogor due to enforcement has begun impacting occupancy rates across several routes. According to Dody, some routes that were previously crowded with minivans now have only a handful of vehicles left that meet the age requirements.

"In the end, there are only 2 or 3 *angkot* under 20 years old operating, which automatically drives up the load factor," Dody explained.

This shrinking fleet size is also beginning to shift service conditions on various routes. The Bogor City Transportation Office noted that routes previously saturated with minivans are now left with only compliant vehicles. This shortage raises the occupancy rate of the remaining vehicles, potentially boosting revenue for both drivers and owners.

For the Organization of Land Transportation (Organda) in Bogor, fleet modernization is a necessary step. The transport operators' organization expressed its support for the vehicle age restriction rule, noting that it directly impacts the condition of the vehicles relied upon by passengers.

"We agree with the 20-year age limit because it ensures passenger security and safety," said Rozak, Deputy Chairman of Organda Bogor City, on Friday (8/14/2026).

However, agreement on fleet modernization does not automatically make replacing vehicles an easy process. *Angkot* owners still face financial hurdles in swapping their aging fleets for new vehicles. If modernization eventually steers toward electric vehicles (EVs), the financial burden will pose an entirely new challenge.

"Because to transition and modernize from conventional vehicles to electric minivans, they will certainly have to shell out a much larger budget since the price [of electric vehicles] is double," Dody said.

In Bogor City, around 18 legal entities or cooperatives oversee *angkot* owners. These legal entities serve as management bodies representing vehicle owners in transit operations, even though individual owners still hold the titles to many of the units. This dynamic means that financing the modernization depends not just on the government or legal entities, but on the individual purchasing power of each owner.

"Because most of these conventional *angkot*, even though they operate under a legal entity, are still individually owned," Dody continued.

Long before fleet modernization resurfaced as a pressing agenda, Bogor briefly tested electric minivans through the Bogor Electric Minivan (Alibo) pilot program in 2024, which ran for three months. That experience showed that shifting from conventional vehicles to EVs requires far more than just acquiring new fleets. Proper planning, ridership volume, routes, and charging infrastructure emerged as key issues during Alibo's post-trial evaluation.

According to Dody, Alibo's challenges went beyond the electric vehicles themselves. During the trial period, the program lacked mature planning and failed to attract a robust passenger base. One primary factor was the tap-card payment system, which presented a steep learning curve for commuters unaccustomed to cashless transit fares.

"Most importantly, the reason why that program [Alibo] wasn't continued was, first, a lack of proper planning," Dody said.

The chosen routes also presented a problem because they overlapped with existing *angkot* routes that were already operating. This condition forced Alibo to compete for passengers with other minivans serving similar paths.

"Because public outreach and the selected routes or paths overlapped or intersected with many existing routes, this naturally impacted passenger numbers or the load factor," Dody said.

Beyond route and passenger challenges, limited charging facilities posed another obstacle. When Alibo was operational, there were only four Electric Vehicle Public Charging Stations (SPKLU) in Bogor City based on PLN data from January 2024, one of which was located at the Bogor City Hall. These scarce charging points made infrastructure provision a major issue in operating the electric minivans.

This experience means that any plan to reintroduce electric vehicles in Bogor will require a vastly different level of preparation. Fleet modernization is now faced with a much bigger question: how to ensure that the replaced vehicles are not only newer, but also capable of operating effectively and meeting passenger needs. The answer will depend on how the government, operators, and other stakeholders redesign the city's transport system.

The Long Road to Greener Public Transit

Alibo served as one of Bogor's initial experiences in testing electric vehicles for public transport. The Bogor electric minivans were trialed for three months, from April to July 2024, under a non-subsidized scheme without utilizing the regional budget (APBD). During this period, Perumda Trans Pakuan (PTP) participated in evaluating vehicle viability and operational performance as a learning exercise before developing public transport electrification further.

In fact, from the initial planning stages, Alibo was not designed with PTP as the primary executor. PTP was subsequently involved in the trial, with PT Kalista Nusa Armada providing or leasing the Alibo units to be operated in Bogor, while operations involved a consortium of public transport legal entities or cooperatives.

"The goal was indeed to assess the units. Roughly speaking, whether implementing *angkot* [Alibo] in Bogor in the future is feasible or not, from an investment and business viability perspective," said Januar Setiawan, Head of Operations Sub-Division at Perumda Transportasi Pakuan (PTP) Bogor City, in an interview on Wednesday (8/26/2026).

From the public perspective, PTP's evaluation results showed a fairly positive response. Field surveys and social media monitoring recorded that approximately 73% of the public responded favorably and expressed interest in using Alibo, citing features such as air conditioning and more reliable designated stops. This response indicates that the use of electric vehicles was not the primary issue for prospective users.

The challenges arose primarily when the vehicles were deployed in the field. During the trial, Alibo faced technical issues including passenger doors malfunctioning on several occasions, air conditioning that lacked sufficient cooling power, inflexible designated stops when traffic engineering measures were implemented, and limited charging facilities.



Alibo units during the trial launch in July 2024. Photo by Perumda Transportasi Pakuan

"What gave us a headache was that if the vehicle left the pool at 100% [battery capacity], they would eventually return to the charging station [due to a depleted battery] all at once," Januar said.

The limitation of charging facilities directly impacted the vehicles' operational patterns. During the trial, PT Kalista Nusa Armada lent five Alibo units to be operated in Bogor City, while the available charging infrastructure had to be shared rotationally.

"Our initial plan was for one unit to charge while the other four covered operations," Januar noted.

In practice, however, all five vehicles departed around the same time, leading to near-simultaneous battery depletion and charging needs. Coordinating departure schedules and charging times thus became one of the main operational hurdles during the trial.

Alibo utilized the DFSK Gelora E electric vehicle model equipped with a 42 kWh battery. According to official DFSK specifications, the vehicle offers a driving range of up to 300 kilometers on a single charge with an energy consumption of about 14.5 kWh per 100 kilometers. However, Alibo's operation on Bogor's streets took place amidst mixed traffic, meaning real-world conditions did not always match factory test specifications.

Throughout the trial, PTP recorded an average electricity consumption of roughly 2 to 4 kWh per trip for Alibo. The vehicles needed to be recharged when the remaining battery dropped to around 20%, or theoretically about 8.4 kWh of the full capacity. PTP noted that it has yet to secure a definitive, precise consumption figure for every individual trip because travel times fluctuate depending on traffic conditions.



Specification of DFSK Gelora E, the unit used in the Alibo trial

"Because we don't have dedicated lanes, we operate in mixed traffic. During certain events, a trip that should only take 30 minutes can stretch to an hour or an hour and a half," Januar said.



The Operation of Alibo
Battery usage and charging records during the Alibo trial (April – July 2024)

Discrepancies between vehicle specifications and conditions are key factors that must be taken into account when introducing electric vehicles to public transit. Alibo had to contend not only with the vehicle's energy requirements, but also with road conditions, traffic congestion, passenger volume, and travel patterns that directly influence battery drain.

Beyond energy consumption, charging costs emerged as another crucial consideration in Alibo's operations. During the trial, electricity used was charged at a commercial rate of approximately Rp2,400 per kWh, while conventional public minivans continued to run on subsidized fuel. This difference in cost structure constitutes a vital component that must be factored into any assessment of electric vehicles' financial viability for public transit.

At the same time, PTP acknowledged that Alibo's business model was not yet fully formulated, as the pilot phase was primarily intended to test the vehicles themselves. The evaluation encompassed unit durability, battery usage, operational costs, and comparisons with conventional minivans.

"Naturally, because it was just a trial back then, we didn't build a mature business model," Januar said.

Investment hurdles also surfaced regarding the need for charging infrastructure. PTP noted that constructing a single fast-charging station requires an investment of roughly Rp1.5 to 1.8 billion, excluding land acquisition costs. This hefty investment underscores the fact that public transport electrification goes far beyond procuring vehicles; it requires substantial backing from supporting infrastructure.

In addition to cost and infrastructure issues, the routes utilized during the trial also formed a key part of PTP's evaluation. Alibo's initial route was designed to run from Cidangiang to Sukasari via BTM with 30 designated stops, but it was subsequently trimmed down during implementation. Alibo ultimately operated along a loop route covering Cidangiang, Suryakencana, Sukasari, Pahlawan, and Empang before returning to Cidangiang.



According to Januar, that route failed to provide a strong indication of passenger potential because it was not a high-demand corridor. Alibo merely captured a fraction of the planned Corridor 3 service route previously designed to connect Bubulak and Sukasari.

"From a business perspective, we simply didn't see high passenger potential at the time," he said.

This condition was precisely why Alibo's evaluation could not automatically serve as a benchmark for gauging public interest in electric transport as a whole. The trial took place on a limited route, with the active fleet eventually shrinking from five to three operational units. At the same time, PTP had yet to formulate a long-term business model for the service.

Given these various constraints, Alibo ultimately left behind valuable lessons regarding vehicle readiness and its supporting ecosystem rather than a ready-to-deploy operational model. The experience demonstrated that public transport electrification requires far more than just swapping conventional vehicles for electric ones.

Alibo's journey also showed that the challenges of electrification extend beyond the vehicles and their infrastructure to include who manages and finances the service. Under the pilot scheme, PTP acted as the operator, covering crew salaries and providing compensation to conventional *angkot* drivers whose operations were suspended while Alibo ran. Meanwhile, PT Kalista Nusa Armada supplied the five trial vehicles and continued to shoulder vehicle maintenance costs.

Throughout the trial period, maintenance expenses largely bypassed PTP since they were absorbed by PT Kalista Nusa Armada. Nevertheless, several technical hiccups still occurred, including passenger doors malfunctioning or throwing errors on multiple occasions, alongside a cracked windshield incident on one unit that required it to be pulled from service. These conditions highlight that technical readiness and accessible after-sales support are crucial components of electric fleet operations.

On the revenue side, Alibo's fare was eventually set at Rp5,000 after initially being planned as free. Passenger fare collections went into PTP's accounts, but the cashless payment system could only be implemented after the service launched because setting up the tapping devices took time. The rapid pace of the pilot meant several supporting service components were not fully prepped from day one.

"This was a 'Sangkuriang-style' pilot project, you could say, so the process happened very quickly," Januar remarked, describing the project as 'something that is expected to be completed overnight'.

Ultimately, PTP concluded that Alibo was discontinued not simply because electric vehicles were unviable. The core issues lay instead in an immature business model, unready infrastructure, and the absence of a clear framework to transition the service from a trial phase into long-term operations.

Alibo's trial experience has since become a key reference point to re-evaluate the readiness of public transport electrification in Bogor City. For the Institute for Transportation and Development Policy (ITDP), discussions surrounding electric vehicles need to be placed within a broader context, including service requirements and the most appropriate forms of public transit, starting with a city-wide transportation evaluation.

According to ITDP, such planning encompasses route requirements, vehicle types and quantities, passenger load factors, service frequency, and operational workflows. The resulting analysis can then be used to determine the exact type of fleet best suited to a region's needs.

"We want to bring the narrative back to the drawing board and analyze from the start whether Bogor's needs in serving its citizens can still be optimally met by minivans, or if it's time to reform the system entirely by transitioning to bus transit," said Deliani Siregar, Associate Director of ITDP Indonesia, when contacted by *Bincang Perempuan* on Thursday, August 27, 2026.

ITDP also noted that fleet modernization can serve as a momentum to overhaul the institutional framework governing public transport. According to ITDP, shifting vehicle types from minivans to buses, for instance, must be accompanied by changes in management models so that operators and vehicle owners do not shoulder the capital investment for new fleets entirely on their own.

Under the model advocated by ITDP, the government can step in through more organized institutional structures, such as a Regional Technical Implementation Unit (UPTD), Regional Public Service Agency (BLUD), or Regional-Owned Enterprise (BUMD). Such

schemes are seen as opening the door for government backing, including subsidies, which are much harder to provide when services are still managed independently by individuals, cooperatives, or private operators.

In a 2025 ITDP study titled "Roadmap for Feeder Public Transport Electrification in Greater Jakarta," Bogor was highlighted as the city best prepared for public transport transformation among cities outside Jakarta. This assessment was based on several readiness indicators, including existing public transport services, fiscal capacity indicators, and institutional frameworks for transit management.

"Since this *angkot* modernization is viewed as a momentum, why not seize the opportunity to upgrade service quality at the same time?" Deliani said.

Beyond institutional reform, ITDP emphasized that public transport restructuring must prioritize passenger safety and security, particularly for women and vulnerable groups. Minimum Service Standards (SPM) serve as a key instrument to ensure these aspects are embedded into public transit services. However, according to ITDP, implementing SPM on minivans remains challenging because operations are fragmented among individual owners, cooperatives, and separate operators.

ITDP noted that this issue is closely tied to women's vulnerability to gender-based violence (GBV) in public transport. In studies conducted across Jakarta, Medan, Semarang, Surabaya, Makassar, and Bandung, ITDP uncovered reports of gender-based violence occurring within the public minivans.

"Minivans have the weakest SPM enforcement," Deliani said.

According to Deliani, safety and security standards extend beyond vehicle conditions to include onboard equipment and protocols for handling incidents. Modern SPM guidelines, for example, mandate the installation of GPS and CCTV on vehicles to support fleet monitoring and incident response.

"If a GBV incident occurs inside a vehicle equipped with CCTV, the footage can be requested or accessed to serve as evidence," Deliani explained.



A woman and her daughter boarding an angkot Route 02A connecting Cisarua and Sukasari. (Photo by Mutiara Ananda)

The risks to women do not stop once passengers are inside the vehicle. ITDP found that inadequate waiting areas for public transport, such as stops marked by nothing more than a pole or a sign instead of a proper bus shelter, can undermine passengers' sense of security. Poor lighting and isolated locations far from crowds are said to increase the risk of gender-based violence.

"The risk of GBV is also frequently found to occur while waiting for public transport to arrive," Deliani continued.

According to her, the mere presence of public transport services does not guarantee that people will use them if waiting spots and access routes fail to provide a sense of security.

In the context of electrification, ITDP views fleet replacement as a dual opportunity to improve service accessibility. Electric buses are seen as better suited to accommodate wheelchair users, whereas smaller vehicle designs still face spatial constraints when trying to house batteries while simultaneously meeting passenger space requirements.

ITDP also highlighted women's needs, which are frequently overlooked in vehicle design. During advisory work on TransJakarta's electric bus design, for instance, input from women included the need for designated space to place belongings carried during trips.

"In truth, the momentum for inclusivity here addresses the needs of persons with disabilities and women," Deliani stated.

For ITDP, therefore, public transport electrification must go hand in hand with elevated standards for service, safety, security, and accessibility. If Bogor City ultimately chooses to retain smaller fleets, the design of those electric vehicles must actively involve women, persons with disabilities, and other vulnerable groups starting from the planning stage.

Navigating the Future of Mass Transit Electrification in Bogor

Bogor City's public transport electrification plans have not completely stalled following the conclusion of the Alibo trial. The Bogor City Government is reportedly still exploring plans to test electric vehicles in 2027, featuring a larger vehicle model than Alibo. This roadmap indicates that the city government is actively searching for a fleet format deemed suitable for Bogor's public transit needs.

Glimpses of this vehicle model were also shared by Rozak, Deputy Chairman of Organda Bogor City. He said the model is inspired by electric transport in Bandung, which boasts a larger size than conventional minivans. This model has emerged as one of the options in ongoing discussions regarding Bogor's public transit electrification.

For ITDP, however, determining the vehicle type should not serve as the starting point for electrification. Service requirements across each area must be analyzed first, ranging from routes, passenger volume, capacity, frequency, to service coverage. The findings from such analysis can then dictate whether a given corridor is best served by small-scale minivans or higher-capacity buses.

If studies show that minivans remain the most appropriate mode, ITDP asserts that electrification can still proceed, provided the vehicles are designed to meet service standards and are more inclusive for users. Conversely, if urban demand is better met by high-capacity fleets, electrification can anchor a structural shift toward bus-based transit.

"Whether it can still be served optimally by minivans, or if it indeed needs a complete

overhaul into a bus transit system," said Deliani Siregar, Associate Director of ITDP Indonesia.

Vehicle selection is directly tied to the issue of financing. Procuring electric vehicles requires heavy capital investment, while building charging infrastructure further adds to upfront capital needs. ITDP cautions that these transition costs must not simply be passed down onto *angkot* owners, many of whom still operate as individual titleholders.

"If we only talk about minivans without public transport reform, without discussing institutional structures, the risk is that these high costs will be borne entirely by individuals," Deliani added.

According to her, the government must step in to shoulder a share of the transition risks, including through budgetary support and subsidies. With such backing, modernization expenses will not rest solely on owners or operators, while simultaneously offering the certainty to keep the existing transport operators integrated into the electrification process.

"It is feared that when they [individual minivan owners] are financially unable to buy electric vehicles, they will be left behind," she said.

This apprehension is closely tied to the drivers who have long relied on city minivans for their livelihoods. According to ITDP, fleet modifications must be carefully designed so that the very groups who have sustained the service are not left without a source of income.

Similar anxieties were voiced by Iwan Setiawan (50), an *angkot* driver in Bogor City. He stated that he has no objections if conventional minivans are eventually replaced by electric vehicles. However, he hopes the transition will still secure opportunities for veteran drivers to continue working and achieve better welfare.

"If [the authority] can guarantee [electrification will be good for] the people here, then why not? But make it fair. Please don't just bring in newcomers and throw away the old drivers," Iwan said.

At the management level, PTP continues to position electrification as part of its long-term city transit restructuring plan. One proposed scheme involves consolidating two conventional minivans into a single, modern electric microbus unit. Nevertheless, full commercial and

permanent operations still hinge on regulatory clarity, charging infrastructure readiness, and subsidy frameworks capable of sustaining day-to-day operations.

Ultimately, the Alibo experience leaves behind lessons that extend far beyond vehicles, infrastructure, and financing, touching on the very core of what kind of public service Bogor City wishes to build. The 2027 electrification roadmap presents a critical window to ensure that fleet upgrades not only introduce new technology, but also provide a safety net so that legacy drivers and owners are not left behind in the transition. At the same time, this evolution must prioritize the safety, comfort, and accessibility of public transit for women and vulnerable groups.

For women who depend on public transport, electric vehicles alone do not define the success of electrification. Safer, more comfortable, and easily accessible services form an indispensable part of that transformation. In doing so, electrification does more than just swap out aging vehicles. It improves the entire transit network without abandoning the people who have kept city transport alive for decades.

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Dian Amalia Ariani

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Choking on Exhaust While Electric Truck Reforms Stall Out

Dian Amalia Ariani

Most truck fleets remain old and high-emission. As residents along logistics corridors suffer constant exposure, electrification of heavy-duty vehicles is offered as a solution. Yet, the transition stalls against pricing, batteries, infrastructure, financing, and misaligned policies.

Dust arrives every morning, even before the sun fully rises. In front of Cakung Market in East Jakarta, before eight o'clock, 223 trucks pass by in less than an hour, equal to an average of one truck every sixteen seconds.

Some roll out of depots with empty beds, others approach from the port gate, while a few are so heavily laden. Their bulky loads are hidden beneath tarpaulins.



Mang Bewok's fellow parking attendant helps residents cross the street. (Photo by Dian/Prohealth)

Mang Bewok (62), as the people in the market area call him, has spent twenty years standing on the edge of Jalan Raya Bekasi KM 27 as a parking attendant. He no longer wears a mask.

“I just get used to the dust, even on the worst days during the dry season,” he said, gesturing toward the bumper-to-bumper queue of trucks lining into the middle of the road, in front of the gas station across the street.

A similar story echoes all along the market. Abinem, 68, a herbal drink (jamu) vendor who has peddled her wares in the area since her twenties, now always wears a mask when selling near the highway, something she never does when selling the drink in her village.



Abinem had finished selling traditional drink in Cakung Market. (Photo by Dian/Prohealth)

“I wear a mask. This market is so close to the highway, and it’s very dusty,” Abinem said.

Eighty meters from the Cakung gas station, in the dense alleyways of Jalan Tipar Cakung, worry takes another form. Apriyanti Dwi Hanisih, 28, who goes by Santi, sells iced orange juice while keeping an eye on schoolchildren who have to cross the street amid massive container trucks. These heavy vehicles are actually barred from traversing such a narrow road.



Santi sells iced orange juice in the residential neighborhood on Jalan Tipar Cakung. (Photos by Dian/Prohealth)

The same concern is shared by Juadi, Vice Principal of state elementary school SDN Cakung Barat 8 Pagi: truck operating hours frequently overlap with school arrival and dismissal times. The dust his students breathe in every day finds its way into their lungs, though it is not as severe as the exposure faced by children at schools located directly on the main highway.

“If possible, the trucks’ operating hours should be pushed back so they don’t coincide with school arrival times. After 7 o’clock is safer [from accidents],” Juadi said.



Children from SDN Cakung Barat buy snacks in front of the school gate. Photo by Dian/Prohealth

This story repeats itself all along the national logistics corridor, from Cakung, Cilincing, and Tanjung Priok to Cikarang, densely populated areas traversed daily by thousands of trucks.

Voices of Residents Captured in Numbers

At the Cakung Barat Community Health Center, complaints from residents like Mang Bewok and Abinem are nothing new. “Acute respiratory infections consistently rank among the top ten most common illnesses every year in West Cakung,” said the head of the community health center, Istikarahma, affectionately known as Ima.

Having served for nearly two decades across three different posts in the area, she notes that this pattern has never shifted: respiratory infections remain among the most prevalent conditions, running alongside emerging trends of non-communicable diseases like hypertension and diabetes that are now beginning to strike at younger ages.



Istikarahma, Head of Cakung Barat Community Health Center. (Photo by Dian/Prohealth)

Those local figures echo with a much larger resonance at the city level. The Jakarta Health Agency recorded nearly 1.9 million cases of acute respiratory infections across the capital throughout 2025. This staggering figure makes respiratory infections the condition with the highest number of visits to community health centers citywide in Jakarta.

The agency notes that this surge was triggered by a combination of two factors: deteriorating air quality and a wet-dry season that weakened residents' immune systems. East Jakarta and North Jakarta, regions stretching from Cakung all the way to Tanjung Priok, were recorded as the areas with the highest number of respiratory infection cases.

On the ground, those statistics wear faces that can be measured every single day.

Based on monitoring data from the Air Quality Monitoring Stations managed by the Jakarta Environment Agency (DLH) from June 1 to August 11, 2026, air quality in the Cakung - Cilincing - Tanjung Priok corridor fell within a daily Air Pollution Standard Index range of 68 to 131, spanning the Moderate to Unhealthy categories, with PM2.5 concentrations ranging from 13.64 to 149 micrograms per cubic meter.

The DLH monitoring network across these three areas consists of three reference monitoring stations and 13 low-cost sensors.



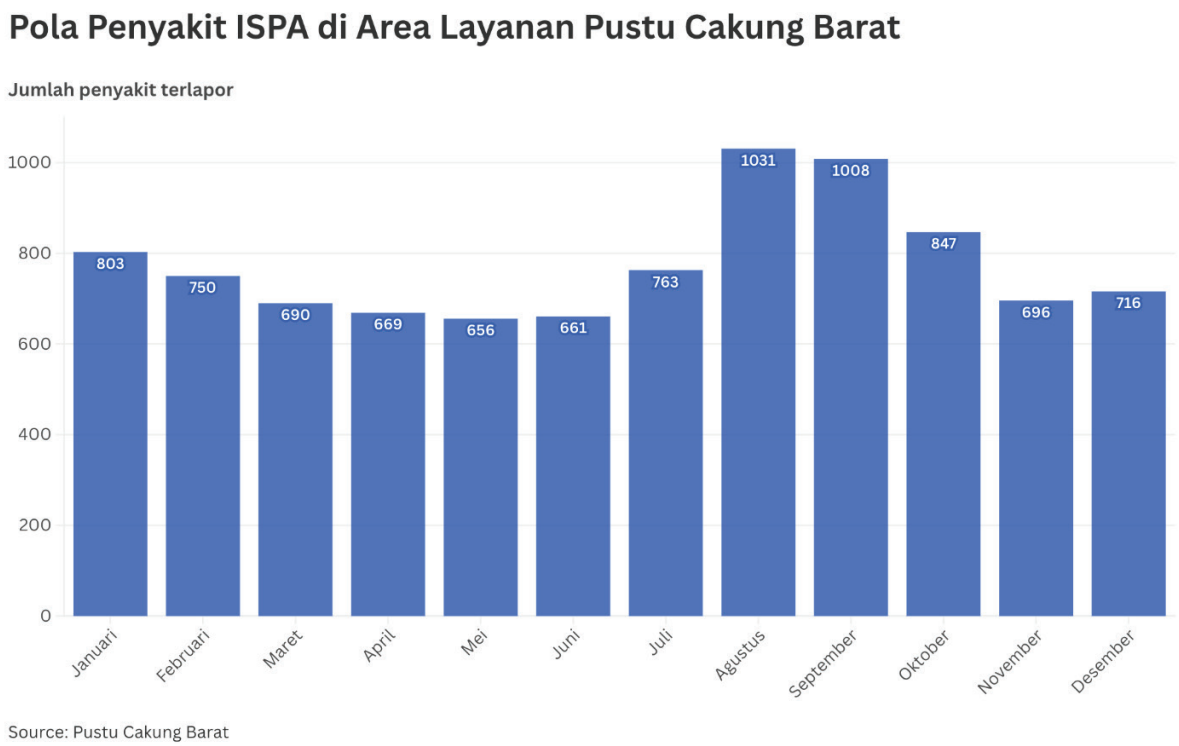
A fruit vendor pushes his cart through Cakung Market. (Photo by Dian/Prohealth)



The ten most common diseases in the service area of the Cakung Barat Community Health Center in 2025. (Infographic by Dian/Prohealth)

For instance, on August 17, 2026, the air quality index (IQAir) on Jalan Raya Bekasi, right in front of the Cakung market where Mang Bewok usually stays during his working hours, hit 156, placing it in the "unhealthy" category.

The PM2.5 concentration that day reached 63 micrograms per cubic meter, more than six times the annual safe limit recommended by the WHO (10 micrograms per cubic meter). Over several days of monitoring, the index hovered between 131 and 172, remaining consistently in the unhealthy zone.



Acute respiratory infections (ISPA) are the most commonly diagnosed condition, particularly during the dry season. (Infographic by Dian/Prohealth)

Dudi Gardesi, Head of the Jakarta Environment Agency, noted that air quality in the corridor is dynamic, fluctuating according to emission source activities and weather conditions.

"Pollutant concentrations tend to spike at certain times, especially when vehicle activity increases during the morning and evening," he told *Prohealth* on Thursday, August 13, 2026.

According to him, the morning temperature inversion phenomenon, where a layer of warm

air traps pollutants near the ground, further compounds the issue, keeping particulate concentrations close to the surface where residents carry out their daily lives.

The dry season exacerbates this condition, as a lack of rainfall means fewer natural scrubbing processes to wash pollutants out of the air.

The Four Percent that Matters

The poison hidden in that dust has a name. Agus Dwi Susanto, a pulmonologist and former Chairman of the Indonesian Society of Respirology, explains that diesel vehicle emissions, such as those from trucks, contain two primary types of pollutants: particulate matter (PM) and gases.

The most heavily scrutinized is PM2.5, particles small enough to penetrate deep into the respiratory tract, eventually reaching the lungs and bloodstream.

“Short-term exposure triggers irritation, coughing, and increases the risk of acute respiratory infections because the respiratory tract’s immunity is weakened,” he said on a phone interview on Wednesday, August 12, 2026.



Air pollution turns the morning sky gray over the Cakung Market area amid the heavy traffic of commuters heading to work. (Photos by Dian/Prohealth)

Something that is even more concerning, Agus said, is long-term exposure that often shows no symptoms at first, much like a smoker who only starts coughing a dozen or more years later. The long-term exposure causes a decline in lung function, asthma in previously healthy individuals, chronic obstructive pulmonary disease (COPD), and lung cancer, which takes about 15 years to be detected.

“Lung cancer grows in the lung tissue. Lung tissue doesn’t have nerves. When our body’s tissue has no nerves, you can’t feel it,” Agus said.

“Without any ailments, it turns into cancer, and only 15 years later do they regret it.”

Diesel exhaust, the smoke pouring out of the tailpipes of the trucks passing in front of Bewok and Abinem’s stalls every day, is, according to Agus, far more than just an ordinary irritant.

The International Agency for Research on Cancer (IARC) under the WHO classifies diesel engine exhaust as carcinogenic to humans (Group 1), with sufficient evidence linking it to lung cancer, alongside trends pointing toward bladder cancer, albeit with currently limited evidence.



A truck drives along Jalan Tipar Cakung amid local commuter traffic. (Photo by Dian/Prohealth)

Roadside testing data from the Jakarta Environment Agency reveals just how disproportionate the impact of trucks is compared to other vehicles.

Heavy vehicles account for only about 5.9% to 12.7% of total traffic volume in the Cakung - Cilincing - Tanjung Priok corridor. Yet their contribution to road dust kicked back into the air in a resuspension process vastly outweighs their share: roughly 83.5% in Marunda, one of the access routes to Tanjung Priok Port, 71.2% on Jalan Yos Sudarso, and 64.5% in the Cakung-Cilincing area.

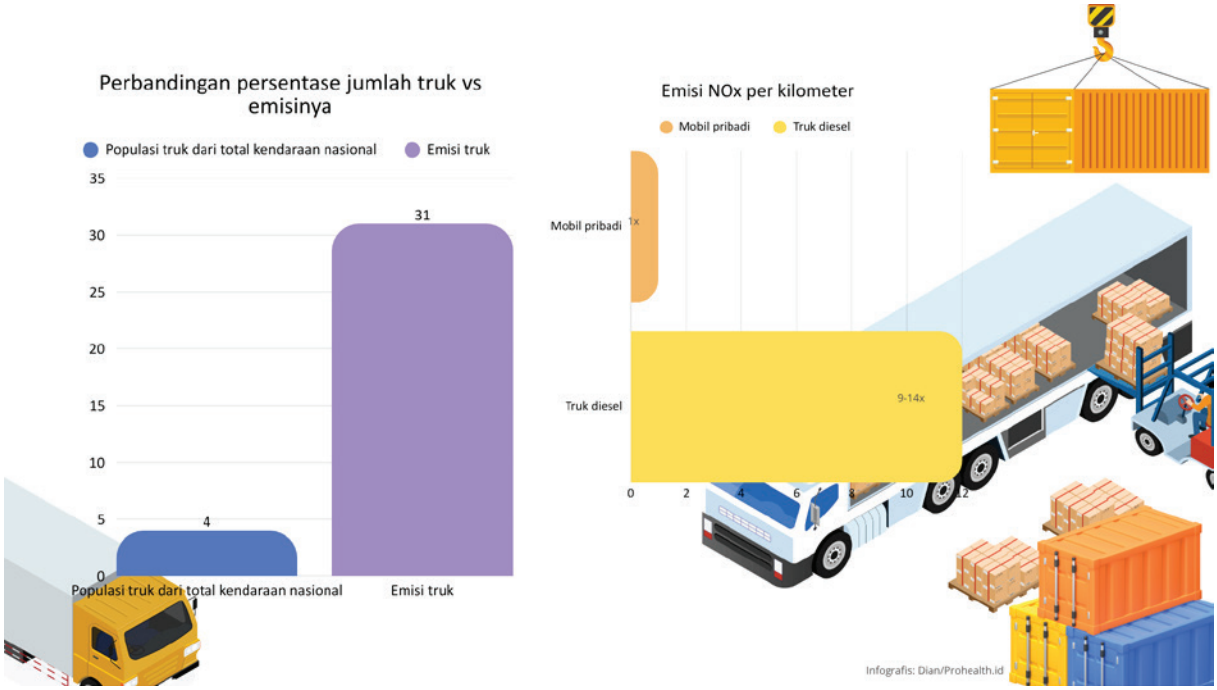
The reason is simple: with weights reaching 9 to 20 tons compared to private cars that average under 2 tons, every passing truck kicks up a far greater volume of settled particles from the pavement.



A line of trucks travels through the Cakung–Cilincing corridor (commonly abbreviated as Cacing) at night. (Photo by Dian/ Prohealth)

Diesel-powered trucks, according to real-world on-road emission tests cited by the Environment Agency (DLH), also produce nitrogen oxides (NOx) roughly 13 to 14 times higher than private gasoline-powered cars, and about nine times higher than comparable commercial gasoline vehicles.

Nor does this NOx remain an ordinary gas; in the atmosphere, it reacts to form secondary PM2.5, adding to the heavy burden of fine particulates already choking the air in the logistics corridor.



Truck Volumes Vs Their Environmental Emissions

On a national scale, according to Deon Arinaldo, Energy System Transformation Program Director at the Institute for Essential Services Reform (IESR), trucks account for only about 4% of all vehicles operating nationwide, yet they generate roughly one-third of transportation emissions, equivalent to 48 million tons of CO2e, and about 11% of air pollution from all motor vehicles in Indonesia.

Roughly one-third of medium and heavy-duty trucks currently in operation are over 20 years old, built to outdated emission standards and growing increasingly inefficient.

The truck fleet population is also projected to surge 2.5-fold by 2060, keeping pace with economic growth, while freight transport activity triples.

“If emission and pollution standards aren’t strengthened, or if we don’t transition to zero-emission options, the total share of truck contributions to transport emissions could easily climb by two to two and a half times,” he said on Thursday, August 13, 2026.

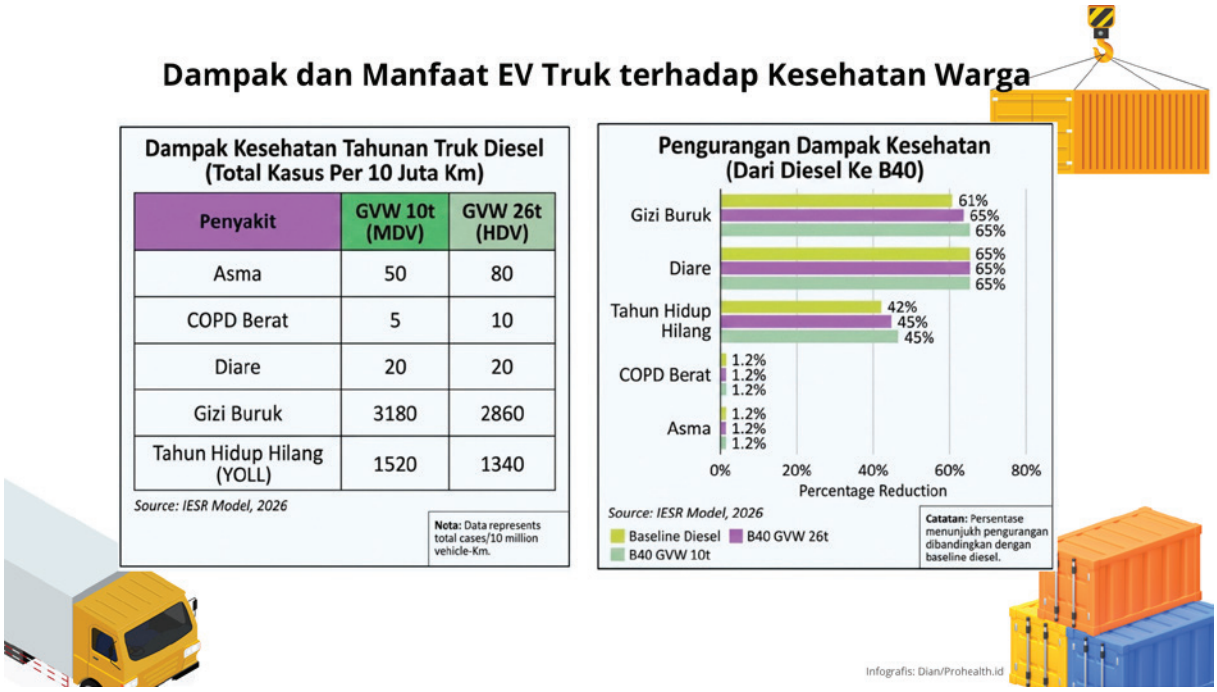
IESR estimates fiscal savings of up to Rp5,000 trillion by 2060, while electric truck operations cost just Rp2,000 to 3,200 per kilometer with a payback period of 3 to 14 years.

IESR's model even measures the human toll in units of lifespan: for every 10 million kilometers driven by trucks operating in high-activity zones, such as the northern coast of Java, where Cakung and Tanjung Priok lie, the cumulative exposure is estimated to rob a total of 10 years of life expectancy from every 150 people exposed.

The Tangible Human Cost

Utilizing the Life Cycle Assessment and Environmental Priority Strategies (EPS) 2015 method, the analysis projects that truck emissions contribute to cases of asthma, chronic obstructive pulmonary disease (COPD), diarrhea, malnutrition, and years of life lost (YOLL).

For every 10 million kilometers traveled, medium-duty vehicle (MDV) emissions are estimated to be linked with roughly 50 asthma cases and 1,520 years of life lost. For heavy-duty vehicles (HDVs), the figures reach approximately 80 asthma cases and 1,340 YOLL.



EV Trucks: Health Impacts and Benefits for Communities

Distance also determines the scale of exposure. Pollutant concentrations are highest at points closest to the highway, although wind and humidity can shift the direction of dispersion.

Ima, head of the Cakung Barat Community Health Center, has her own reasons for being

cautious when attributing direct cause and effect. In her view, acute respiratory infections in her area are always linked to other factors: residential crowding that leaves household air circulation suboptimal, the prevalence of smoking among men in the neighborhood, and smoke from waste burning.

"It's actually multi-factorial," she said. Even so, she acknowledges that patients whose jobs expose them directly to road dust, such as warehouse laborers and loading-dock workers at logistics depots, tend to suffer from recurring respiratory symptoms.



A field worker takes a break along the roadside of the Cakung–Cilincing corridor. (Photo by Dian/Prohealth)

"If they say, 'Oh, there's a lot of dust in the warehouse,' or 'I'm lifting and handling goods around the trucks,' they will usually mention, 'Yes, my workplace is full of smoke or dust.' I usually tell them to wear a mask."

Echoing this, Katherine Hasan, an air quality analyst at the Centre for Research on Energy and Clean Air (CREA), confirms the same: residents living or working closest to the truck routes face a higher risk of inhaling carcinogenic diesel exhaust in elevated concentrations, even though no specific studies have measured the data directly at those exact locations.

"Because of the heavy activity, we assume that pollutant concentrations along that corridor will be high as well," she said.

What has the government done, and why isn't it enough?

The Jakarta Provincial Government hasn't stood still. Since 2023, Jakarta has had a policy framework via Gubernatorial Decree Number 576 of 2023 on the Air Pollution Control Strategy (SPPU), which outlines 70 action plans through 2030, spanning stronger monitoring and emissions control from mobile sources like diesel trucks to stationary sources like industries.

Among the key instruments is mandatory emissions testing for logistics and heavy vehicles. Throughout 2025, the Jakarta Environment Agency, alongside the Transportation Agency, Public Order Agency, and the police, carried out joint emission check operations and enforcement in the Cakung and Tanjung Priok areas seven times, penalizing a total of 55 drivers with fines ranging from Rp750,000 to Rp16 million. This year, DLH also issued Decree Number e.0065/2025, mandating motor vehicle emissions testing across industrial and business zones.

Dudi acknowledged that electrification of heavy vehicles, an initiative being pushed by the Ministry of Industry, aligns with existing policy directions, and DLH is ready to work together to ensure both run in sync.



An officer measures the exhaust emissions of a four-wheeled vehicle in Ciracas District, Jakarta, on Tuesday (April 21, 2026), as part of a free emissions-testing service to support air pollution control. (ANTARA FOTO/Rakha Raditya)

"DLH is open to collaborating so that the development of heavy vehicle electrification can align with the SPPU roadmap and emissions testing policies," he told *Prohealth* on Thursday, August 13, 2026.

In other words, current emissions enforcement policies, vital though they are, have their inherent limits: an aging truck forced to pass an emissions test remains a diesel engine burning fossil fuel. Breaking that chain of emissions at its source demands something far more fundamental—replacing the engine altogether.

At the Other End of Priok Corridor

While dust is simply part of the market routine in Cakung, in Alley 22, community unit RW 07, Koja Subdistrict, Tanjung Priok, it is a constant source of grievance. Taufik (66), head of the neighborhood unit, has spent years watching container trucks bypass the nearby flyover to use the neighborhood streets instead.



Trucks idle on Jalan Jampea, right in front of residents' homes. (Photo by Dian/Prohealth)

"They're supposed to take the flyover. But since their fleets are old, maybe some of them aren't powerful enough to make it up the slope, and choose the ground route instead," said the man, fondly called Abah Taufik.



Abah stands amidst the densely populated settlement in Tanjung Priok. (Photo by Dian/Prohealth)

According to Abah, the dust and smoke don't just stay on the road. "The wind blows everywhere. Our streets, our homes, they're filthy. I feel sorry for the mothers having to sweep up all that dust every single day. If you notice, most houses around here keep their doors and windows shut."

When asked if residents have ever complained about the dust to the authorities, he replied briefly. "Who do we even complain to? There's nowhere to go. It's completely pointless."

He added that complaints about breathing difficulties or coughing among children usually end up following the same path: self-treating out of their own pockets. "That's just normal, so nobody makes a fuss. Even if it were taken seriously, where would we even complain? When you go to the doctor, you still have to pay for it yourself."



Children near Koja Regional General Hospital (RSUD Koja) wear face masks on their way home from school. (Photo by Dian/Prohealth)



Trucks rumble along Jalan Jampea in front of Koja Regional General Hospital (RSUD Koja). (Photo by Dian/Prohealth)

Another irony he observed is that rules requiring the renewal of logistics trucks already exist. “If we followed the rules, they’re supposed to be replaced at least every ten years. But look at them now, even after 20 years, nothing’s been done.”

For Abah Taufik, the root of the problem isn’t just technical; it’s about the lack of policy continuity across leadership cycles, an echo of the frustrations voiced by Mahendra Rianto at the business association level, this time coming straight from residents living right along the truck routes. “Our programs change every five years. The president changes, the program changes. There should be a president who actually cares about the people living in this northern area.”

“Breaths of Fresh Air” Come and Go

At that very juncture, the discourse on electric trucks emerges as a proposed solution, not only for public health, but also for the state budget.

Over the past few years, the electrification of freight transport has repeatedly surfaced in policy discussions, marked by incremental progress here and there, but implementation remains a long way off.

Proposals for electric truck incentives are nothing new, and therein lies the problem, says Mahendra Rianto, Chairman of the Indonesian Logistics Association (ALI). According to him, shifting policies with every change of administration make investors and logistics operators hesitant to commit.

He pointed to import duty incentives for two- and four-wheeled electric vehicle components that were once promised, only to be withdrawn halfway through. This has left several two-wheeled EV manufacturers struggling to survive, as prospective buyers choose to wait for subsidies that never materialize.

For Mahendra, the same pattern risks repeating itself with electric trucks unless the government establishes a long-term roadmap insulated from the five-year political cycle. “The implementation is inconsistent, which is the primary reason investors are reluctant to enter Indonesia,” he said in a phone interview on Thursday, August 6, 2026.

Still Cheaper to Stick with Subsidized Diesel

Policy consistency clashes directly with the cold, hard numbers. According to Mahendra, electric trucks still cost around three to four times as much as diesel trucks. While daily operating costs are lower, the margin narrows because the government still heavily subsidizes diesel and biodiesel.

Gemilang Tarigan of the Indonesian Trucking Association (Aptrindo) adds further detail to that cost structure: about 70% of an electric truck's price is tied up in the battery, a component he notes is still considered a novel technology with an immature service network across Indonesia.

"The price of a diesel truck compared to an electric truck is still three times higher. When the gap is that wide, who will buy one? Who would dare?" Tarigan said in an interview with *Prohealth* at the Aptrindo office in Tanjung Priok, North Jakarta.

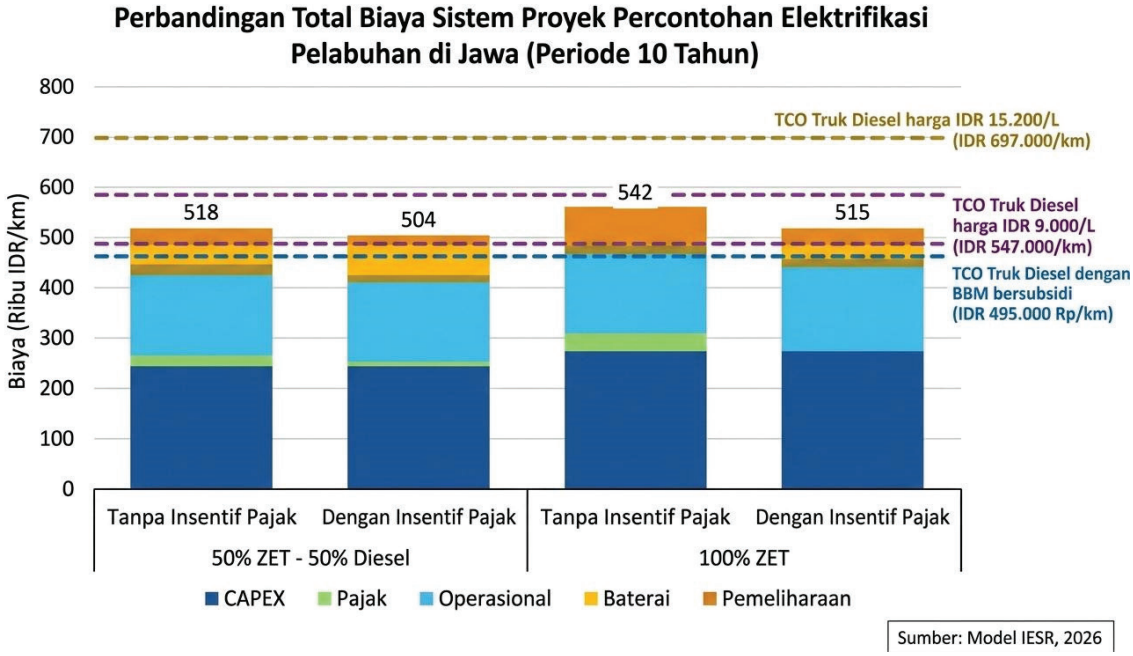


Gemilang Tarigan, Chairman of APTRINDO, in his office in North Jakarta. (Photo by Dian/Prohealth)

According to Tarigan, the government should not only fix capex incentives, but also remove fossil fuel subsidies gradually, something he noted as "politically risky" for the government. "If we want acceleration, we can't just rely on incentives; there have to be disincentives too," he said.

IESR calculations directly prove this: electric trucks remain more expensive than subsidized diesel trucks across all weight classes. Capital expenditure remains the heaviest burden,

accounting for 42–56% of an electric truck's total lifetime costs. Even with a battery-swapping system, electric trucks are still not cheap enough to rival diesel. They will only become competitive if diesel prices sit in the range of Rp8,000 to Rp9,000 per liter.



Total Cost Comparison of Port Electrification Pilot Project Systems in Java (10-Year Period)

On the ground, those limitations are even more apparent. Mahendra noted that current electric truck batteries can only manage a range of 200 to 250 kilometers before needing a recharge, a distance that is only suited for last-mile delivery or short-haul intercity trips, such as within the Greater Jakarta radius, he said.

For long-haul routes, he believed electric trucks are not yet a realistic option in the near future. Tarigan agreed with that assessment, arguing that a phased approach starting electrification with short-haul trucks is currently the most technologically sensible path while waiting for battery energy density to improve.

Public charging infrastructure is the next hurdle agreed upon by both sources. Public electric vehicle charging stations designed for trucks are practically non-existent, Tarigan pointed out, unlike the more widespread charging station networks meant for passenger cars.



A queue of trucks at the COCO gas station in Cakung Barat spills over onto the roadway. (Photo by Dian/Prohealth)

Mahendra urged the government to build a fast-charging ecosystem along logistics corridors, while also highlighting financing hurdles. Regional financial institutions, he noted, are still holding back from providing long-term soft loans for electric trucks because financing tenors in Indonesia average just five years. This period is much shorter than in other countries, which can reach seven to eight years, matching the lifespan of a battery.

Tarigan added another reason behind banks' reluctance to finance electric trucks: untried residual values. Because leasing schemes rely on the truck itself as collateral, banks are hesitant to extend credit for vehicles whose used market has yet to be established, a risk that makes sense from a lending standpoint, yet ironically hinders the very technology adoption the government claims to promote.

Old Trucks, Double Burden

Meanwhile, looking at the existing operational fleet, Tarigan painted a much bleaker picture. Around 60% of national trucks are already over 20 years old, while the rest are evenly split between those aged 5 to 10 years and those under 5 years that already comply with Euro 4 emission standards.

This aligns with the Environmental Agency's (DLH) findings that a portion of the heavy-duty fleet still relies on low emission standards of Euro II or lower, and lacks modern emission control technologies such as Selective Catalytic Reduction (SCR) or particulate filters.

Roadworthiness tests (KIR), which are supposed to filter out these aging trucks, are instead relaxed regarding exhaust gas components, Tarigan notes, because enforcing them strictly would mean the vast majority of older trucks would completely fail.

These cheap, legacy trucks, he adds, create unfair business competition: operators running newer, more eco-friendly trucks struggle to compete on rates with older trucks whose capital costs have long been paid off, pushing some business owners to overload their vehicles (over dimension over load / ODOL) just to secure a margin.



An overloaded truck passes along Jalan Bekasi Raya KM 27. (Photo by Dian/Prohealth)

Ironically, the ODOL (Over Dimension Over Load) policy, which is slated to take effect in 2027 to curb road damage and emissions by capping vehicle loads, is running completely decoupled from the truck electrification agenda.

"No, that's why it doesn't work. They're running on separate tracks," Tarigan saied, regretting the lack of policy synchronization that could otherwise mutually reinforce each other if planned together as a comprehensive logistics reform package.

Beyond vehicle issues, both Mahendra and Tarigan point to a more structural root problem: the low productivity of national trucks. Indonesian trucks average fewer than 100,000 kilometers per year, half the Southeast Asian regional average, due to a combination of chronic congestion, slow manual loading and unloading processes, and industrial zone roads that are not fully connected to primary national highways.

Tarigan viewed that transitioning to electric trucks without fixing these foundational issues is like dropping a new engine into a car stuck in a perpetual traffic jam: the technology changes, but the nation's stubbornly high logistics costs won't necessarily come down.

"Our logistics are expensive, and everything relies on trucks," he said.



The morning street scene in West Cakung, right in front of Cakung Market. (Photo by Dian/Prohealth)

He pointed to long-term operational cost calculations, which he argued are already cheaper than diesel trucks, provided the supporting ecosystem, from fast-charging stations to financing schemes, is built seriously rather than stalling as mere rhetoric among ministries thatstill operate in silos.

The Ministry of Energy and Mineral Resources (ESDM), the Ministry of Industry, and the Ministry of Finance, he says, need to sit down together and agree on a unified roadmap.

“We expect the government to act as the referee and level the playing field.”

Roadmap Yet to Exist

The complaints from ALI and Aptrindo regarding the absence of an electrification roadmap align closely with findings from ICCT research. Rizqi Ilma Nugroho, an Associate Researcher at the ICCT, noted that Indonesia is not entirely lagging in emissions regulations. Euro 4 already has a legal basis, but the real issue lies in implementation and monitoring.

“If we look at Europe, standards have already reached Euro 6. In Indonesia, Euro 4 has the regulations in place, but it’s all about how they are actually implemented,” she said.

For electrification, the ICCT assesses that urban trucks under 7.5 tons and sectoral trucks, such as mining dump trucks or waste haulers, represent the most realistic segments to transition first. Their routes are relatively short, and their operations are more predictable.

Meanwhile, long-haul trucks technically already have adequate technology, but Indonesia still lacks fast-charging infrastructure along major logistics corridors.

The bigger issue remains the same: a national roadmap is still missing. “There is no roadmap yet for electrification,” Rizqi said. Targets within the National Electric Power General Plan (RUKN) have yet to be translated into a specific roadmap for heavy-duty vehicles. PLN’s readiness to support truck electrification also remains limited to discussions rather than concrete planning.

As a point of comparison, Rizqi mentioned India, which shares socioeconomic conditions closer to Indonesia’s. The FAME program in that country has driven the electrification of commercial vehicles through subsidies.

For Indonesia, the ICCT advocates for a feebate scheme, where high-emission vehicles are hit with additional levies, with the proceeds channeled into incentives for low-emission vehicles. “It’s technology-neutral; it doesn’t have to be electric right away, but the endpoint still leads there,” she said.



Jayanti Maharani, Coordinator for Transmission, Electricity, Aerospace, and Aeronautics at the Ministry of National Development Planning/Bappenas, at the Bappenas Office in Central Jakarta. (Photo by Dian/Prohealth)

The void pointed out by Rizqi is confirmed outright by the Ministry of National Development Planning/Bappenas. Jayanti Maharani, Coordinator for Transmission, Electricity, Aerospace, and Aeronautics at Bappenas, admitted during an interview at her office on Thursday, September 17, 2026, that electric trucks are not currently included in the National Priority Work Program (PKPN), the list of programs receiving direct funding priority under presidential directives.

“Electric trucks are not yet a priority, neither in the RPJM planning nor in its current annual [budget]” she said. What actually made it into the PKPN, she noted, is the program to convert fossil-fuel motorcycles to electric ones, not trucks. “It doesn’t mean we aren’t working on it. But those things still require studies and assessments.”

Regarding who should coordinate this cross-ministerial issue, the answer loops in circles, a fact Jayanti candidly acknowledged. For the electricity sector, she said, the

technical ministry is clearly the Ministry of Energy and Mineral Resources (ESDM), which coordinates with Bappenas on policy and budgeting.

However, specifically for trucks, the coordinator remains hazy. The Coordinating Ministry for Infrastructure and Regional Development (Kemenko IPK) will formulate a transportation decarbonization roadmap as part of an action plan to accelerate the adoption of low-emission vehicles, though the process is still in the study phase.

Afterward, the government needs to assess technologies, financing schemes, locations, and learn from other countries' experiences to determine pilot projects before scaling them up nationwide. "That can become a pilot project that we can later upgrade to a national scale," she states. According to Jayanti, budget considerations will follow the policy direction set by the government. "Money follows [the policy]," she said.

Ready, But Not Alone

Concerns over grid readiness receive some clarity from PLN. Gregorius Adi Trianto, Executive Vice President of Corporate Communications and Social and Environmental Responsibility at PT PLN, called heavy-duty vehicle electrification the "next crucial stage" after the ecosystems for two- and four-wheeled electric vehicles begin to take shape.

From a grid perspective, PLN claimed it is ready to support growing power demands in strategic logistics hubs, including Cakung, Cilincing, and Tanjung Priok.

The technical challenge, according to Gregorius, is not just about adding capacity, but spatial design. Electric trucks require much larger charging areas than passenger cars to accommodate access, queuing, and the maneuvering of oversized vehicles. PLN, he said, will develop new Public Electric Vehicle Charging Station designs and dimensions to meet these needs through two approaches: corridor-based charging along logistics routes, and depot-based charging at locations such as ports and distribution centers.

But Gregorius also underscores the limits of PLN's authority. "The development of the electric vehicle ecosystem, especially heavy-duty electric vehicles, cannot be carried out by PLN alone," he said. Success, in his view, depends on synergy among the government, PLN, port and industrial estate managers, logistics companies, fleet owners, and vehicle manufacturers.

Regarding the dominance of coal as an electricity source, Gregorius pointed to the 2025–2034 Electricity Supply Business Plan (RUPTL), which allocates about 76 percent of the 69.5 gigawatts in planned additional generation and energy storage capacity to new and renewable energy (NRE) and battery energy storage systems (BESS).

“As the share of clean energy in the power grid increases, the emission reduction benefits of every electric vehicle will also grow significantly,” he said.

Prohealth also reached out to the Public Relations division of the Ministry of Transportation and the Director General of Metal, Machinery, Transportation Equipment, and Electronics (ILMATE) at the Ministry of Industry for comments. As of publication, no response has been received from the ministries.

This article was published in Prohealth.id on September 18, 2026. It is accessible through the following link:

https://prohealth.id/hidup-dalam-kepulan-truk-elektrifikasi-tersangkut-harga-dan-kebijakan/



I Wayan Widyantara

I Wayan Widyantara, or Ara as he is fondly called, is a journalist who has built a career at Jawa Pos Radar Bali since 2015. Ara is experienced in reporting on various public issues, governance, social dynamics, culture, and public policy. He is also active in professional journalistic organizations with a focus on strengthening press freedom, journalist advocacy, and enhancing media professionalism.

Fading Spotlight: The True Legacy of Bali's G20 EV Push

I Wayan Widyantara



The 2022 Group of Twenty (G20) Summit crowned Bali as the pioneer of a massive acceleration and the primary showcase for Indonesia's electric vehicle (EV) ecosystem. Back then, the island's roads were transformed with hundreds of charging stations built in rapid succession to support the zero-emission mobility of global delegates. Today, four years later, as the spotlight fades, a vital question remains: Has that infrastructure legacy solidified into the bedrock of a new era, or is it slowly deteriorating into a mere relic of the past?

Okto, a native of Jember, East Java, has worked as an online ride-hailing driver in Bali for quite some time. Eight months ago, he made a bold shift. He traded the steering wheel of his gasoline-powered car for a six-seater electric vehicle, renting it for Rp400,000 per day. Under the arrangement, he is even allowed to bring the car home and park it at his residence in Dalung, Denpasar.

At the Nusa Dua Public Electric Vehicle Charging Station (SPKLU) on Saturday, August 29, 2026, Okto shared that his risk paid off handsomely. "The world has moved on. In the past, we used kerosene; now we use gas. Vehicles are no different," he quipped.

Okto targets premium customers as his main market. While trips around Denpasar consistently yield high passenger volume, serving elite resort corridors like Nusa Dua offers a double advantage. He can secure eight to ten passengers daily. This generates enough revenue to comfortably cover his rental fees while turning a clean profit.

His primary motivation for sticking to this route comes down to extreme efficiency. The operational cost comparison between a gasoline-powered car and an EV sits at a stark three-to-one ratio. "Refueling with Pertamax would set me back around Rp460,000. Meanwhile, with an electric car, covering a distance of up to 420 kilometers costs only about Rp120,000 in charging fees," he explained.

The Challenges Behind the Efficiency

However, this migration is not without its risks. Another story comes from Asep, an online taxi driver from Banyuwangi. He recalled a bitter experience involving a colleague who was forced to call a towing service in the Kintamani area of Bangli.

"At the time, my friend was dropping off a passenger. On the way back, his battery ran out because he'd forgotten to charge it, and to make matters worse, there were no public charging stations anywhere around. He had no choice but to get towed," Asep recalled.
The problem isn't limited to a lack of infrastructure in remote areas. Even in densely populated regions like Badung, the quality of charging facilities remains a frequent hurdle. While recharging his vehicle at the Nusa Dua charging station, Asep pointed out several faulty units.

"This plug here is loose. And that one over there charges frustratingly slowly. When that happens, you have no choice but to request a refund through the app," he lamented.

The experiences of Okto and Asep serve as a clear reflection of EV adoption in Bali: operational cost efficiency has skyrocketed, but it is not yet fully backed by reliable or evenly distributed charging infrastructure, especially along tourist routes outside Denpasar and Badung.

"The Southern Bias"

Meanwhile, the electric vehicle population in Bali is flourishing. Data from the National Police Traffic Corps registration through late August 2026 records 17,435 electric vehicles distributed across the Island of the Gods. This figure is dominated by 10,930 motorcycles, followed by 6,414 passenger cars, 87 freight vehicles, 1 bus, and 3 special-purpose vehicles.

As the backbone of the infrastructure, PLN has thus far operated 196 public electric vehicle charging stations across various locations, both independently and through private partnerships. However, their distribution remains heavily skewed. Eko Sudaryoni, Senior Manager of Marketing Strategy at the PLN Bali Distribution Main Unit (UID), detailed that PLN currently manages 153 units across 100 locations, with the vast majority concentrated in South Bali.

Outside of that zone, availability drops drastically. There are only eight units in Bangli, 10 in Karangasem, and five in Klungkung. This imbalance stems from the infrastructure layout legacy of the 2022 G20 Summit. At the time, PLN installed around 200 centralized units around the Kempinski and ITDC Nusa Dua areas. Following the event, about 50 units had to be relocated outside Bali as part of a national infrastructure redistribution mandate.

"Moving forward, our development will target North Bali, East Bali, and strengthening tourism destination points. We are providing the infrastructure first in strategic locations without looking at commercial profit and loss," Eko asserted.

This equitable distribution is urgent. PLN targets an ideal service ratio of one unit per 12 electric cars (1:12). Currently, the ratio specifically for PLN-managed units in Bali stands at 1:25. Although factoring in private facilities improves the ratio to 1:15, PLN still aims to add 30 new units this year.

Private support is also beginning to flow. At least 28 charging units under an "SPKLU Center" concept, where a single location accommodates 8 to 10 facilities, have applied for construction permits with PLN.

Maintenance and Regulation

Building infrastructure is one thing, but maintaining it is another. To ensure facilities remain reliable, PLN allocates an annual routine maintenance budget for SPKLU in Bali reaching Rp1 billion. This funding covers everything from daily cleaning to equipment readiness checks, excluding heavy spare part replacements, such as damaged power modules.

"When a unit is completely broken down, we typically partner with charger manufacturers interested in investing in Bali to revitalize and replace it," Eko explained.

From the local government's perspective, electrification ambitions align directly with Bali's Development Vision. The Head of the Bali Transportation Office, I Kadek Mudarta, emphasized that developing electric vehicles is key to realizing low-emission transportation.

The provincial government also continues to push mandates for PLN to increase the number of SPKLU, including opening up avenues for land management cooperation with the private sector. "There are already several SPKLU at government offices, though they are still designated for internal agency operational needs rather than the public," Mudarta said.

The future of green tourism in Bali is inevitably at a crossroads. Letting electric vehicles take to the road without evenly distributed charging infrastructure is tantamount to promoting green tourism while leaving travelers stranded on the road. True collaboration between the government, PLN, and the private sector is the absolute key; ensuring every zero-emission wheel that turns across every corner of Bali is a definitive step toward preserving nature.

This article was published in the Jawa Pos Radar Bali newspaper on September 12, 2026.

Bali's Green Tourism Ambitions Face Electric Roadblock

I Wayan Widyantara



Enjoying Bali's natural splendor is now challenged by a stark contradiction. The desire to cultivate green tourism clashes with the reality of transportation emissions, which account for up to 41% of pollution on the Island of the Gods. Is that true?

Amidst grand ambitions to establish Bali as a green destination, the transition toward electric vehicles urgently needs to move beyond elite rhetoric. The challenge is no longer about intention, but rather the availability of infrastructure and reliable vehicles capable of carrying travelers across regional borders without range anxiety.

I Putu Winastra, the Chairman of the Regional Chapter of the Association of Indonesian Tours and Travel Agencies (ASITA) Bali, welcomes the government's commitment to

developing sustainable tourism. The use of electric-based vehicles is seen as having great potential to become an environmentally friendly tourism product line.

"As tourism industry players, we actually support the government's program in the concept of Bali becoming a green destination," Winastra said.

Nevertheless, Winastra emphasized that mass adoption can only run optimally if the availability of electric vehicles is accompanied by adequate charging infrastructure. For tour operators, tourism activities are never confined to a single spot, but involve movement between destinations with long travel distances. Consequently, the distribution of electric vehicle charging stations (SPKLU) must follow tourist mobility patterns.

"If charging stations are only available in Denpasar, running tours around Bali becomes a major challenge. If a battery suddenly drops and leaves a vehicle stranded, that is a huge problem."

The even distribution of SPKLU across tourist areas and routes is believed to provide a sense of security for business operators to expand their operational reach across regions, rather than just circling urban areas.

Private Sector Support

Support for this eco-friendly ecosystem has genuinely taken root in the hotel sector. Several prominent hotels in Bali, such as The Apurva Kempinski Bali in Nusa Dua, Platinum Hotel Jimbaran Beach Bali, ZIN Canggu Resort & Villas, and Fairfield by Marriott Bali Kuta Sunset Road & Legian, have already provided charging facilities for their guests. Similar steps are being championed by hotels within the ITDC Nusa Dua area, including The Ritz-Carlton, Grand Hyatt, The Westin, and Hilton, as a tangible manifestation of strengthening sustainable tourism.

Nevertheless, challenges in the field do not stop at infrastructure alone. Tourism operators also face vehicle specifications that do not yet fully align with operational tour requirements.

Winastra notes that the electric vehicle models currently available are still dominated by city cars and family cars with limited capacity. Yet, tour operators require larger-capacity

fleets capable of accommodating groups of tourists, drivers, guides, and luggage all at once.

"What we see is that electric vehicles are still limited to city cars and family cars. Meanwhile, we need electric vehicles that are truly proper for tourists," he reveals.

Pricing factors are also a crucial calculation for businesses. A higher initial investment value compared to conventional fuel vehicles forces industry players to think multi-layered, weighing unit durability, after-sales service, and resale value in the secondary market.

"We want to avoid a situation where we spend hundreds of millions to buy one, it breaks down, and suddenly it crashes in value with no one willing to buy it. Meanwhile, with diesel or gasoline vehicles, if you sell them second-hand, they still hold value," he complained.

Therefore, Winastra hopes manufacturers can introduce commercial electric vehicles at more competitive and affordable price points. This economic factor is considered the primary determinant of the private sector's willingness to abandon internal combustion engines. "At the very least, the price should be affordable, so it isn't more expensive than conventional vehicles," he added.

From an ecological standpoint, the urgency of transport electrification rests on a solid scientific foundation. WRI Indonesia's Bali Transport Decarbonization Project Lead, Haiqal Rizaldi, explains that the transportation sector accounts for approximately 41% of emissions in Bali Province, making the transition to zero-emission vehicles an absolute necessity.

"Indeed, one of the ways to reduce emissions in the transportation sector is by using electric vehicles. So electric vehicles can serve as a key effort to lower emissions or drive decarbonization," Haiqal said.

He does not deny that electric vehicle operations are not yet entirely emission-free, given that the current electricity mix still relies on fossil fuel supplies. Even so, their primary advantage lies in the complete absence of direct tailpipe emissions that have long poisoned urban air.

Positive Trend

The development of the four-wheeled electric vehicle population in Bali itself shows a very positive trend. Based on WRI Indonesia data, the total EV population on the Island of the Gods has now reached 16,000 units, with 6,000 of them being four-wheeled vehicles. This achievement is considered aligned with the Regional Action Plan for Battery-Based Electric Motor Vehicles previously launched by the Bali Provincial Government.

The year 2026 is viewed as a crucial momentum for the acceleration of four-wheeled vehicles, while the growth of two-wheelers has begun to slow down and requires adjustments in terms of pricing and accessibility. Equally important, electrification must also target mass public transportation. Haiqal notes that Bali has secured support for 11 electric buses, although their realization still requires investment certainty and sustainable procurement models.

The government is urged to provide long-term contracts, such as multi-year cooperation schemes of up to five years through the establishment of a regional transportation-owned enterprise (BUMD). This step is believed to alleviate operator hesitation while fostering certainty for return on investment.

"If it's, say, five years, they will definitely want to switch to electric buses," he explains. With a mature scheme, electric bus fleets are projected to dominate Bali's public transportation landscape between 2028 and 2029.

The future of Bali's green tourism is now on the verge of proof. The effort to transform the Island of the Gods from merely a showcase of ecological ambition into a resilient zero-emission destination has become a necessity. Yet, it all requires collaborative work. When charging infrastructure is evenly distributed to remote areas, and certainty of public transport investment is firmly established, electric vehicles will no longer be a source of anxiety on the road. They will transform into a new heartbeat that cleans the air, preserves nature, and brings enduring optimism for the sustainability of Bali's tourism.

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Bethriq Kindy Arrazy

Bethriq Kindy Arrazy began his journalism career nearly half a decade ago as a correspondent for Tempo. He subsequently worked for several media outlets, including Wartaekonomi.co.id, Apahabar.com, and Ekuatorial.com. Alongside several colleagues, he went on to co-found and manage Apakabar.co.id, while also serving as a correspondent for Progresip.id, focusing on human rights and labor issues. Outside of his journalism work, he is actively involved in advocating for labor cases concerning journalists and cross-sectoral workers. Furthermore, he serves as a member of the Labor Division for AJI Jakarta and as the Advocacy Division Coordinator for the Alliance of Media and Creative Industry Workers for Democracy (SINDIKASI) greater Jakarta chapter.

The Looming Labor Crisis Behind Indonesia's EV Boom

Bethriq Kindy Arrazy

Behind the soaring sales of electric vehicles that signify the shift toward low-emission mobility in Indonesia, lies a gripping dilemma for hundreds of thousands of conventional automotive factory workers facing the shadow of layoffs. Will this green economic wave spell the death knell for their livelihoods?



Trainees are participating in electric vehicle practical training at BBPVP (Center for Vocational Training and Productivity) Bandung. (Photo by BBPVP Bandung)

The timeline of the automotive industry is spinning at a relentless pace. The transition toward zero-emission mobility is not merely changing what rolls down the highway; it is fundamentally overhauling the industry's foundation from its roots. Unfortunately, this wave of the green economic awakening is not a universal celebration. Beneath the fanfare

of this energy transition, the fate of hundreds of thousands of conventional automotive workers hangs at a historical crossroads, awaiting guarantees that they will not be left behind.

The shifting era is vividly captured in sales data for battery-based electric vehicles (EVs). Data from the Association of Indonesia Automotive Industries (Gaikindo) records that the market share of internal combustion engine (ICE) cars plummeted from 99.6% in 2021 to 78.2% in 2025. Conversely, the portion of pure electric vehicles (battery electric vehicles/ BEVs) skyrocketed from a mere 0.1% to 12.9% over the same period.

This trend continues. Throughout the first half of 2026, sales of electrified cars reached 117,108 units, contributing 26.8% to the total national automotive market of 436,564 units. Within that electrified pie, which spans hybrids (HEVs), plug-in hybrids (PHEVs), and BEVs, pure electric cars emerged as the star performer. BEVs sold 69,739 units, surging 80.8% compared to the same period last year.

Amid the clamor of this transformative era, a crucial question lingers: What lies ahead for the hundreds of thousands whose livelihoods have long relied on the conventional automotive supply chain?

The Shadow of Layoffs

This anxiety is clearly etched on the face of Eko Purwanto, a worker at PT Musashi Autopart Indonesia. His company operates as a Tier-1 supplier for major Sole Brand Holder Agents such as Honda, Suzuki, Daihatsu, and Hino. For years, PT Musashi has manufactured vital internal combustion engine (ICE) components, including camshafts to regulate combustion valves and transmission gears to transfer engine rotation to the wheels.

Eko has relied on this job for a quarter of a century, bearing witness to the company's golden era throughout the 1990s and 2000s. However, following the COVID-19 pandemic, business momentum began to slow, with the factory strictly executing existing projects without expansion. This condition was compounded by the exchange rate exceeding Rp18,000 per US Dollar in mid-2026, dealing a severe blow to cash flows heavily dependent on imported raw materials from Japan and South Korea.

"The transition from conventional vehicles to EVs is deeply concerning, especially since our

company operates in the internal combustion engine sector. The impact will be profound moving forward. Just to survive until 2030 would be great," Eko told Progresip.id in the Cikarang industrial area, Bekasi, on Saturday, August 22, 2026.

Being a unit work leader at his company, Eko noted that this stagnation is beginning to cast a shadow over the livelihoods of 1,500 workers. Although a wave of mass layoffs has yet to materialize, the symptoms of tightening belts are palpable. Several allowances, ranging from overtime components to shuttle transport facilities, have been trimmed.

"It is a kind of win-win solution to prevent layoffs. On the other hand, the company must find a way to stay afloat, though no one knows for how long," said Eko, who also serves as the general treasurer of the Federation of Indonesian Metal Workers Unions (FSPMI).

FSPMI's Automotive, Machinery, and Component Workers Union (SPAMK) fully recognizes that this technological disruption cannot be resisted. SPAMK Chairman Khairul Bakrie highlighted the fundamental differences in vehicle architecture that are reshaping the labor landscape.

He pointed out that a conventional car is typically assembled from approximately 3,000 components, whereas a pure electric vehicle requires only about 600. The powertrain components in conventional cars, which reach around 2,000, are slashed to just 20 in EVs.

To put it into perspective, a single conventional car requires 10 workers to assemble its engine and transmission parts, while a single EV requires only one worker to assemble its motor. Ford estimates that EV production requires 40% less labor.

This contraction in component count, coupled with massive automation and robotization, is triggering workforce reductions. Khairul noted that conventional vehicle manufacturer PT Honda Prospect Motor in Karawang has carried out gradual efficiency measures since 2023 by offering early retirement schemes.

"This is not an idle threat, but a challenge. When we talk about technology transfer, there must be a safety net for workers," Khairul asserted. He predicted that workers in engine, transmission, and exhaust manufacturing plants will be hit harder than those in tire, chassis, or wheel plants, which remain relatively secure.

Consequently, Khairul is urging guarantees for a just transition. Workers should not merely

be pushed into early retirement. They must be equipped with upskilling and reskilling programs covering battery technology, electronics, and software. Meanwhile, directly affected workers must be given opportunities for redeployment within the supply chain network.

Furthermore, Khairul emphasized that newly created jobs must still meet standards of decent wages, occupational safety and health, clear employment relationships, and social protection.

"This is where social dialogue is essential. Trade unions must be involved, so that technological transition does not simply serve as a pretext for layoffs," he said.

Industrial Potential and Human Resources

On the other side of the coin, a new industrial ecosystem is beginning to open doors. The Indonesian Electric Vehicle Industry Association (Periklindo) notes that BEV sales continue to skyrocket.

According to Periklindo data, BEV car sales reached 82,176 units between January and July 2026, capturing a 16% market share. This figure represents an 84.6% surge compared to the same period in 2025.

Periklindo Chairman Moeldoko emphasized that this high demand must be matched by Indonesia's readiness to become a production base, rather than merely a market. The government has set a minimum Domestic Component Level (TKDN) target of 60% for 2022-2026, which will scale up to 60-80% for 2027-2030 under the Ministry of Industry Regulation Number 28 of 2023.

"This increase in TKDN must absolutely be accompanied by the readiness of our human resources," Moeldoko said.

According to Moeldoko, Indonesian workers possess immense potential to fill new technical roles, ranging from electrical systems and inverter maintenance to public electric vehicle charging station (SPKLU) management. Currently, the Ministry of Industry has also issued a dedicated Indonesian National Work Competency Standard (SKKNI) for light electric vehicles.

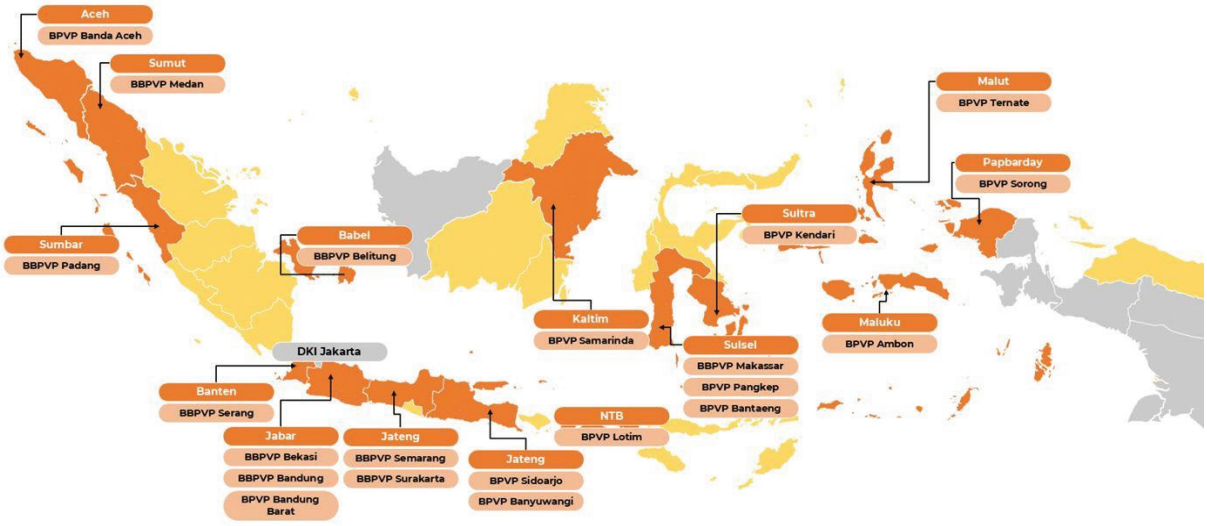


Students at SMK Ganesha Satria 2 Depok are engaged in practical learning on conventional engine vehicles. (Photo by Progresip.id/Bethriq Kindy Arrazy)

Unfortunately, educational foundations at the grassroots level remain unevenly distributed. At SMK Ganesha Satria 2 Depok, for instance, students majoring in Light Vehicle Engineering are still entirely occupied with internal combustion engines, basic electrical systems, chassis, and painting. Not a single electric vehicle is available for practical training.

"To this day, there are no government coaching programs to adapt the electric vehicle curriculum in our school," said Herman, the headmaster of SMK Ganesha Satria 2 Depok. He strongly hopes that the EV industry will embrace vocational high schools to train teachers so that their students will eventually align with market demands.

On a positive note, the Center for Vocational Training and Productivity (BBPVP) Bandung under the Ministry of Manpower has initiated anticipatory measures. Since 2023, the institution has opened specialized electric vehicle classes lasting 160 to 320 hours. There, students are equipped with theory and 70% practical training using electric cars and motorcycles.



The distribution of job training centers operating directly under the Ministry of Manpower. (Data by the Ministry of Manpower)

Ari Kustiandi Ariffien, Coordinator of the Sub-group for Instructor and Training Staff Competency Enhancement, Program Testing, Systems and Methods of Vocational Training, and Productivity Enhancement at BBPVP Bandung, noted that alumni from this training program have been absorbed by EV conversion workshops, although adoption by large-scale global EV manufacturers in Indonesia remains minimal. Interestingly, these classes are also frequently attended by conventional automotive workers who have fallen victim to efficiency cuts.

The Ministry of Manpower actually provides a Tailor-Made Training (TMT) program fully subsidized by the state, targeting 220,000 school graduates and 50,000 laid-off workers. This program can be accessed directly by automotive industries seeking to retrain their workforce.

Unfortunately, according to Gilang Amaldi, coordinator of Vocational Training Guidance at the Ministry of Manpower, no conventional automotive manufacturers, the majority of which are Japanese, have taken advantage of it.

"The Japanese automotive industry still appears to lean toward hydrogen technology and has not massively migrated to battery electric vehicles. We are awaiting initiatives from them to utilize this training incentive," Gilang explained.

Green Jobs

To avoid lagging behind in this transition, the government is urged to design an integrated roadmap. Deon Arinaldo, Energy System Transformation Program Director at the Institute for Essential Services Reform (IESR), emphasized the importance of building integrated battery manufacturing downstreaming. Integrated battery plants will serve not only electric vehicles but also energy storage systems, which in turn will absorb labor on a massive scale.

Aligned with this, Coaction Indonesia Research Manager Ridwan Arif reminded that jobs in the green sector must do more than just bear an eco-friendly label. They must also meet standards of fair wages and non-discriminatory worker protection.

The assumption that electric vehicles will "kill" automotive jobs can actually be dispelled if the industry is built comprehensively. A study by Andrew Weng et al., titled *Higher Labor Intensity in US Automotive Assembly Plants After Transition to Electric Vehicle* (2024), proves this point. Weng's research captured the transition from the conventional automotive industry to the EV industry across three U.S. states: California, Michigan, and Illinois.

One notable example is the New United Motor Manufacturing Incorporated (NUMMI) plant in Alameda District, California. NUMMI was a joint venture between General Motors and Toyota that operated from 1984 to 2010. When it closed in 2010, the conventional plant wiped out 4,700 jobs. However, when Tesla took over the facility in 2012 and rolled out models such as the S, X, 3, and Y through 2022, Tesla was able to periodically recruit an average of 2,500 workers annually.

Tesla also developed battery pack assembly for several of its electric vehicle models, while other models utilized battery cells supplied directly by Panasonic and Sparks.

Over a decade, Tesla employed 22,000 people for assembly and 12,000 specialized workers for battery cell production alongside Panasonic. Labor intensity proved to increase by three to ten times compared to the golden era of combustion engine production at the same facility. Transformation does take time, estimated at around 15 years in Weng's study.

Zero-emission vehicles are an inevitability of civilization. However, a transformation can only be considered complete if it leaves no one behind. If managed with a clear downstreaming vision, the transition to zero-emission vehicles is not a death knell for workers, but rather a gateway to a far more massive industrial ecosystem.

This article was published in Progresip.id on September 18, 2026. It is accessible through the following link:

https://progresip.id/artikel/penjualan-mobil-listrik-melesat-pekerja-otomotif-desak-transisi-berkeadilan/



Glenys Octania

Glenys Octania began her journalism career in 2015. Throughout her journey, Glenys has consistently focused on environmental issues, climate change, and the energy transition through various reports and journalistic works. Her commitment to environmental issues is also reflected in her active participation in various fellowships, training programs, and journalism competitions focused on climate change and sustainability. This consistency led her to participate in an event in Singapore regarding the Global Heat Health Information Network (GHHIN), which discusses health threats posed by rising temperatures and heatwaves. Through her journalism, Glenys strives to bring environmental and energy transition issues close to everyday public life, while fostering public understanding of the importance of shifting toward more sustainable energy and transportation systems.

Jakarta's Bid to Cure Choking Emissions Through Transit Hubs

Glenys Octania

Jakarta still faces a major challenge in curbing emissions from the transportation sector. Economic activity and citizen mobility across the greater Jakarta area (Jabodetabek) crowd the city with vehicles from surrounding buffer zones. Meanwhile, the Jakarta Provincial Government has set a course toward Net Zero Emissions by 2050 through a decarbonization roadmap, targeting a 55% public transportation modal share by 2045.

Transit-Oriented Development (TOD) has become one of the government's primary strategies to encourage residents to switch to public transit. But to what extent can TOD truly address Jakarta's transportation emission problems?

The transportation sector accounts for 52% of direct emissions in Jakarta. Based on the Jakarta Police's data from December 2025, the number of motor vehicles in Greater Jakarta reached more than 25 million units, increased by 2.93% from the previous year. This included 161,447 newly added motorcycles and 93,621 passenger cars.

"Jakarta needs a mobility system that can expand access, boost productivity, lower emissions, and connect the metropolitan area as a single economic entity," stated Jakarta Governor Pramono Anung in a press release received by Kompas TV on August 20, 2026.

The Jakarta Provincial Government notes that TOD is part of a "pull" strategy, enhancing the appeal of public transportation, paired with a "push" strategy involving vehicle restrictions, such as the odd-even license plate rule. Even so, the Jakarta Transportation Agency stated that the parameters for assessing TOD success still require deeper study.

Ahmad Safrudin, Executive Director of the Leaded-Gasoline Erasure Committee (KPBB), acknowledged that the concept is sound in theory, but flawed in execution. He argued that the TOD concept has failed to make residents' journeys easier, noting that several transit points remain poorly integrated, forcing commuters to travel longer distances.

Deon Arinaldo, Director of the Energy System Transformation Program at IESR, emphasized that Jakarta's TOD system should not only attract Jakarta residents onto public transit, but should be capable of addressing the mobility needs of commuters from buffer cities who flood into Jakarta every day.

This news video was aired on Kompas TV on September 5, 2026. It is accessible through the following link:

https://www.youtube.com/watch?v=E2pRtOqLM1Y



Wawan Akuba

Wawan Akuba works daily as a journalist for TribunGorontalo.com. Wawan has a keen interest in environmental issues and photography, which also form a major part of his core activities. From 2023 to 2025, he served as the Chairperson of AJI Gorontalo, and beginning in 2026, he was entrusted to be the Coordinator of SIEJ for Gorontalo. Throughout his journalistic journey, he has received several grants and fellowships for various reporting topics, ranging from the environment and economics to urban issues. He has a strong passion in technology and digital safety issues, having participated in several trainings, including fact-checking certification and digital safety training, and now serves as a trainer. Outside of his journalism and organizational activities, Wawan currently manages a street coffee MSME business

Gorontalo's Slow Move to Electrification amid Roaring *Bentor* Engine

Wawan Akuba



GORONTALO'S RIDE-HAIL & BENTOR DRIVERS — The daily struggle of online motorcycle taxi and bentor (motorized rickshaw) drivers in Gorontalo as they face high fuel costs, fierce competition, and the relentless pressure to make a living amid congested streets.

Ilham Lakadjo had just put on a bluish-green shirt. Two minutes before the clock on his phone struck 10:00 WITA, the 26-year-old man was already ready on his motorbike.

The Honda Genio, which had been parked on the porch since the night before, was turned on. The engine was left idling for about 30 seconds before he set off.

Instantly, the area around his house filled with the smell of exhaust smoke. Yet, that sight was nothing new to Ilham. Every day, the motorbike is an inseparable part of his routine.

That morning, Ilham did not immediately head out to look for orders as a GrabFood driver. His five-year-old son had just finished being bathed and dressed.

He still had to ensure that his son's babysitter arrived before speeding toward downtown Gorontalo.

Ilham's residence is in Leato Urban Village, Dumbo Raya Subdistrict, Gorontalo City, about 7.1 kilometers from the city center.

His wife leaves for work earlier, so the two take turns looking after their child. Only after the babysitter arrives can Ilham begin his work.

"I look after him first. My wife leaves for work earlier. That's why I wait for him [the child] to wake up, then I go to work, usually around 10 in the morning," Ilham said.

Upon reaching the city center, Ilham's activities continued like those of any other food delivery driver: waiting for orders to come in, picking up food from restaurants, and delivering it to customers' addresses.

While he was being interviewed, an order pinged on his phone. The restaurant to pick up the food was located just across the street from where he was parked on the side of Jalan Nani Wartabone, around the Saronde Roundabout area.

"Wait, I need to pick up the food first," Ilham said.

He quickly crossed the street and headed to the cashier. The order, worth Rp28,000, was paid for in cash upfront.

Once the food was ready, Ilham checked his phone again. The customer's address was more than two kilometers away from the restaurant.

Since he already knew the area very well, he only glanced at the map on his phone for a moment before starting his bike and heading out.

About five minutes later, the order arrived safely in the customer's hands. Ilham completed the order through the application, then returned to his usual waiting spot.

"That's it, just like that. Time to wait again for the next order to come in," he remarked.

In a single day, Ilham can deliver up to 13 food orders. His routes vary, depending on the orders that come in.

For certain deliveries, he has even traveled a round trip of around 28 kilometers to the Limboto area in Gorontalo Regency.

Distance and the volume of trips make fuel a crucial part of his daily expenses.

Every day, Ilham spends about Rp30,000 to Rp40,000 to buy 4 liters of Pertalite at the gas station.

That expense can increase when he is forced to buy Pertamax because the Pertalite lines at the gas station are too long, while an order urgently needs to be delivered.

Under such conditions, his fuel expenses can reach around Rp60,000 a day.

For an online driver, a reliable motorbike and a steady supply of fuel are essential partners in his daily work.

"People like us can't afford to run out of gas on the road. Every trip must be completed promptly. If we're late, customers will get angry," he said.

The Honda Genio motorcycle he rides is still relatively new. The motorcycle has been his dependable vehicle for only about two months, after his previous bike broke down while he was working as an express courier.

Nowadays, Ilham is more diligent about maintaining his motorcycle. He changes the oil based on mileage, even doing so when it hits around 1,000 kilometers.

"Basically, as soon as it hits a thousand kilometers, I immediately change the oil. I change both, the engine oil and the gear oil," he said.

For Ilham, the motorcycle is not just a tool for getting around. A portion of his livelihood

depends on that very vehicle, taking him from home to restaurants, and then delivering food to customers' doorsteps.

Ilham is just one of many people who rely on motorized vehicles every day to go about their lives in Gorontalo.

Based on motor vehicle registration data, the total number of vehicles in Gorontalo Province has reached 625,783 units. Of that figure, 547,601 units, or roughly 87.5%, are motorcycles.

That figure highlights just how strong the position of motorcycles is in the mobility of the Gorontalo community.

Two-wheeled vehicles are not only used for traveling. For many, a motorcycle is a working tool, utilized by motorcycle taxi drivers, couriers, vendors, and various other workers.

In Gorontalo, motor vehicles also take on a more distinct form: the *bentor*.

This mode of transport has become deeply intertwined with everyday life in Gorontalo. A *bentor* is a modified motorcycle combined with a passenger cabin resembling a traditional rickshaw (becak).

The majority of *bentors* are used for inner-city passenger transport. Their presence has even reshaped urban transit and helped displace traditional minivans.

Over time, this mode of transport has also integrated into app-based services like Maxim, Gojek, and Grab.

However, Yayan Abdul (46), a *bentor* driver who is stationed daily in front of Campus I of Universitas Negeri Gorontalo (UNG), prefers to find passengers manually.

Together with fellow drivers, he formed a routing system that resembles an unofficial terminal. This system is not rigidly binding, but rather based on mutual agreement among the drivers.

Unlike his previous experience with online ride-hailing, Yayan prefers manual work so his

bentor is not constantly overworked by heavy passenger loads and long distances.

Yayan used online ride-hailing systems for the first time in 2018. He was among the early generation of online motorcycle taxi drivers in Gorontalo. However, after only a year of partnering with the app, he decided to step down.

"My account still exists. It's still occasionally active, but I don't use it anymore. It's better this way [looking for passengers without using app]," Yayan said on Tuesday, August 11, 2026.

When met, Yayan was sitting on the passenger bench of his *bentor*. Even while being spoken to, his eyes never left the passersby.

From residents stepping out of stores to students emerging from the campus's "rat-hole gates," he watched them all. He understands the body language of people who need his services inside and out.

Yayan said one of the reasons he left the online transportation sector was that the vehicles wore down much faster.

Customers sometimes carried heavy luggage, adding extra weight to the vehicle. There were also long-distance pickups, compounded by fierce competition among drivers.

According to data from the Gorontalo Province Transportation Office, the three active online motorcycle taxi apps operating in Gorontalo are Maxim, Grab, and Gojek.

The number of *bentor* drivers registered across all three apps reaches 1,111 units. In addition, there are 1,275 two-wheeled vehicles and 703 four-wheeled vehicles.

"Especially nowadays, it's hard to compete. There are already so many online motorcycle taxis here in Gorontalo City. So I'll just stick to this," he remarked.

When interviewed, Yayan had only pocketed around Rp40,000. That amount came from two passenger trips.

He shared that he started working at 8:00 AM. He took a break to go home for a nap around 12:00 PM to 2:00 PM before heading back to his usual spot.

"I just came back here at 3:00 PM," Yayan said during an interview near the Maghrib call to prayer at around 5:49 PM on Saturday, August 15, 2026.

Yayan planned to head home around Maghrib. But before leaving, he suddenly called out to a woman carrying a child as she exited a shop.

"Ah, here's a passenger. Coincidentally, they live in my neighborhood. I can head home at the same time," he said.

Yayan then started his *bentor* by kicking the starter twice. Once the engine roared to life, he immediately turned the vehicle's handlebars around and invited his two passengers to board.

"Going off now," Yayan said with a smile.

That day, Yayan admitted he only bought a single liter of roadside Pertalite for Rp13,000.

The Unseen Emissions

Behind the flurry of vehicles crowding the streets lie emissions that road users cannot always see.

Research by Indri Hamzah, Fitryane Lihawa, and Sri Maryati from Universitas Negeri Gorontalo highlights the relationship between the volume of motor vehicles and carbon monoxide (CO) concentrations in Gorontalo City.

The study found a positive correlation between the number of motor vehicles and CO concentration, with a correlation coefficient of 0.416.

Conducted across several thoroughfares in Gorontalo City, the research recorded the highest vehicle volume on Jalan Prof. HB Jassin, while the highest CO concentration was measured on Jalan Jenderal Sudirman.

The researchers also noted that this relationship does not stand alone. Roadside vegetation, weather conditions, and the timing of the study all serve as factors influencing CO levels. These findings indicate that transport-related emissions are hardly a brand-new issue for Gorontalo.

Yet, tackling emissions collides with the reality that motor vehicles have become deeply woven into the daily lives of local residents.

Reducing transport emissions is not as simple as asking people to abandon the vehicles they have long relied on for work and daily activities.

It is precisely at this juncture that conversations about low-emission transport begin to clash with the realities on the ground.

The Emergence of Electric Vehicles

Amidst the dominance of fossil-fueled vehicles, electric vehicles are beginning to make an appearance in Gorontalo.

Their numbers remain very small compared to conventional vehicles. Registration data shows that electric vehicles in Gorontalo account for only around 312 units out of a total 625,783 motor vehicles. The market is far from large.

Koko Pakaya, a sales representative at the Yadea electric motorcycle and bicycle dealership in Gorontalo City, said that electric motorcycle sales still fall well short of set targets.

Each month, he is tasked with selling around 15 units. In practice, however, the dealership located on Jalan Nani Wartabone averages only about two units sold per month.

Instead, electric bicycles enjoy much higher demand from buyers.

"Electric bikes actually sell a lot better, probably because they are cheaper than electric motorcycles," Koko said on Tuesday, August 18, 2026.

For the highest-tier electric motorcycle, the price reaches around Rp19.5 million per unit after subsidies.

According to Koko, price is not the only obstacle. The people of Gorontalo remain accustomed to conventional vehicles.

Customers who visit the dealership, he noted, generally already possess some knowledge of electric vehicle technology. A portion of them come from middle-to-upper-income

backgrounds, such as civil servants (ASN) and university lecturers.

"The average buyers who come in include PLN employees, and we also recently handled a procurement order for the Bone Bolango Regency Government," he explained.

The use of electric vehicles by workers who rely on transportation to earn a living is not yet visible.

Koko admitted he has never seen an online ride-hail driver using an electric motorcycle.

Inside the showroom, that reality is palpable. The room is relatively quiet. Electric bicycles line one side, while electric motorcycles are displayed on the other.

For Koko, the electric vehicle market in Gorontalo is still in its infancy.

Even so, electric vehicles are not entirely without a foothold in Gorontalo.

Three Years with an Electric Vehicle

Jefri Rumampuk is among the early adopters of electric vehicles in Gorontalo.

That afternoon, Thursday, June 20, 2026, Jefri was driving an electric car he has owned and operated since 2023.

Previously, he drove a conventional fossil-fuel vehicle. After seeing an advertisement for electric cars, he decided to make the switch.

He chose the Wuling Air EV, a Chinese-manufactured electric car launched in 2022.

A year after its release, Jefri brought one home, making him recorded as the second Air EV buyer in Gorontalo.

"So Wuling actually benefited a bit from me, because I indirectly helped promote their product," Jefri said.

Throughout his time using it, Jefri has found the most significant difference to be in operational costs.

He noted that his electric car requires about Rp28,000 to cover a distance of 200 kilometers.

Since it is primarily used for inner-city driving, that range is more than sufficient for his daily needs.

Jefri shared that his electricity expenses top out at around Rp200,000 per month for charging.

That figure is vastly lower than his previous fuel expenses when driving an internal combustion car, which reached about Rp1.8 million monthly.

"So it's incredibly economical. Maintenance is also quite affordable; there isn't much to replace every month, mostly just routine unit checks," he said.

However, Jefri's experience also demonstrates that EV efficiency remains tied to infrastructure availability.

He has taken several trips to western Gorontalo, including Pohuwato Regency, which lies roughly 150 kilometers from Gorontalo City.

That distance means a Rp28,000 charge for 200 kilometers isn't enough for a round trip, requiring him to recharge along the way.

The challenge, according to Jefri, is that charging points in Pohuwato remain scarce.

He noted that there is only one PLN-owned charging station in the region, and it lacks fast-charging capabilities.

"Like some of PLN's other SPKLUs, it isn't fast charging. The power capacity is high, but the charging speed is slow, so it can sometimes take up to six hours to charge," Jefri explained.

In certain situations, Jefri has even had to travel to neighboring regencies just to find a functional charging spot.

For Jefri, this experience highlights the fact that electric vehicles cannot rely on operational cost savings alone.

"Infrastructure is crucial. Electric cars may be more affordable to run, but without supportive infrastructure, it will turn into a new problem for Gorontalo," he said.

According to him, these limitations are still tolerable while the number of electric vehicles remains in the tens or hundreds.

However, the situation will change drastically if the number of EVs surges toward the scale of motorcycles, which currently number in the hundreds of thousands.

"Just imagine if there were hundreds of thousands of them, like motorcycles. The grid and system simply wouldn't support it yet," he concluded.

Infrastructure Begins to Take Shape

A critical issue in electric vehicle adoption is the availability of charging infrastructure.

PT PLN (Persero), through its Main Distribution Unit for North Sulawesi, Central Sulawesi, and Gorontalo (UID Suluttenggo), has begun expanding electric vehicle charging infrastructure across Gorontalo.

PLN has activated four new Public Electric Vehicle Charging Stations (SPKLU) within the working area of UP3 Gorontalo, located at ULP Marisa, ULP Kwandang, ULP Limboto, and ULP Telaga.

With these additions, there are now a total of five PLN SPKLUs in Gorontalo, including the existing station in Gorontalo City.

This expansion is part of PLN's efforts to broaden access to EV charging, reaching beyond the city center into buffer regions.

Usman Bangun, General Manager of PLN UID Suluttenggo, stated that accessible charging infrastructure is a crucial element in building public confidence in electric vehicles.

All of these SPKLUs have also been integrated with the EV features on the PLN Mobile app.

In terms of infrastructure, foundational steps for electric vehicles are certainly being laid.

Yet, building SPKLUs does not automatically transform how people travel.

Across the streets of Gorontalo, electric vehicles remain an uncommon sight.

Even the EVs currently utilized by the government largely appear only for specific public services.

In Gorontalo City, for example, the local government has deployed 50 electric Motorized Garbage Carts (*gerobak motor* or *getor*) for waste collection at the neighborhood level.

Gorontalo Mayor Adhan Dambea stated that the procurement of this fleet was not merely driven by the pursuit of the Adipura environmental award, but rather as part of the government's responsibility to maintain city cleanliness.

These electric *getors* are managed by sub-district and village offices to assist with waste hauling.

Thus, while electric vehicles are present, they are far from becoming the primary face of mobility for the people of Gorontalo.

Bentor Drivers See No Electric Path Yet

This dilemma is felt most acutely by *bentor* drivers.

The Gorontalo Provincial Government notes that approximately 28,000 people rely on *bentor* driving for their livelihoods across the province.

Meanwhile, in Gorontalo City alone, the number of three-wheeled vehicles, or bentors, is recorded at around 3,220 units.

For these drivers, the most pressing concern does not even extend to replacing their vehicles.

Iwan Latif, Chairman of the Gorontalo Bentor Drivers Association (IPB), stated that drivers find it increasingly difficult for their daily earnings to keep pace with daily expenses.

A driver might bring in around Rp50,000 to Rp60,000 a day, but a significant portion of

that income must go toward fuel, meals, and other necessities.

Under certain conditions, after covering all expenses, the take-home pay can shrink considerably.

Spending around Rp30,000 to Rp35,000 a day on fuel alone already feels heavy for many drivers.

Driven by these economic pressures, he noted, some drivers struggle to meet administrative obligations and vehicle taxes.

Given such conditions, the discourse surrounding a transition to electric vehicles still feels a world away.

"As for this shift to electric motorcycles, it's only something we see in the media. It hasn't reached the grassroots level in terms of how it's used, its functions, benefits, or comparisons, we don't know any of that yet," he said.

According to him, drivers have yet to receive adequate information regarding the costs, benefits, or operational schemes of electric vehicles.

He also questions whether electric vehicles will truly lighten the drivers' burdens or simply create new expenses.

For *bentor* drivers, electric vehicles are not yet an easy concept to picture.

The issue goes beyond the price of the vehicle; it touches on how the vehicle can sustain their daily livelihoods.

He explained that they have no definitive knowledge of where to charge them, how much it will cost, or where to take the vehicles if they break down.

Such uncertainties make electric vehicles feel entirely disconnected from their immediate needs.

"Electric motorcycles are still a long way off, Sir. There's nothing like that yet," he said.

"We don't know where to charge them. If they break down, where do we fix them?" Iwan concluded.

This article was published in Tribun Gorontalo on September 5, 2026, and is accessible through the following link



https://gorontalo.tribunnews.com/provinsi-gorontalo/89809/di-kota-bentor-gorontalo-deru-motor-masih-menjadi-wajah-transportasi#goog_rewarded

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Nandito Putra

Nandito Putra began his journalistic career in 2022 as a reporter for Langgam.id in Padang, West Sumatra. In 2024, he joined Tempo, taking on reporting duties for the economy and energy sectors. He is also an active member of the Alliance of Independent Journalists (AJI) Jakarta.

Targeting 2030: How Jakarta is Preparing Its Electric Bus Fleet

The Jakarta Provincial Government has set a target for the entire Transjakarta fleet to transition to electric buses by 2030. What preparations are underway?

Nandito Putra



A Transjakarta electric bus arrives at Blok M Terminal, South Jakarta, May 27, 2026. (TEMPO/Ilham Balindra)

Jakarta has set sights on a fully electric Transjakarta fleet by 2030. Governor Pramono Anung emphasized that electrifying public transport is key to achieving the city's net-zero emissions goal by 2050.

Upgrading public transport and electrifying the Transjakarta fleet are key steps to drawing commuters away from private vehicles, according to Pramono. "We are accelerating our

green transition through the electrification of public transport," he stated on Thursday, August 27, 2026.

The politician from the Indonesian Democratic Party of Struggle (PDI-P) mentioned that Transjakarta currently operates 500 electric buses out of a total of 5,227 buses. The target is to scale up to 10,047 units by 2030, as outlined in Gubernatorial Decree Number 1053 of 2022.

PT Transjakarta President Director Welfizon Yuza stated that the company has prepared electrification phases to meet the 100% electric bus fleet target by 2030. Over the next four years, approximately 9,500 conventional buses must be transitioned. Consequently, Transjakarta estimates the need to add an average of 2,375 electric buses annually between 2027 and 2030.

According to Welfizon, electrification will be carried out gradually by aligning with the fleet rejuvenation cycles of operator partners. From 2026 to 2028, Transjakarta will rejuvenate around 3,300 partner-operated buses in accordance with contract terms. Investment for the rejuvenation of this entire fleet is estimated to reach Rp6.5 trillion.

The electrification roadmap covers fleet mapping, annual unit additions, and priority route designations. Transjakarta requires joint investments with operator partners to accelerate the procurement of electric buses.

The electrification stages will begin with low-entry buses, high-floor buses for main corridors, medium buses for non-corridor routes, and microtrans. For the initial phase, Welfizon stated that Transjakarta is prioritizing corridors with high passenger density and pollution levels, including Corridor 1 (Blok M–Kota).

Electric buses will be deployed on routes connected to main depots equipped with fast-charging facilities. "The roadmap toward 100% electrification by 2030 is designed in phases through fleet mapping, annual quantity additions, and route prioritization," Welfizon told *Tempo* via written response on Thursday, August 27, 2026.

DAMRI, one of Transjakarta's operators, is also preparing to add electric buses to support the electrification target. This year, DAMRI applied for a loan of approximately Rp672.53 billion from the Asian Development Bank (ADB) for the procurement of 99 electric buses and the construction of two charging stations.

Handhi Setiawan Adiputra, Coordinator for Land Transportation and Railways at the Directorate of Connectivity and Logistics Infrastructure at the Ministry of National Development Planning/Bappenas, stated that the loan proposal is still under discussion among the Ministry of Finance, Bappenas, and the ADB.

"The value is around US$37.5 million. They submitted the proposal to us, and we have provided a recommendation to the Ministry of Finance for it to be backed by government guarantees," Handhi said during a discussion on Public Transportation and Energy Transition held by the Institute for Transportation and Development Policy (ITDP) in Jakarta on Wednesday, August 5, 2026.

According to Handhi, financing from the ADB is attractive because it is part of a clean energy and emission reduction program. The loan carries an interest rate of 1–3% with a tenor of approximately 10 years.

DAMRI targets finalizing the loan contract agreement in 2027, followed by fleet procurement. In addition to DAMRI, three Transjakarta operators, PT Biro Perjalanan Wisata Pahala Kencana, PT Bayu Holong Persada, and Koperasi Jasa Angkutan Arief Rachman Hakim, are partnering with PT Kalista Nusa Armada (KALISTA Group) and PT Energi Makmur Buana (INVI) to accelerate the electrification of more than 10,000 Transjakarta buses by 2030.

KALISTA Group Business Development Director Yoga Adiwinarto stated that the collaboration utilizes a fleet-as-a-service scheme and a by-the-service business model. This framework is designed to overcome several electrification hurdles, particularly high initial investments, charging infrastructure needs, and the operational sustainability of electric buses.

Through the fleet-as-a-service scheme, Yoga continued, operators do not have to shoulder massive upfront investments. "KALISTA provides services through an operating lease model that covers vehicle selection, charging infrastructure installation, periodic maintenance, and operational support," he said, as quoted from a written statement.

ITDP Urban Mobility Manager Mizandaru Wicaksono stressed that the government must ensure the readiness of the electric bus ecosystem before realizing 100% electrification for Transjakarta. Currently, charging facilities are still primarily located at depots outside Jakarta, forcing buses to travel significant empty mileage just to recharge.

"It is important to underline that the target of 10,000 electric buses by 2030 includes not just large buses, but all types of Transjakarta fleets, including medium buses, small buses, and microtrans," Mizandaru said.

Unlike large buses, which generally have sufficient battery capacity to operate throughout the day, microtrans require midday recharges due to their more limited batteries. Therefore, Mizandaru urged the government to promptly provide opportunity charging facilities in easily accessible locations along active routes.

Terminals that serve as Transjakarta transit points, for example, could be utilized as charging locations so buses do not need to return to distant depots. To achieve this goal, the provincial government is encouraging investments in the electric bus charging ecosystem.

According to Made Jony, Head of Law Enforcement Section at the Jakarta Transportation Agency, limited charging infrastructure remains a primary challenge. Currently, charging facilities are largely confined to pools or depots located on the outskirts of Jakarta, thus making bus operations more complicated.

"This condition forces buses to return to pools situated relatively far from the city center just to recharge," Made said in a discussion with the Institute for Transportation Development, as quoted by *Antara*.

Made stated that idle land owned by the provincial government would be utilized to build charging stations closer to the city's active centers. Beyond utilizing vacant land, the provincial government is evaluating other strategic locations for charging stations, such as Pulogebang, Kampung Rambutan, Ragunan, Pinang Ranti, and Ancol terminals.

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https://www.tempo.co/ekonomi/transjakarta-ganti-seluruh-armada-dengan-bus-listrik-pada-2023-2284210

The Financial Reality of Transjakarta's Electric Fleet Target

Transjakarta berencana mengganti semua armada dengan bus listrik pada 2030. Benarkah lebih irit?

Nandito Putra



A lineup of Transjakarta electric buses was parked at the National Monument, Jakarta, in December 2024 TEMPO/ M.Taufan Rengganis.

As Jakarta races toward its 2030 target of electrifying the entire Transjakarta fleet, the big question is whether the math behind the transition truly adds up to long-term savings. PT Transjakarta President Director Welfizon Yuza projected that the full deployment of electric buses can lower operational costs compared to diesel buses. By 2030, Transjakarta is targeted to operate around 10,000 buses, spanning main corridor buses, feeder buses, and microtrans.

According to Welfizon, the operational cost per kilometer for electric buses is generally lower than that of diesel buses, with efficiencies primarily stemming from energy and maintenance savings. Calculated based on the Total Cost of Ownership (TCO) across the vehicle's lifespan, electric buses are estimated to be 5% more efficient than conventional buses.

"Additionally, bus electrification is projected to save around 120 million liters of fuel and reduce emissions by up to 277,000 tons of CO2 annually," Welfizon told *Tempo* via a written response on Thursday, August 27, 2026.

However, these cost-saving efforts must contend with significantly higher upfront capital requirements. The price of a single electric bus currently exceeds double that of a diesel bus. To pursue the 2030 electrification target, Transjakarta will align with the fleet rejuvenation cycles of operator partners from 2026 to 2028 in accordance with contract terms.

Welfizon estimates that rejuvenating approximately 3,300 existing buses across all services will require an investment of around Rp6.5 trillion. Despite the higher purchase price of electric buses, Transjakarta continues to utilize a rupiah-per-kilometer procurement mechanism with its operating partners.

According to Welfizon, the difference in investment costs will be mitigated through financing scheme adjustments. The cost structure makes the rupiah-per-kilometer rate for electric and diesel buses relatively balanced at present. Electric buses require higher capital expenditure but feature lower operating costs, particularly for energy and maintenance.

This efficiency, Welfizon noted, can offset the higher initial investment over the vehicle's operational lifespan. "When calculated based on total cost of ownership, the cost per kilometer for electric buses remains competitive compared to diesel buses," he stated.

Institute for Transportation and Development Policy (ITDP) Urban Mobility Manager, Mizandaru Wicaksono, stated that financing schemes are key to accelerating electrification, particularly within the microtrans segment, which is largely managed by cooperatives with limited capital capacity.

According to Mizandaru, electric bus prices remain 2.5 to 3 times higher than diesel buses. Although overall ownership costs can be lower, the high upfront investment remains a barrier for operators.

Consequently, ITDP recommends leasing schemes for microtrans, covering both vehicles and depot or charging infrastructure. ITDP is also exploring a by-the-service model and concession schemes that shift initial investment risks from operators to entities with greater capital capacity.

"The high cost of initial investment is not a reason to delay electrification, but rather a signal that more suitable financing mechanisms are needed," Mizandaru remarked.

Beyond financing, vehicle utilization rates determine the economic viability of electric vehicles. A 2023 study by the International Council on Clean Transportation (ICCT) indicates that electric buses are more economical when deployed on routes with high operational activity.

ICCT Indonesia researcher Aditya Mahalana stated that electric buses need to be prioritized on routes with high demand and high mileage. Based on ICCT research, an electric bus operating around 71,000 kilometers per year still requires additional incentives to achieve ownership costs that are lower than conventional buses. If mileage increases to 80,000 kilometers per year, the cost gap with diesel buses narrows further.

The research also shows that deploying electric buses on routes with 13% higher activity can reduce TCO by up to 9% per kilometer. The higher the utilization rate, the greater the opportunity for the initial electric bus investment to be offset over its operational lifespan.

Institute for Essential Services Reform researcher Deon Arinaldo stated that Transjakarta electric bus operational costs can be lower by around Rp500 per kilometer compared to diesel buses, assuming an electricity tariff of Rp2,400 per kilowatt-hour (kWh). "Without any incentives, the total cost of ownership for diesel and electric buses is already on par, at around Rp18,000 per kilometer," he said.

According to Deon, government fiscal support can make the economics of electric buses even more compelling. For instance, exempting the motor vehicle title transfer fee (BBNKB) and motor vehicle tax (PKB) can significantly slash ownership costs.

"Exempting BBNKB and PKB, for instance, has already driven down the TCO of electric buses drastically to Rp10,400 per kilometer. This represents a saving of around Rp7,600 per kilometer compared to a 10-year operational period," Deon said.

Deon noted that these calculations are based on current price and technology conditions. Declining battery prices and the evolution of electric vehicle technology hold the potential to drive ownership costs even lower. In addition to cutting operational costs, bus electrification has the potential to reduce diesel consumption and imports while boosting the growth of domestic electric vehicle and battery industries.

"Government savings will primarily stem from reduced diesel imports. Furthermore, there is potential to spur the growth of domestic battery and bus industries while improving Jakarta's air quality," he concluded.

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Mafa Yulie Ramadhani

Mafa Yulie Ramadhani is a journalist, freelance photographer, and media photographer based in Medan, North Sumatra. With around 10 years of experience in journalism, she focuses on visual-driven reporting, human interest, features, photo stories, and data journalism.

Mafa also contributes as a writer and photographer for Project Multatuli, with a keen interest in public issues, vulnerable groups, inclusivity, the environment, disaster management, transportation, and the energy transition. She is drawn to stories that bridge policy issues with everyday human experiences, particularly the impacts on those in vulnerable positions.

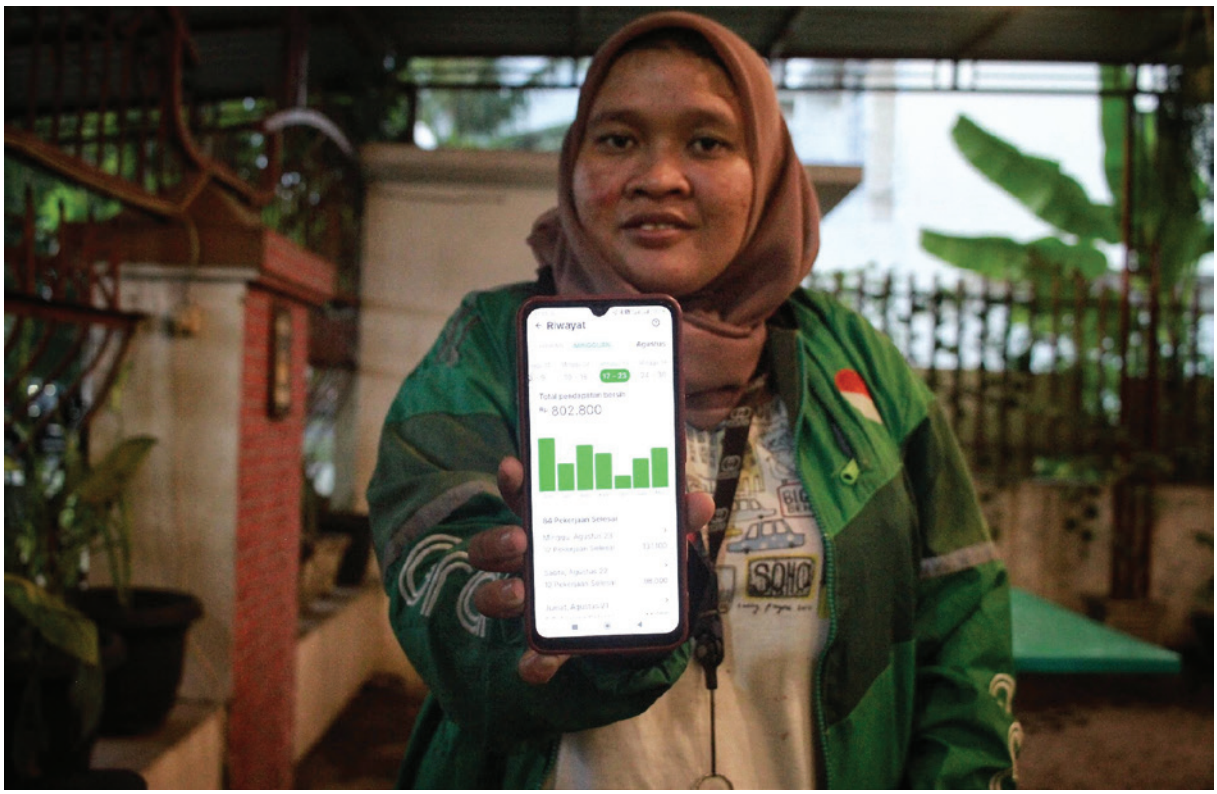
As a freelance photographer, Mafa develops documentary photography and visual storytelling practices for various editorial needs and personal projects. She combines the power of photography, field observation, data, and interviews to build narratives that are not only informative but also deeply connected to human experiences.

Mafa is active in the Indonesian Female Journalists Forum (FJPI) and the Indonesian Photo Journalists (PFI), and is involved in the Galeri Pejalan Foto photography community.

In her journalistic work, Mafa views photography not merely as a medium to record events, but as a way to bring forward the perspectives and voices of those who are often unheard.

Who Pays for the Hidden Price When Ride-Hailing Goes Electric

Maya Yulie Ramadhani



Asmidar Siregar (31), an online motorcycle taxi driver and health worker, shows a chart of her weekly earnings in Medan, North Sumatra. Despite her fluctuating daily income, she still has to pay the rental costs for her electric motorcycle and cover operating expenses. (Photo by Mafa Yulie)

At six in the morning, when some people are just starting their day, Asmidar Siregar is already out on the road. An electric motorcycle serves as her work companion before she changes into a uniform to do her job as a healthcare worker in Deli Serdang, North Sumatra.

The 31-year-old woman is accustomed to splitting her day between two jobs. From 6:00 to 9:00 AM, she takes on passengers on her motorcycle taxi through the ride-hailing app until night. Afterward, she becomes a healthcare worker at a community health center (Puskesmas) with government-contract (P3K) status until 1:00 PM. Leaving the

Puskesmas, Asmidar returns to the road and takes orders from the ride-hailing customers, sometimes even later when ride orders keep coming in.

“Sometimes I work on the road until 1 AM, that’s the longest hour,” she said.

For Asmidar, the electric motorcycle is not just a means of transportation, but also a tool to supplement her income, help her parents, and support her future plans. Working as an online motorcycle driver gives her an average of Rp2.5 to 3 million in additional income per month.

She usually gives her income to her parents, saving the rest. Asmidar also dreams of buying and renting out several electric motorcycles to other drivers.

Yet, behind that lies something she must calculate every day: how long can the electric motorcycle be used for work before its battery needs to be recharged?

On Saturday, August 22, 2026, Asmidar began accepting orders around 10:07 AM. Out of 15 incoming orders, 12 were completed, and three were canceled. The recorded distance during her observation reached 39.06 kilometers. Gross earnings from her trips reached Rp90,000, while she earned Rp58,000 in tips.



Asmidar Siregar (31) picks up a passenger using a rented Polytron electric motorcycle in Medan, North Sumatra. While being a healthcare worker, Asmidar moonlights as an online motorcycle taxi driver to supplement her income. (Photo by Mafa Yulie)

After deducting operational costs of Rp9,000 and a motorcycle rental fee of Rp55,000 per day, Asmidar's recorded net income came to Rp84,000.

The following day, her earnings were slightly better. She was able to complete 12 out of 15 orders with a travel distance of 47.17 kilometers. Gross earnings reached Rp131,000, plus Rp30,000 in tips. After deducting Rp1,000 for parking and Rp55,000 for vehicle rental, her net income was Rp105,000.

But there is another figure that also appeared in the field notes: unproductive time.

On the first day, Asmidar estimated that about 1.5 to 2 hours were spent resting while charging the battery. On the second day, about two hours were spent on the same activity.

That time cannot entirely be called lost time due to battery charging. Asmidar indeed used part of her time to rest. However, for drivers whose income depends on orders, every hour the vehicle is non-operational still holds economic value.

This is where the cost of electric vehicles begins to appear in a different form. It is not just the rupiah exiting the wallet, but also productive time that cannot be used to accept orders.

Asmidar has actually been familiar with electric vehicles for quite some time. Before using her current Polytron motorcycle, she had used an electric motorcycle provided by the ride-hailing platform under a daily rental scheme.

Experience left behind some unpleasant memories

"Before I used this Polytron electric motorcycle, I used to use one from the ride-hailing platform. All my time was wasted just charging the battery," she said.

The problem is not just waiting for the battery to charge, but also the condition of the battery during a swap. If the battery is in good condition, the vehicle can be put back to use. But if its power performance has already degraded, the attainable mileage becomes an issue.

She even chose at times not to swap batteries and instead brought along one she considered still good to charge at home.

“If the battery we get during a swap turns out to be weak, well, it’s just luck of the draw,” she said.

The same experience is shared by other drivers. An online motorcycle taxi driver who declined to be named said that queues to charge or swap batteries can last for hours.

“This is how it is for us when we queue up to charge batteries. Just see for yourself, some people even end up sleeping there. Sometimes it takes up to four hours, only for charging, while we still have daily rental fees to pay,” he said.

Complaints about batteries and wait times emerged as a key finding in the field observations. At several points, available battery swapping or charging facilities remain limited. Not all slots are operational. Consequently, drivers must wait when the number of users exceeds available facilities.

For online motorcycle taxi drivers, waiting in line is not merely a matter of convenience. Their income depends on the vehicle moving and orders being completed. When the vehicle stops, the opportunity to secure orders stops with it. Yet, the obligation to pay vehicle rental fees keeps ticking.



Asmidar Siregar (31) wears her uniform as a healthcare worker before returning to work as an online motorcycle taxi driver in Medan, North Sumatra. She frequently changes clothes in a gas station (SPBU) restroom before continuing her work of transporting passengers on her electric motorcycle. (Photo by Mafa Yulie)

Asmidar chose to leave the previous scheme and use a Polytron motorcycle under a scheme she finds more manageable. She pays Rp55,000 per day, Rp10,000 cheaper than the Rp65,000 daily fee she previously paid to rent a vehicle from the ride-hailing platform.

According to her, if payments run smoothly for two years, the motorcycle can become hers. However, she also noted the risk of battery costs. If a battery is damaged and needs to be replaced, she estimates the replacement cost to be around Rp20 million.

This difference in schemes shows that the transition to electric vehicles does not have a single model that works for all drivers. Some rent vehicles, some use a gradual ownership scheme, some swap batteries at public facilities, while others can charge their batteries at home.

The Hidden Costs of a Cleaner City

The shift to electric vehicles is becoming part of the strategy for app-based transportation companies in Indonesia. For ride-hailing platforms, electrification is no longer just a technological experiment, but part of an effort to transform a mobility system that has long relied on fossil fuels.

In 2021, Gojek stated its ambition to transition all cars and motorcycles within its ecosystem to electric vehicles by 2030. Speaking to Reuters at the time, Gojek Co-CEO Kevin Aluwi stated that the company would partner with vehicle manufacturers and explore leasing schemes to drive the transition. However, from the outset, issues of cost and charging infrastructure have posed ongoing challenges.

Five years later, electric vehicle expansion is increasingly visible at Grab. By June 2026, the number of electric vehicles operated by Grab partners in Indonesia reached approximately 28,000 units, double the previous year's figure of around 14,000 units. The government hopes this number will reach 42,000 units by the end of 2026.

For the government, this growth is part of an effort to accelerate the transformation toward cleaner transportation. Coordinating Minister for Infrastructure and Regional Development Agus Harimurti Yudhoyono noted that transport electrification aligns with Indonesia's target to achieve Net Zero Emissions by 2060 or sooner. He also emphasized the importance of building supporting infrastructure, including electric vehicle charging stations.

This push is taking place as cities continue to grapple with emissions and air quality issues, not least in Medan.

On July 17, 2024, Medan ranked as the city with the third-worst air quality in the world according to morning monitoring by IQAir, recording an Air Quality Index (AQI) of 157. Over two months later, on September 29, 2024, Medan re-entered the top ten cities with the worst air quality, ranking ninth with an index of 107. While these figures capture air quality snapshots at specific times rather than reflecting Medan's year-round conditions, their recurrence highlights air quality as an ongoing environmental challenge for the city. On the roads, motor vehicles are a major source of emissions. Consequently, shifting the energy source of transportation forms a key part of the agenda to reduce fossil fuel dependency.

Electric vehicles offer the most visible change: no direct tailpipe emissions as the vehicle moves.

But that transformation does not stop at the vehicle. There are people who must drive them every day. To a passenger, an electric motorcycle may simply feel quieter and smoke-free. To a driver, the vehicle is a tool of trade. It must be ready when an order comes in, hold a charge when a trip begins, and ideally not consume time that should be spent finding passengers.

At this exact intersection, the statistics of electric vehicle growth begin to tell a different story.

Asmidar Siregar is one of the drivers caught right in the middle of that transformation. While working as a ride-hailing driver, there are times when the vehicle generates no income. The battery needs charging. The body needs rest.

Cities want cleaner transportation. Companies are pushing for electrification. Governments have embedded it into their energy transition agendas. But out on the streets, it is the drivers who must carry out this shift, while ensuring the vehicle still allows them to earn a living.

Because of this, the success of the energy transition cannot be measured solely by how many gasoline-powered vehicles have been replaced by electric ones.



Several online motorcycle taxi drivers queue to swap electric motorcycle batteries at a Public Electric Vehicle Battery Swapping Station (SPBKLU) in Medan, North Sumatra. For drivers, the existence of SPBKLU is a crucial part of keeping their motorcycles running amidst the heavy activity of finding passengers. (Photo by Mafa Yulie)

Another question remains: who bears the cost when the vehicle cannot be used to earn an income?

For drivers whose earnings depend on the number of orders and the hours spent on the road, time is not just a duration. Time is a part of their income.

This is where the growth of electric vehicles conceals issues that do not always show up in fleet size statistics.

Currently, Grab provides electric vehicles through its GrabRental scheme. This model opens up opportunities for people who do not own a vehicle to still become driver-partners. Yet, at the same time, electric vehicles become part of the economic relationship between the platform, the vehicle provider, and the driver.

The costs of the energy transition do not solely take the form of vehicle or battery prices. There are costs that are much harder to calculate: the time when the vehicle cannot be

used to accept orders because it must be charged, limited charging facilities, and battery conditions that are not always optimal.

All of that may never appear in reports on electric vehicle growth.

But for drivers, waiting time carries an economic value.



The screen of a battery swapping machine at a Public Electric Vehicle Battery Swapping Station (SPBKLU) in Medan, North Sumatra, shows five empty slots and three slots currently being used to charge batteries. This condition is one of the hurdles faced by online motorcycle taxi drivers. When their batteries run out and need to be swapped, available batteries are not always ready for use because a number of charging slots are damaged and inoperable. (Photo by Mafa Yulie)

Therefore, the success of the energy transition on the road cannot be measured solely by how many gasoline-powered vehicles have been replaced by electric ones. Fleet size is certainly important to gauge how far technological change has progressed. Yet that figure still fails to answer whether the shift also makes a driver's livelihood more viable.
There is a paradox here.

Cities need vehicles that produce fewer emissions. Companies are pushing for the adoption of more sustainable fleets. Governments require cleaner transportation. Meanwhile, drivers need vehicles that allow them to keep earning a living.



Several electric motorcycle batteries were seen queued to be inserted into charging terminal slots at a Public Electric Vehicle Battery Swapping Station (SPBKLU) in Medan, North Sumatra. Online motorcycle taxi drivers should take turns to charge these batteries before using them again, illustrating how heavily their mobility depends on the availability of battery-swapping and charging infrastructure. (Photo by Mafa Yulie)

Thus, the question of the energy transition does not stop at what comes out of the tailpipe, or, in the case of electric vehicles, the absence of tailpipe smoke.

The questions are also: what happens behind the steering wheel? Do drivers have access to electric vehicles without bearing an excessively heavy rental burden? Is charging infrastructure available when they need it? Who bears the cost of the time when batteries must be charged? And are there schemes that ultimately allow drivers to own the vehicles they use for work?

These questions matter because the energy transition is not merely a technological shift. It also reshapes how cities move, how companies conduct business, and how workers make a living.

Medan needs cleaner transportation. Yet that transformation will lose part of its meaning if the cost is largely shifted onto the very people who drive these vehicles every day.

Asmidar is not thinking about the energy transition when she sets off for work. She simply turns on her vehicle, waits for orders to come in, drops off passengers, charges the battery, and goes back out to look for more orders.

Yet out of that exact routine, a larger issue emerges: a city can calculate how many electric vehicles are on the road, but it does not necessarily calculate how much working time is lost alongside the battery-charging process.

Therefore, the challenge of the energy transition is not just about swapping gasoline engines for electric motors.

The challenge is ensuring that as cities become cleaner, the people driving that change do not end up paying a heavier price. Every one of these choices carries its own cost.

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On the same road, Yunus Montana, 72, still relies on a conventional motorcycle to make a living.

For Yunus, keeping those physical limits in check is a daily consideration. He continues to work almost every day, but prefers not to push himself too late into the night.

“Atok never takes a day off. Every single day, Atok works on the road,” he said, speaking about himself with the nickname *Atok* (grandpa in the local language), as he is fondly called.

On Saturday, August 22, Yunus worked for 13 hours. He received 26 orders, but only completed 12 trips. His travel distance reached 49.3 kilometers. Gross earnings were Rp122,000, with Rp35,000 in tips.

That day, he spent Rp25,000 on fuel and Rp30,000 on food, drinks, and cigarettes. The net income he recorded reached Rp102,000.

On Sunday, August 23, his earnings improved. Out of 28 incoming orders, 20 were completed. His travel distance reached 58.4 kilometers. Gross earnings hit Rp210,000, plus Rp56,000 in tips. After fuel costs of Rp35,000 and operational expenses of Rp26,000, his net income was recorded at Rp205,000.



Yunus Montana (72) shows his daily earnings through his online motorcycle taxi driver account in Medan, North Sumatra. At 72 years old, Yunus still works as an online motorcycle taxi driver to earn an income, with his daily earnings depending on the number and value of the orders he receives. (Photo by Mafa Yulie)

During each day of the observation, Yunus also experienced about three hours of unproductive time.

These two drivers certainly cannot be used as a sample to conclude which vehicle is more profitable. The observation was only conducted over two days for each driver, under differing working conditions, ages, operating hours, and vehicle schemes.

Yet, that comparison helps illustrate one thing: energy costs do not stand alone.

With a conventional motorcycle, the energy cost is plainly visible in the form of fuel purchases. With an electric motorcycle, the energy cost can be harder to spot because a portion of the burden shifts into charging time, reliance on infrastructure, battery condition, rental fees, and the risk of component replacement.

In other words, an energy-efficient vehicle does not automatically make a driver's entire working system easier.

Deon Arinaldo, Director of the Energy System Transformation Program at the Institute for Essential Services Reform (IESR), stated that the time spent charging or swapping

batteries causes drivers to lose working opportunities, which can indeed be viewed as a cost.

According to him, this issue is especially crucial for online motorcycle taxi drivers because the vehicle is their tool of production.

“If that is the real condition right now, then it becomes a cost for them,” he said.



Yunus Montana (72) picks up a food order he received through his online motorcycle taxi app in Medan, North Sumatra. Despite his advanced age, Yunus still works every single day to meet his living needs. For Yunus, the streets and customer orders are a part of his daily routine to keep earning a living.
(Photo by Mafa Yulie)

Deon himself is an electric vehicle user and has experienced both direct charging and battery-swapping systems. In his view, infrastructure issues indeed pose a greater challenge for users in regions where EV adoption and swapping facilities remain limited.

Such conditions, he argued, must be viewed as systemic ecosystem challenges rather than solely the user’s problem.

Battery quality is also a crucial component. In a swapping system, drivers do not choose the batteries they use themselves. The batteries operate within a managed system overseen by the service provider.

Therefore, Deon believes manufacturers or system operators bear the responsibility of ensuring minimum performance standards and monitoring battery health.

Battery management, according to him, should also not stop at simply replacing batteries whose performance has degraded. With available technology, battery conditions can be tracked and specific issues identified early on.



Several electric motorcycles are queued at a charging station in Medan, North Sumatra. Five electric motorcycles are seen waiting their turn, while only two charging units are available. Infrastructure hurdles make waiting time a part of the daily routine for drivers who rely on electric motorcycles to work. (Photo by Mafa Yulie)

This issue is crucial because drivers occupy a relatively weak position in that chain. They do not manufacture the vehicles, do not set battery standards, do not determine the number of swapping stations, yet they are the ones who must use these vehicles to chase daily earnings.

At this exact juncture, the question of who pays the price of the energy transition becomes relevant.

If the government pushes for electric vehicle adoption through incentives, policy success cannot be judged solely by the number of electric vehicles sold.

For online motorcycle taxi drivers, the measure of success must extend to their everyday lives: whether operational costs genuinely decrease, whether productive time increases or decreases, whether battery quality is guaranteed, whether infrastructure is available when needed, and whether drivers have protection when vehicles or batteries encounter problems.



An online motorcycle taxi driver inserts an electric motorcycle battery into a charging slot at a Public Electric Vehicle Battery Swapping Station (SPBKLU) in Medan, North Sumatra. Battery swapping and charging have become part of the driver's routine to keep the vehicle operational amidst the hustle of finding passengers. (Photo by Mafa Yulie)

Deon suggests several approaches. One of them is expanding financing support so drivers are not solely dependent on daily rental schemes. Financing through direct leasing with manufacturers, for instance, can provide drivers with the room to pay for vehicles on a monthly basis.

According to him, the government can also use incentives not just to create demand for electric vehicles, but simultaneously to drive up vehicle performance standards and infrastructure development.

A just transition, Deon says, requires at least transparency regarding the process of change

and the identification of the groups most affected.

Online motorcycle taxi drivers are among the groups that need to be accounted for because they use vehicles not merely to move from place to place, but to sustain their livelihoods.

If the energy transition aims to reduce dependency on fossil fuels, drivers also need a pathway to make that shift without losing their ability to earn a living.

Asmidar herself is not closed off to that change.

In fact, she views electric vehicles as part of her future. She divides her income as a driver between family needs and savings. One day, she hopes to own two electric motorcycles and rent them out to other drivers.

“Slowly, maybe later I’ll buy two units first, so it can grow bit by bit,” she says.

That aspiration reveals another side of the energy transition. For workers like Asmidar, an electric vehicle is not just new technology or a symbol of emission reduction. It can be a vehicle for building assets and improving one’s life.

But the road to get there must not be placed entirely on the shoulders of the drivers.

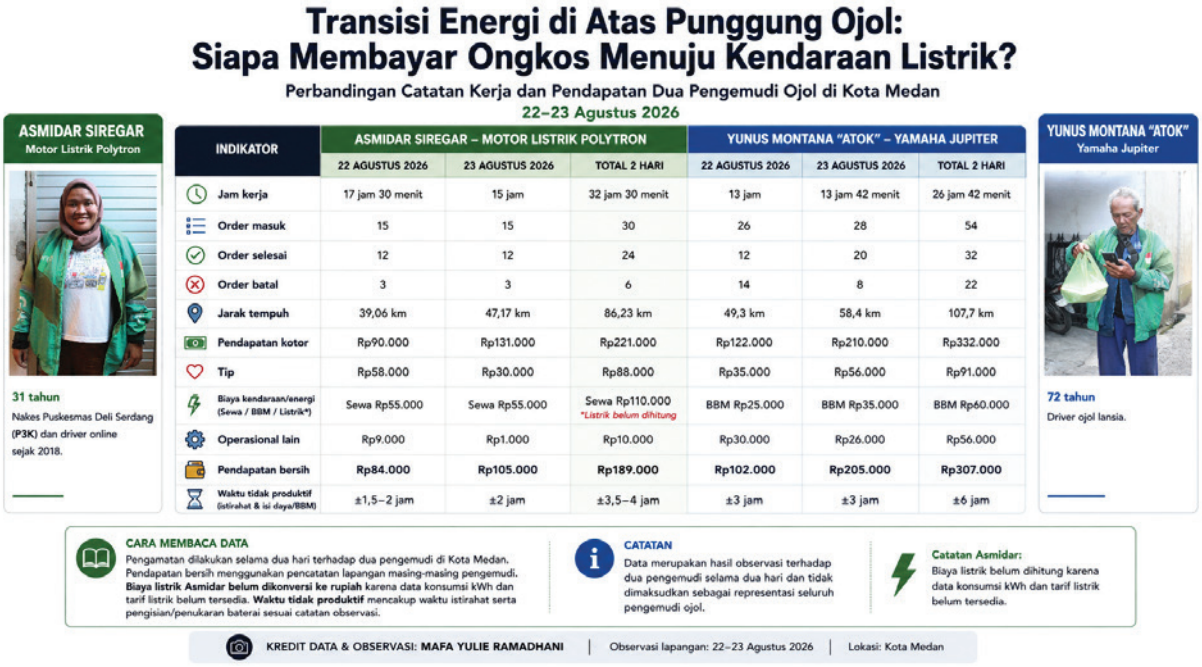
Because when batteries have to be waited on, when charging stations are limited, when vehicles must be rented every day, when the swapped batteries are not always in prime condition, and when waiting time means lost opportunities to accept orders, there is a cost that is invisible in the price of electricity.

That cost is paid in time.

And for online motorcycle taxi drivers, time is income.

Therefore, the biggest question in the electric vehicle transition is not merely how many gasoline motorcycles have been successfully replaced by electric ones.

The question is: as Indonesia moves toward cleaner energy, are the ride-hailing drivers riding those vehicles also moving toward a more prosperous life, or are they once again left bearing the cost of change entirely on their own shoulders?



Comparison of Work Records and Income of Two Motorcycle Drivers in Medan City, August 22-23, 2026

A two-day observation table comparing two online motorcycle taxi drivers in Medan, North Sumatra, using different vehicle types: a conventional motorcycle and an electric motorcycle. The observation was conducted on the same days and dates to compare working hours, number of orders, travel distance, earnings, operational costs, and unproductive time experienced by each driver.

Over the two days of observation, Asmidar and Atok both spent hours on the road. Yet the costs of keeping their vehicles moving differed. With the electric motorcycle, part of the cost did not appear as money spent daily, but rather as time spent waiting for the battery.

This article was published on Tobasatu.com on September 2, 2026. It is accessible through the following link:

https://www.tobasatu.com/2026/09/02/transisi-energi-di-atas-punggung-ojol-siapa-membayar-ongkos-menuju-kendaraan-listrik/



Teguh Adi Prasetyo

Teguh Adi Prasetyo is a multiplatform journalist whose work is published across BTV, Beritasatu, Investor Daily, and Jakarta Globe (B-Universe), focusing personally on socio-political issues, humanism, and social dynamics. Through the ICCT x AJI collaborative program, he connects energy transition issues with tangible social impacts through an editorial titled “Transport Pollution Causes One Premature Death Every 12 Minutes.”

How Traffic Pollution is Silently Harming Indonesia's Children

Teguh Adi Prasetyo

For Nurlela (38), keeping her child healthy is no simple matter. Living in the Manggarai area of South Jakarta, she must split her attention between working as a domestic helper and caring for her five-and-a-half-year-old child, who frequently suffers from shortness of breath.

Manggarai is one of Jakarta's major mobility hubs. Heavy traffic blends with ongoing construction activities every day. This environment is an inescapable part of Nurlela's daily routine.

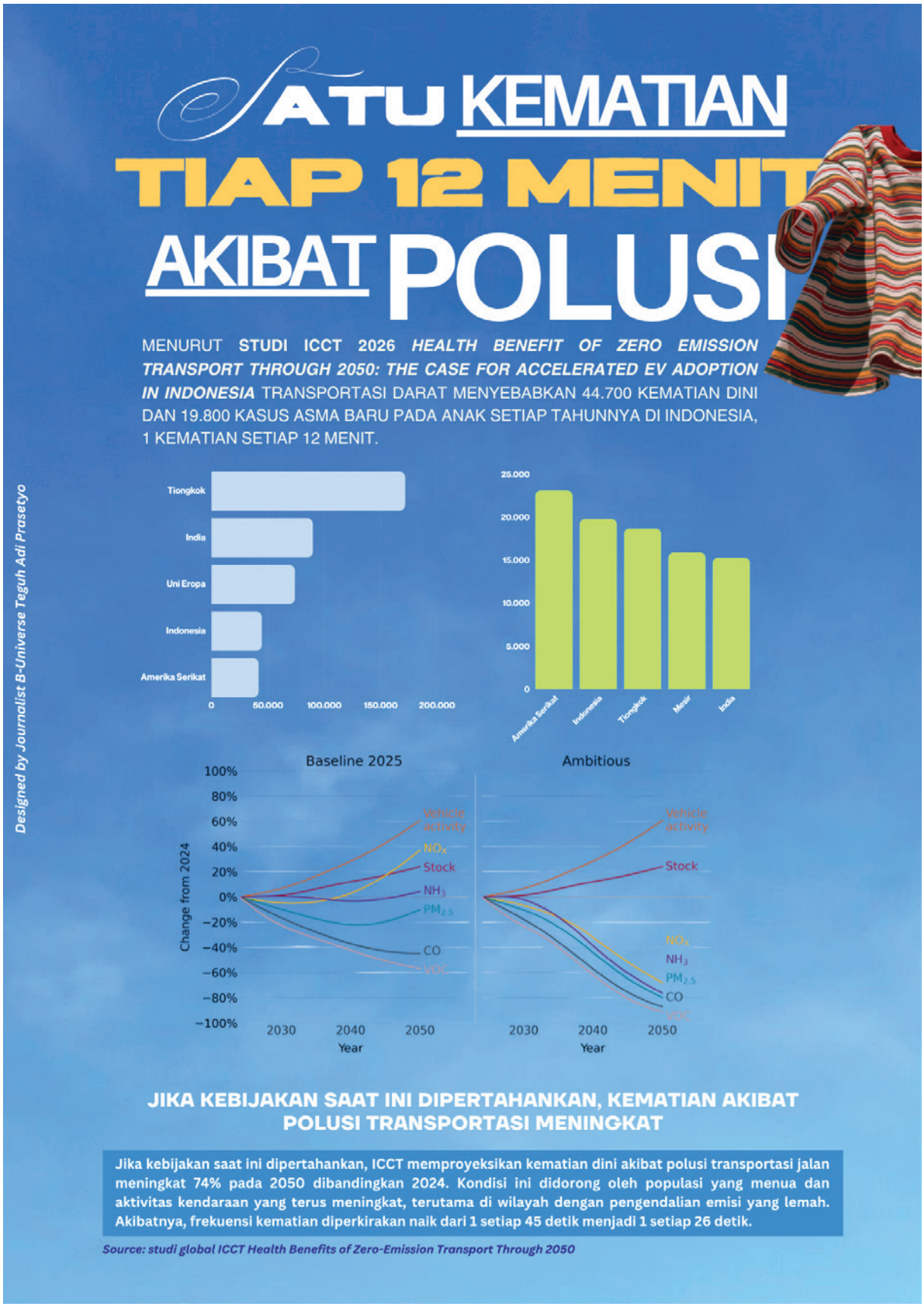
Her husband works as an online motorcycle taxi driver. While Nurlela is at work, the family's grandmother or aunt takes care of her child. In such situations, constant supervision of environmental conditions and the child's habits is not always possible.

"Honestly, as a parent, I can't call this a burden because this is my child. But if you ask whether my work gets disrupted, yes, it does, especially since my child is still five years old. Inevitably, I have to check in with the doctor or give my child a nebulizer, and I try to keep my child away if my husband is smoking," Nurlela told *Beritasatu.com* at her home in the Manggarai area, South Jakarta, on Saturday, August 22, 2026.

Whenever her child needs medical treatment or a nebulizer session, Nurlela's daily routine gets upended. She also strives to shield her child from cigarette smoke and air pollution.

Nurlela's story illustrates how air quality directly intersects with children's health in Jakarta.

This issue grew increasingly poignant in August 2026. During the presentation of the 2027 State Budget by President Prabowo Subianto on August 14 and the 81st Independence Day celebrations of the Republic of Indonesia on August 17, Jakarta's air quality was recorded in the unhealthy category based on IQAir monitoring.



Infographic of results from ICCT Global Study on "Health Benefits of Zero-Emission Transport Through 2050"

Yet, the impact of air pollution does not stop at daily air quality figures. The exposure is prolonged, weighing heaviest on vulnerable groups such as children.

A recent study by the International Council on Clean Transportation (ICCT) titled *Health Benefits of Zero-Emission Transport Through 2050* highlights the massive health toll exacted by road transport emissions.

In Indonesia, for instance, road transport emissions in 2024 were estimated to be linked to approximately 44,700 premature deaths and 19,800 new cases of childhood asthma. This averages out to one premature death every 12 minutes and one new case of childhood asthma every 26 minutes.

These figures stem from modeling that connects vehicle emissions with air quality and health impacts. Consequently, individual cases cannot be definitively attributed solely to vehicle emissions.

The ICCT also found that emission sources vary by vehicle type. Two- and three-wheeled vehicles account for roughly 14% of transport energy consumption, yet contribute heavily to specific pollutant emissions, including volatile organic compounds (VOCs) and carbon monoxide (CO). Therefore, emission control policies must be tailored to the characteristics of each emission source rather than relying on a one-size-fits-all approach across all vehicle types.

Under the 2025 Baseline scenario, assuming only current policies are maintained, the ICCT projects that premature deaths from road transport pollution will surge globally by 74% by 2050 compared to 2024. Meanwhile, the frequency of deaths caused by transport pollution will shift from roughly one death every 45 seconds in 2024 to one every 26 seconds by 2050.

This projected increase is set to occur even as emissions of most pollutants decline. The driver behind this trend is an aging global population paired with continuous growth in vehicle activity, which expands the pool of individuals vulnerable to pollution impacts, particularly in regions with weak emission controls.

An Invisible Threat to Children

Novita Natalia Kusumawardani, co-founder of the clean-air organization Bicara Udara, warns that air pollution exposure, particularly to fine particulate matter known as PM2.5, can trigger long-term health consequences for children.

"From a health standpoint, PM2.5 cannot be filtered out by nasal hairs. So when it enters the body, the impact on children is prolonged. It might start with a cough, a cold, acute respiratory infection, or similar conditions. But when a child is sensitive, those complications can escalate into pneumonia," Novita told *Beritasatu.com* following the Indonesia Net-Zero Summit 2026 media briefing at Mayapada Tower, South Jakarta, on Thursday, July 30, 2026.

According to Novita, the impact of air pollution on children goes beyond worsening air quality over a matter of days. Continuous exposure can trigger respiratory disorders, particularly because children are still in their critical growth and development phases.

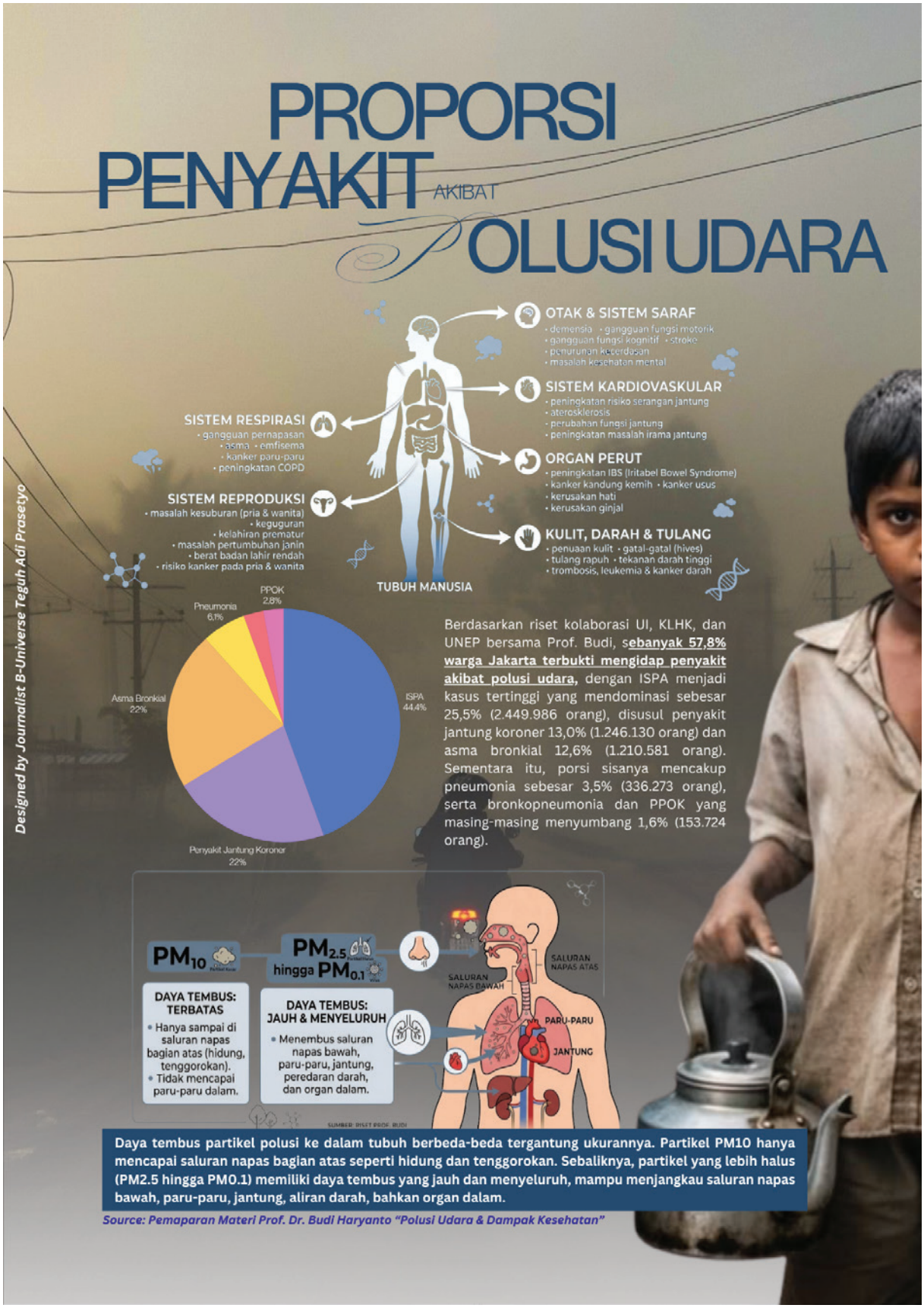
Novita also pointed to research by Universitas Indonesia public health expert Budi Haryanto regarding the correlation between children's daily activity locations and their risk of respiratory issues.

"There is research from Prof. Budi showing that children who go to school close to roadside areas suffer from acute respiratory infections at much higher rates compared to children whose schools are tucked away inside residential complexes," Novita said.

Professor and lecturer at the Faculty of Public Health, Universitas Indonesia, Budi Haryanto, explained that children are far more vulnerable to the hazards of air pollution because their organs and immune systems are still developing, compounded by high levels of physical activity.

"Why are children still the most vulnerable? Because, as mentioned, everything [in their bodies] is still growing. Their immune system is still under development," Budi said during his presentation at the ICCT media briefing in the Menteng area, Central Jakarta, on Tuesday, August 4, 2026.

Budi added that the high frequency of breathing when children are active multiplies the volume of polluted air inhaled into their lungs.



Infographic on Prof. Budi Haryanto's Presentation on Illnesses Caused by Air

"Children are very active. While normal breathing is about 20 times a minute, when they are active, the frequency can jump to 30-40 times, even up to two to three times higher when running or riding a bicycle. Imagine what enters the lungs: more pollutants, and much faster," he explained.

Regarding the hazards of inhaled PM2.5 particulates, Budi emphasized that their microscopic size allows pollutants to penetrate vital organs more deeply.

"PM2.5 is a metric used to observe deeper effects, both in the lungs, which can then enter the heart, circulate throughout the body, and deposit. Over time, long-term exposure will cause various diseases," he elaborated.

The impact, Budi noted, goes beyond short-term respiratory disorders to include long-term risks threatening children's futures.

"It relates to brain development, subsequent declines in lung function, and these children can even develop cancer. There are chronic lung diseases, heart diseases, and even strokes. So it is no longer just an adult issue. Since the exposure is high, this has become a serious problem for children," Budi stressed.

The study *Air Pollution and School Children Respiratory Diseases in Indonesia: A Cohort Study,* published in the *ASM Science Journal* (2020), examined 392 students from 25 elementary schools in Jakarta over 90 days. The findings revealed that air pollution is linked to the risk of various respiratory symptoms in children, including sore throats, coughing, phlegm, and nasal congestion or runny noses.

Confirming the research findings regarding areas with poor air quality, Budi highlighted, "What we found is that in high-pollution areas, the frequency of these illnesses, including asthma, is much higher. It can be six to seven times greater compared to those living in low-pollution regions."

Jakarta and the Transportation Burden

As a high-mobility city, Jakarta faces immense challenges in curbing emissions from its transportation sector.

Hendry Sampurna, Head of Road Traffic Management at the Jakarta Transportation Agency, stated that the regional government is actively working to expand the electrification of public transportation.

"This electrification of public transportation is what we are currently implementing. Right now, 1,160 electric units are operational. Furthermore, we have a target to reach 10,000 vehicles by 2030."

However, these efforts face limitations, ranging from regulations on emission standards and fuel quality to vehicle ownership policies that fall under the authority of the central government.

"At the regional government level, we can only implement emission testing. We have prepared regional regulations stipulating that only vehicles under 15 years old are permitted to enter Jakarta. The main issue does not lie with Jakarta as the implementer. The core issue rests within the ministries. We cannot forbid people from owning vehicles, but how do we regulate the types of vehicles and so on. Those Norms, Standards, Procedures, and Criteria are regulated at the ministry or institutional level."

In other words, Jakarta's transport pollution crisis cannot be resolved through provincial government policies alone. Consequently, cross-governmental collaboration is crucial, as it spans everything from vehicle and fuel standards to the expansion of public transit networks.

Parents Often Mistake It for a Common Cold

At the household level, the toll of pollution is frequently difficult to recognize.

Dr. dr. Nastiti Kaswandani, SpA, Subsp Respi(K), from the Respirology Working Group of the Indonesian Pediatric Society, noted that many parents are slow to realize that a child's respiratory problems are tied to pollution exposure.

"More than 50% of parents are late in realizing this because they write it off as a common cold caught from friends. Yet, if a child experiences more than one or two recurrent episodes of coughing and runny noses in a single month without fever, parents should suspect that air pollution is the trigger," Nastiti said in an online interview on Saturday, August 8, 2026.

According to Nastiti, these recurrent impacts on children should not be taken lightly. Repeated asthma attacks and oxygen deprivation can disrupt growth, while recurring infections driven by pollutants threaten to diminish lung capacity and increase the risk of chronic pulmonary issues in adulthood.

Protecting children, therefore, goes beyond shielding them outdoors; the indoor home environment demands equal attention.

"If your home sits right along a busy roadside, create a buffer using climbing plants in the yard. These plants not only supply oxygen but also act as a physical barrier to keep exhaust dust from blowing straight into the house. The use of an air purifier is also recommended to minimize indoor pollutants."

Nastiti also reminded parents to eliminate other household pollutant sources, such as cigarette smoke, irritating cooking fumes, and vehicle exhaust from warming up engines in the morning.

"Since roadside pollution outdoors is beyond parents' control, minimize indoor pollutants: keep children away from smokers, irritating cooking smoke, and morning engine exhaust. When heading outdoors or walking to school, children must wear masks."

Back to Nurlela's House

For families like Nurlela, these various figures and studies ultimately boil down to one simple concern: how to ensure a child can breathe comfortably.

She has no control over the traffic density on the streets of Manggarai. Nor can she halt construction or dictate the emission standards of the vehicles passing by every day.

She simply focuses on getting medical care for her child when breathing difficulties strike, keeping them away from cigarette smoke, and asking family for help when she and her husband have to work.

Amid the hustle and bustle of Jakarta, the issue of pollution for Nurlela is not just a matter of air quality indexes or research modeling results. The impact manifests as a child who needs to be rushed to the doctor, work schedules that must be adjusted, and lingering anxiety every time her child's breathing sounds heavy.

For low-income families, safeguarding a child's health also means constantly rearranging time and labor. When illness strikes repeatedly, that burden becomes part of everyday life.

And in a city where mobility is endlessly accelerated, the ultimate question is no longer just how to make vehicles move faster, but how to ensure that urban development should never sacrifice the health of children growing up in the city.

This article was published on beritasatu.com on August 29, 2026. It is accessible through the following link:

https://www.beritasatu.com/nasional/3022767/1-kematian-dini-tiap-12-menit-akibat-polusi-transportasi

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Suci Sekar

Suci Sekar has built a career spanning over a decade in journalism. In 2023, she was granted a scholarship to pursue graduate studies in public policy at the KDI School of Public Policy in Sejong, South Korea. In recent years, Suci Sekar has focused extensively on environmental issues and human interest stories.

Ride-Hailing Giants Push Into Electric Fleet Rental

Suci Sekarwati



While ordering an online motorcycle taxi from Cikarang to Bekasi, an *Independen.id* journalist received a text message from Suhaemi, an online motorcycle taxi driver riding an electric motorcycle. Suhaemi asked if his passenger was in a rush and requested permission to stop briefly to swap batteries mid-trip.

The journey marked the *Independen.id* journalist's first experience of traveling a considerable distance on an electric motorcycle. The ride took about 1 hour and 15 minutes, and the motor's hum was noticeably quieter than that of a conventional gasoline-powered bike.

According to Suhaemi, the electric motorcycle felt less powerful compared to a fossil-fuel vehicle, noting that a conventional bike would have made the trip in less time. Along the way, Suhaemi shared that the electric motorcycle was a rental from Grab, costing around Rp50,000 per day, excluding the battery.

So, is this vehicle more profitable than a gasoline-powered motorcycle? According to him, it depends on the number of daily passengers, but overall it is fairly profitable. The main reason, he explained, is that he no longer needs to wait in line to buy gasoline. When the battery runs low, he simply swaps it out at a station for about Rp30,000.

For Suhaemi, the primary reason for choosing an electric vehicle is not about environmentalism. As an online ride-hailing driver, his bottom line is everyday profit.

Nurdin, a GrabBike driver who has been using an electric motorcycle for a year and three months, shared a similar story. Nurdin rented an electric motorcycle from Grab to take passengers after his own bike was stolen. He uses Smoot Tempur, a locally made product that utilizing a battery swapping system.

He noted that there are 530 battery-swapping stations across the Greater Jakarta area (Jabodetabek), so he is never worried about running out of power.

“There’s no need to fear running out of batteries. Even in the Ciawi area, Bogor, there are already electric motorcycle battery-swapping stations,” he told Independen.id on Sunday, August 9, 2026, in Jakarta.

He prefers renting an electric motorcycle because the rental cost is more advantageous than buying one outright. For example, if the motorcycle he rents gets a flat tire three times, a driver can exchange it for a new one. Similarly, if the electric motorcycle breaks down on the road, drivers can request technical support to pick it up, and that day’s rental fee is waived. Meanwhile, if it is privately owned, the owner must entirely borne all such risks.

Even so, Nurdin acknowledged that plug-in charging electric motorcycles (rather than battery-swapping models) are still a struggle for long-distance riding, as the infrastructure is not yet as robust as the swapping network, which is readily available at convenience stores and restaurants like Alfamidi, Dandan, KFC, and FamilyMart.

Suhaemi and Nurdin's experiences in choosing electric motorcycles align with broader efforts by various parties to reduce the escalating burden of fossil fuel subsidies. Every year, Indonesia pours over Rp200 trillion into fossil fuel subsidies. By 2045, fuel subsidy expenditures are projected to double, approaching Rp700 trillion by 2060.

The International Council on Clean Transportation (ICCT) reveals that Indonesia's reliance on fossil fuels in the road transport sector has become an ever-expanding fiscal burden. Fuel subsidies are a recurring burden that directly strains the state budget that should ideally be allocated toward healthcare, education, or infrastructure.

At the same time, the number of vehicles in Indonesia continues to grow at about 5% per year, automatically driving up fuel demand and subsidy costs. Unfortunately, those subsidies go toward vehicles that pollute the air and harm public health.

This escalating fiscal burden could be curbed if vehicles shifted to more efficient electrical energy, given that fossil-fuel vehicles are a primary source of air pollution. Electric vehicles are therefore considered effective in minimizing pollution impacts and easing public health costs.

Based on Nurdin's experience, electric motorcycles are more economical than fossil-fuel bikes, particularly models equipped with a 72-volt battery capacity. With that capacity, the motorcycle can reach a distance of up to 100 kilometers and ride at higher speeds. However, as a renter, Nurdin does not have many options, as he is dependent on the vehicles provided by Grab.

Nurdin typically works from 11:00 AM to 11:00 PM. Over the course of 12 working hours, he says he manages a daily profit. Moreover, Grab has a policy giving priority orders to rental electric motorcycles. He can secure at least 20 to 27 customers, yielding a net daily income of Rp150,000 to Rp200,000.

"I'm someone who can't just sit still; ride-hailing drivers who complain about dead orders are probably just parked around too much. Now that I use an electric motor, I don't have to stress about buying gas. When the battery runs low, I just swap it," he said.

Before handing over the rental vehicle, Nurdin shared that Grab provides a briefing covering the electric motorcycle, recommended high-demand passenger hotspots, and the order priority system for electric bikes.

A similar story was shared by Rizky Surahman, a Grab electric motorcycle driver. Rizky explained that newer electric motorcycle models offer faster speeds and longer travel ranges, alongside a growing number of battery-swapping locations and servicing options.

“I rent this electric motorcycle from Grab. To ride around all day dropping off passengers, the battery rental is only Rp25,000. It covers its own cost, and I can still turn a profit,” Rizky said on Tuesday, August 11, 2026.

Amid rising fuel prices, Rizky noted that purchasing an electric motorcycle for personal use is more profitable. Even so, he advises buying a plug-in model so owners can charge the battery at home. Additionally, fast-charging options are an important consideration to avoid waiting up to two hours for a full charge.

A different experience was shared by Andi Rahmayadi, an online motorcycle taxi driver who frequently hangs out around Sarinah in Central Jakarta. Speaking to independen.id on Saturday, July 25, 2026, Andi shared that he rented an Electrum electric motorcycle for a rental fee of Rp80,000 per day because he does not own a personal bike to pick up passengers.

With a rental fee that high, Andi admitted that he sometimes breaks even and at other times has to dig into his own pocket to cover the deficit, depending on the number of customers he gets that day. However, he affirmed that this type of motorcycle is more powerful and faster when it comes to serving passengers who are pressed for time.

Meanwhile, Reza A, an electric motorcycle driver from Gojek, shares an experience similar to Andi’s, where earnings as a ride-hailing driver are sometimes insufficient. As a result, he also works as a ShopeeFood driver and package courier to supplement his income.

Reza noted that the electric motorcycles rented out by Gojek come in various models with different rental rates. For instance, Electrum electric motorcycle models H1, H3, and H5 with a 70 kW power output have rental prices ranging from Rp50,000 to Rp55,000, plus a battery fee of Rp30,000 per day.

He mentioned that the advantage of using an electric motorcycle is not having to queue at gas stations for fuel, as the electric bikes rented out by Gojek generally use a battery-swapping system.

However, for Reza, a drawback of electric motorcycles arises when he has to swap batteries. Working as a package courier, he has to unload cargo from the motorcycle seat in order to swap the battery, and then reload everything afterward. Another issue is that roughly every 20 kilometers, he has to swap batteries due to their small capacity.

Reza said that the maintenance and repair costs for electric motorcycles can be quite expensive, which is why renting a bike through Gojek is his preferred option.

“Rather than sitting around doing nothing, I decided just to rent,” said Reza, who has been an online motorcycle taxi driver since 2019.

He also noted that owning an electric motorcycle outright is far more profitable than renting. This is because owners avoid rental fees, and battery-swapping costs start at just Rp5,000, whereas rental battery swaps run up to Rp30,000. If drivers manage to secure at least 10 orders on a given day, they can break even or make a small profit.

“The problem is that daily earnings are unpredictable, and our working relationship status is merely that of online driver partners. For example, if we cannot work for three days due to illness or a lack of orders, we still have to pay the daily electric motorcycle rental fee of Rp55,000,” Reza told *independen.id* on Sunday, August 9, 2026, in Jakarta.

Electric motorcycles, Reza added, generally have a top speed of 60 to 70 kilometers per hour. He emphasized that regardless of the type of vehicle, whether electric or gasoline-powered—both require monthly maintenance and routine servicing. As for which is more economical, Reza believes they are roughly the same, unless an online taxi driver uses a privately owned electric motorcycle rather than a rented one.

“Electric motorcycles are environmentally friendly, but just look at how many hectares of land are excavated for battery raw materials. If it’s for Jakarta, electric motorcycles might be eco-friendly because pollution is high, but if they’re used in villages, I’m not so sure. Pollution is much lower in rural areas,” Reza remarked.

What about electric cars? Are they any different from gasoline-powered vehicles? On June 23, 2026, *Independen.id* had the opportunity to ride in an electric car via Gojek’s GoCar app, traveling from PGC Cililitan in East Jakarta to Pantai Indah Kapuk 2 in North Jakarta.

Hilman Sulaiman is a driver who uses an electric vehicle. He shared that he originally used his personal gasoline-powered car to transport passengers, but for the past three months, he has been renting an electric car through Gojek. The rental cost is around Rp200,000 per day for a brand-new BYD model.

For him, the car rental and charging costs are quite affordable and profitable compared to using his own gasoline vehicle. Throughout his three months of renting an electric car, Hilman acknowledged that he has consistently turned a profit.

Unfortunately, Hilman noted that charging the battery can sometimes mean waiting in line for up to an hour. For him, this waiting time is highly inefficient because it sacrifices precious time that could be spent looking for or dropping off passengers.

When he chose to use an electric car, Hilman didn't give much thought to being "environmentally friendly." He simply calculated it from a purely economic standpoint.

Elsewhere, Lily Pujiati, Chairperson of the Indonesian Transport Workers Union (SPAI), an organization advocating for the rights of online transportation workers and public transit users, argued that vehicle rentals, including electric vehicles, are merely part of the online transport operators' business model. This strategy is not solely intended to help victims of layoffs who lack a vehicle to serve passengers. After all, drivers who rent electric vehicles from operators receive no guarantee that their accounts will perform better or more frequently receiving orders.

She pointed out that for electric motorcycles, rental rates generally reach Rp75,000, including the battery. Meanwhile, for electric cars, drivers must leave a security deposit of about Rp1.5 million, with a rental fee of around Rp300,000 per day.

"If they want to break even, drivers have to work like slaves, go all out working 14 hours, or what we call *ngalong* [working through the night], even sleeping at the basecamp. This happens because the government lacks regulations [regarding online transportation]. To be more eco-friendly effectively, state officials' cars should be the ones swapped for eco-friendly models," Lily said.

Lily noted numerous complaints from drivers regarding electric vehicles, ranging from a frequent lack of power or slow acceleration to long charging queues. She asserted that the

government should build more Public Electric Vehicle Charging Stations (SPKLU), on par with conventional gas stations (SPBU).

She added that whether electric or fossil-fuel vehicles, both come with their own pros and cons, especially given the overhead costs drivers face when renting electric vehicles.

The Rising Trend of Electric Vehicle Rentals

There is a noticeable upward trend in the number of online transport driver-partners renting electric vehicles (EVs) through platforms like Grab Indonesia and Gojek. Halim Wijaya, Director of GrabRental and Expansion Business at Grab Indonesia, stated that EV rentals, known as GrabElectric, have surged, reaching more than 28,000 units by May 2026, marking a twofold increase from the previous year.

Halim explained that Grab operates a daily rental scheme, allowing driver-partners to use vehicles without making a large upfront investment. Routine maintenance is handled by Grab, enabling drivers to focus entirely on their daily operations. Through this framework, drivers can reportedly save up to 50% on operational costs compared to conventional vehicles.

Rental fees and requirements vary depending on the vehicle type, operational region, and the maturity of the local ecosystem in each area.

“As the electric vehicle ecosystem develops in Indonesia, Grab sees continuous growth in interest toward EVs. Our electric motorcycle rental services via GrabElectric Rental are also ongoing and continue to be developed,” Halim said on Friday, August 14, 2026, in Jakarta.

Addressing complaints that electric motorcycles lack power, Halim assured that every vehicle within Grab’s ecosystem complies with safety standards and applicable regulations. Vehicle performance metrics, including top speed and range, follow the respective manufacturers’ specifications.

“Driver-partners still need to drive within speed limits and adapt to road conditions, including when passengers are in a rush. Grab also continuously coordinates with fleet partners to evaluate vehicle performance to ensure it aligns with drivers’ operational needs,” Halim stated.

Currently, GrabElectric operates across 10 regions in Indonesia: Greater Jakarta (Jabodetabek), Bandung, Yogyakarta, Solo, Semarang, Surabaya, Bali, Makassar, Medan, and Palembang. By December 2025, the GrabElectric fleet had logged more than 450 million kilometers in cumulative travel, with approximately 175 million of those kilometers accumulated throughout 2025 alone.

Meanwhile, Gojek reported that by the end of 2025, it had rented out 11,500 electric vehicles to partner drivers across Indonesia. This figure represents a significant jump compared to 2024 and 2023, which recorded 6,500 and 2,000 EVs, respectively. Gojek claimed this initiative has contributed to a 7.37% year-on-year reduction in total greenhouse gas (GHG) emissions.

Rosel Lavina, Head of Corporate Affairs at Gojek, noted that the company facilitates daily rental schemes for both two-wheeled and four-wheeled electric vehicles through various approaches. This includes connecting existing and prospective driver-partners with fleet partners or subsidiary vehicle providers, offering a diverse selection of vehicles for rent. Thus far, EV rentals remain concentrated in Greater Jakarta due to its established infrastructure ecosystem.

Rental rates start at Rp225,000 per day for cars and Rp35,000 for motorcycles. These prices cover maintenance, regular vehicle inspections, and insurance. “Gojek has actively forged strategic partnerships through various schemes to ensure the availability of battery-swapping or charging facilities, ensuring operational convenience for driver-partners in the field,” Rosel said on Friday, August 14, 2026, in Jakarta.

Rosel emphasized that Gojek’s electric vehicle utilization rose by 77% compared to the previous year, reflecting a stronger momentum toward low-emission mobility in Indonesia.

The Growth of EV Charging Station

To support the acceleration of the national electric vehicle ecosystem and provide reliable, accessible, and convenient charging services for the public, PT PLN is committed to developing Public Electric Vehicle Charging Stations (SPKLU).

Gregorius Adi Trianto, Executive Vice President of Corporate Communications and Social

and Environmental Responsibility at PT PLN, revealed that the growth of SPKLU over the past three years has been highly significant, surging from 1,081 units in 2023 to 3,233 units in 2024, and reaching 4,655 units in 2025. As of May 2026, the number has hit 5,000 units distributed across 3,162 locations throughout Indonesia.

In the Jakarta region specifically, PLN and its partners continue to increase the number of SPKLU to keep pace with the rapid growth of electric vehicles in the capital. To date, there are 1,252 SPKLU units spread across 674 locations in Jakarta.

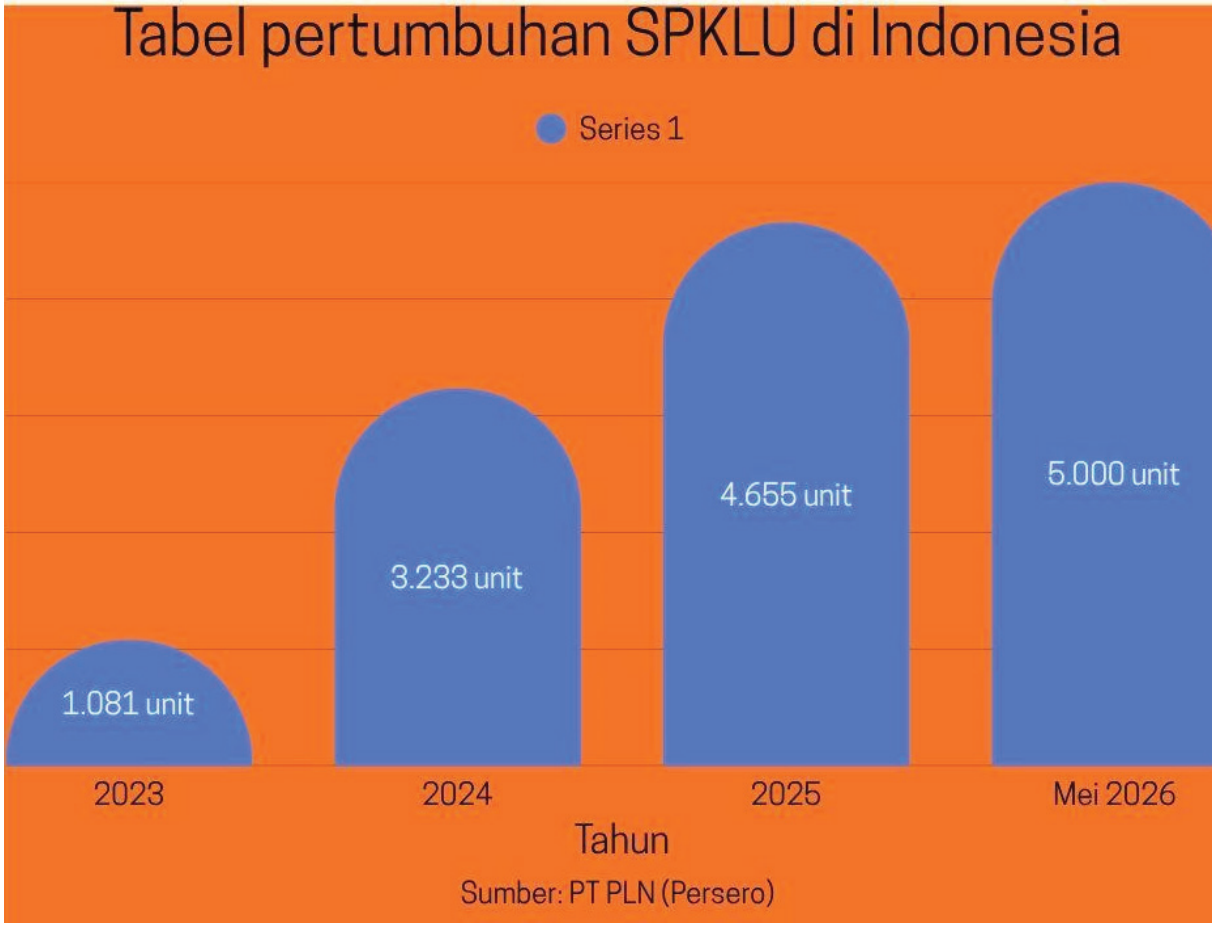
In 2026, PLN targets the addition of approximately 518 SPKLU units across 492 locations nationwide, with a broader developmental target of reaching around 62,000 units by 2030.

In addition to expanding the SPKLU network, PLN is developing fast-charging and ultra-fast-charging technologies. PLN is also opening up partnership opportunities with landowners and charging equipment providers to accelerate equitable service distribution.

“PLN continues to expand its charging infrastructure gradually, based on projected electric vehicle growth, local demand levels, and the readiness of the electrical grid system,” Gregorius said.

Addressing complaints from several online vehicle drivers about long queues during battery charging, Gregorius assured that PLN has worked to improve service quality, notably through digitalization. For instance, the Electric Vehicle Digital Services (EVDS) feature on the PLN Mobile application allows users to locate the nearest SPKLU, check availability status, plan travel routes using the Trip Planner feature, and monitor queue conditions in real-time through the AntreEV feature, enabling drivers to plan their charging more efficiently.

“PLN urges all electric vehicle users, including online transportation driver-partners, to utilize the features on PLN Mobile to determine optimal charging locations and times, thereby minimizing potential queues and maximizing operational time productively,” he stated.



The Growth of EV Charging Stations in Indonesia
Illustrator: Suci Sekar

Meanwhile, Rizqi Ilma Nugroho, a researcher at ICCT, revealed that complaints about electric motorcycles lacking power are most likely due to older vehicle models dating back to around 2020 or 2021.

"I had the chance to ride electric motorbikes with both Grab and Gojek in 2026, including both charging and battery-swapping types. They were all completely fine and quite swift," Rizqi said on Saturday, July 25, 2026.

Rizqi noted that electric vehicles—particularly electric motorcycles manufactured in 2025—are in good condition. In fact, some people have switched from conventional motorcycles to electric ones because fuel costs are lower, allowing them to ride all the way from Jakarta to Bekasi or Tangerang.

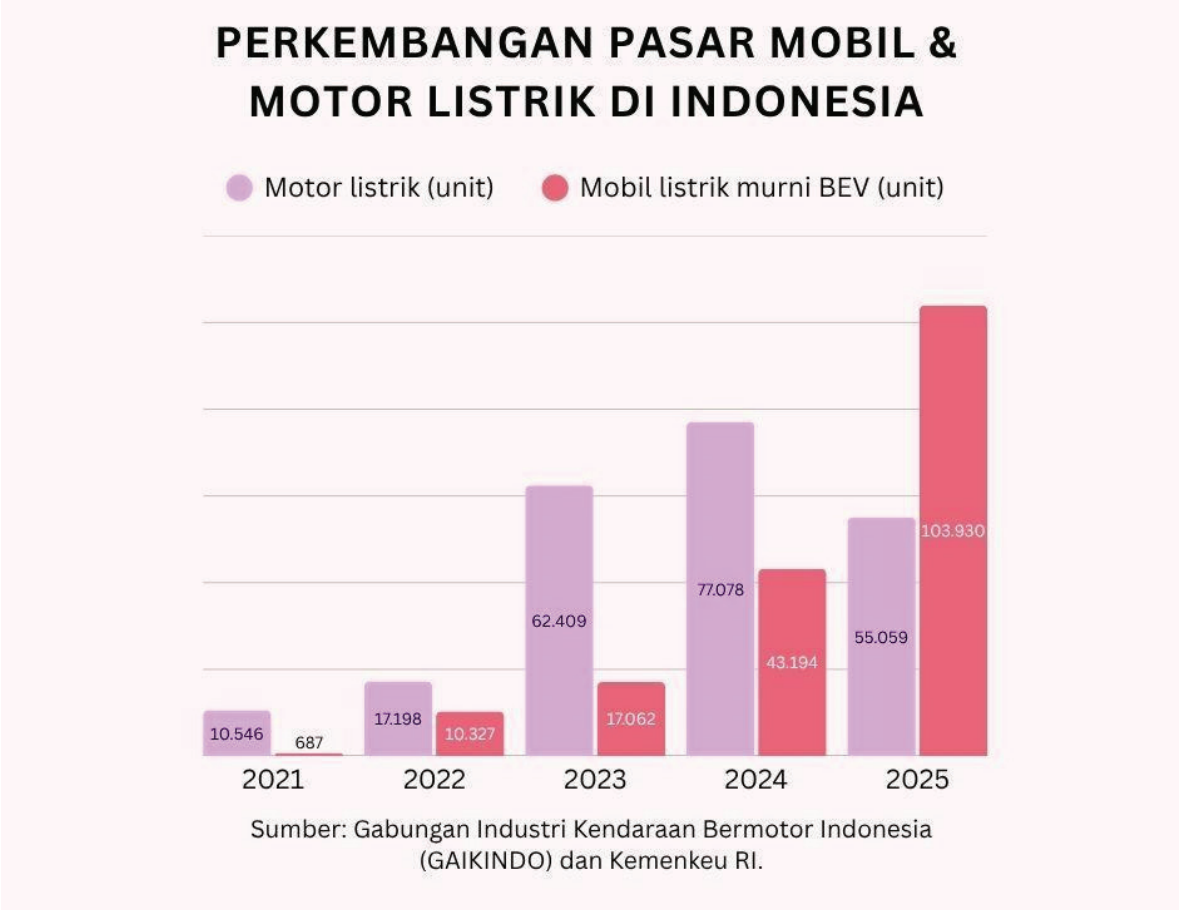
It proves that electric motorcycles are capable of handling long-distance travel and

navigating diverse terrains, whether they utilize a battery-swapping system or a plug-in setup.

“Now, if you check motorcycle sales websites, they frequently list the degree of incline a vehicle can climb. This shows that vehicle manufacturers have already accommodated those needs. There are plenty of capable electric vehicles out there,” Rizqi stated.

Furthermore, Rizqi suggested that Grab and Gojek provide upskilling programs for their drivers, noting that driving an electric car or motorcycle is different from operating a gasoline vehicle, where gas stations are easy to find. Electric vehicles have distinct mechanisms, operational requirements, and safety protocols.

“Drivers need to understand that before they become partner drivers, they must have the knowledge. We shouldn’t have drivers thinking that all they need to do is just drive,” Rizqi said.



The Development of Electric Car and Motorcycle Market in Indonesia
Illustrator: Suci Sekar

The Advantages of Electric Vehicles

Rizqi assured that electric vehicles are not only more environmentally friendly and free of air pollution, but also easier on the wallet. The monthly maintenance costs for electric vehicles are lower, making them an attractive consideration for consumers choosing between EVs and fossil-fuel vehicles.

Beyond that, electric vehicle technology continues to evolve, consumer adoption is growing, and financing schemes have matured significantly.

“Here’s my advice to Grab and Gojek drivers: let’s keep using [electric vehicles]. Innovation in EVs will continue to advance because battery prices are getting cheaper, electricity operating costs are low, and the trend toward electric cars and motorcycles is likely to keep growing and become even more massive,” he said.

Rizqi noted that the positive environmental impacts of electric vehicles are clear. ICCT research reveals that by 2030, electric vehicles will become the greenest mode of transport, supported by increasingly affordable electricity prices.

“We have two pieces of homework. First, to voice support for electric vehicles; second, to advocate for a greener grid,” he said.

Scientific Perspectives on Electric Vehicles

Budi Haryanto, a Professor and Lecturer at the Faculty of Public Health, Universitas Indonesia, highlighted that fuel consumption by vehicles remains critically high, with 92% of Indonesian citizens using Pertalite, the fuel with a quality level that falls below Euro 4 health standards. Consequently, Indonesia urgently needs massive, revolutionary, and collaborative interventions, as this is directly tied to air pollution crises and severe negative health impacts.

“Sixty percent of illnesses enter through the nose, yet air pollution control remains stagnant,” Budi said on Tuesday, August 4, 2026.

Indonesian society is facing a multidimensional crisis, a climate crisis intricately linked to developmental economics. Research published by the ICCT in Jakarta on Tuesday, August 4, 2026, revealed that air pollution functions as a silent killer. A study conducted by the

ICCT Global Health Study across more than 180 countries and territories, as well as over 13,000 urban areas, found that emissions from road transport cause one premature death every 12 minutes and trigger one new case of childhood asthma every 26 minutes. These premature deaths could drop by up to 20% if preventive measures against air pollution are implemented.

Furthermore, the ICCT noted that World Health Organization (WHO) data indicates that in 2023, 7.9 million deaths worldwide were linked to air pollution, accounting for roughly one in eight deaths globally. Out of that 7.9 million total, 4.9 million people died from exposure to ambient PM2.5, 2.8 million died from household air pollution, and 470,000 died due to ozone impacts.

The ICCT regards the transition to electric vehicles as the closest-to-ideal solution for achieving net-zero emissions by 2060. Electric vehicles can also minimize the health impacts associated with fossil-fuel vehicular pollution.

This article was published in Independen.id on August 18, 2026. It is accessible through the following link:

https://www.independen.id/transportasi-online-rambah-pasar-sewa-kendaraan-listrik-apa-nilai-lebihnya

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Cintya Ayu Phitaloka Dharmawan

Cintya Ayu Phitaloka Dharmawan is currently active as a journalist, AI Trainer, and content writer. She is excited to be part of the AJI Indonesia and ICCT Training and Fellowship program. This experience has provided her with the opportunity to learn and explore deeper into the issues of energy transition and clean road transport, particularly in East Java. Through this reporting, Cintya aims to weave together the story of how the shift toward cleaner transportation is unfolding in East Java, not only from the perspective of policy and technology, but also through the people, industries, innovations, and ecosystems driving it. To her, the true success of an energy transition is achieved when a policy is accessible, understandable, and its benefits are genuinely felt by the community.

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Building an EV Chain that Goes Beyond Tailpipes and Charging Stations

Cintya Ayu Phitaloka Dharmawan



Queues of electric vehicles at charging stations are becoming a common sight at several spots in Surabaya. Amid the accelerated shift from internal combustion engines to electric motorcycles, the issue is no longer just how many electric vehicles are hitting the road.

A more fundamental question is: how ready is East Java to support this electric vehicle boom?

This question led enewsindo's journey from the streets of Surabaya, meeting an online motorcycle taxi driver using an electric motorcycle, tracing the network of Public Electric Vehicle Charging Stations (SPKLU), entering business districts, to observing electric vehicle research on a university campus.

The answer is not as simple as the total number of SPKLU. On Wednesday, August 19, 2026, the heat in Surabaya felt searing as we chose an online motorcycle taxi to cut through the

city streets. It was atop the vehicle that we met Wili, an online motorcycle taxi driver who has switched to an electric motorcycle.

For Wili, the decision to move away from fossil-fueled vehicles was not solely about the environment. Instead, he chose an electric vehicle because it is more practical for supporting his daily work.

Before making the purchase, Wili admitted to comparing four different brands. He looked beyond the vehicle price, inspecting the ecosystem, repair shops, availability of spare parts, technicians, and after-sales service.

His choice ultimately fell on Polytron, utilizing a battery subscription scheme. He pays roughly Rp200,000 per month. However, that choice has left him facing other challenges.

Wili complained that fast-charging facilities are beginning to see queues. The growth in electric vehicle users, in his view, has not yet been fully matched by the distribution of charging infrastructure.

“I hope the ecosystem will improve. PLN must ensure even distribution across all cities, particularly smaller ones. Because charging infrastructure is a core consideration for users,” Wili said.



The complaint from that online motorcycle taxi driver led us to the next question: Is East Java's charging infrastructure capable of keeping pace with the rapid growth of electric vehicles?

315 Charging Stations across 178 Locations

Wili is not alone. The challenges on the ground and complaints regarding fast-charging facilities are also shared by other electric motorcycle users, particularly online ride-hailing drivers. This reality raises critical questions about infrastructural readiness for the electric vehicle ecosystem across East Java.

Rukmito Arie, Manager of Strategy for PLN's Main Unit of Distribution in East Java, provides a broader perspective. To date, there are 315 Public Electric Vehicle Charging Station (SPKLU) units operating across 178 locations in East Java.

The charging options vary, ranging from standard charging to ultra-fast charging. This figure continues to expand in tandem with user growth. One key indicator is obvious in SPKLU transaction volumes, which have surged by an average of up to three times annually.

A spike in transactions at a specific hub serves as one of the primary factors prompting PLN to add new charging points.

"The development pattern is also targeted toward major long-distance travel corridors. Rest areas are a priority for us because electric vehicles need reliable charging spots before drivers continue their journeys," Rukmito said.

At several rest areas, PLN has even installed more than one charging unit to help curb waiting times. Fast charging typically takes about 10 to 15 minutes, depending on the vehicle model and the charger's capacity.

However, building out the SPKLU network cannot rest on PLN's shoulders alone. The electric vehicle supply chain also extends into commercial and industrial zones.

In the Rungkut Industrial Estate, for instance, PLN has partnered with PT Surabaya Industrial Estate Rungkut (SIER) to deploy SPKLU infrastructure.

"In East Java's industrial zones, PLN collaborates with PT SIER to provide SPKLU in

Rungkut. SIER works alongside PLN's partners, while PLN provides training and oversees operations," Rukmito explained.

Such collaborations demonstrate that the electric vehicle ecosystem is shifting beyond basic infrastructure deployment toward private sector engagement. Yet, the next question arises: what are these electric vehicles actually being used for within industrial parks?

PLN data indicates that electric vehicle adoption within East Java's industrial sector remains largely confined to administrative and office operations. The electrification of heavy-duty logistics transport and heavy machinery has yet to see widespread implementation.

This is a notable gap, given that SIER and the Java Integrated Industrial and Port Estate (JIIPE) serve as vital hubs for East Java's economic activity.

Journalist of *enewsindo* reached out to both SIER and JIIPE to assess their readiness and infrastructure demands for electric vehicles within industrial zones. However, as of publication, neither entity has responded.

Ultimately, raw figures regarding the number of SPKLU do not automatically reflect true ecosystem readiness. The deeper picture requires looking beyond how many machines are standing, examining instead where they are located, who is using them, what capacity they offer, and whether they can keep pace with evolving electric mobility patterns.

When SPKLU Becomes Part of the Retail Business

The supply chain looks quite different in downtown Surabaya. The second day of our journey brought us to World Trade Center (WTC) Surabaya. In this technology and retail hub, two SPKLU units featuring three nozzles are prominently positioned in an easily visible area for visitors.

While their vehicles charge, owners can step inside the shopping center. Some go shopping, while others sit down at a coffee shop.

It is in spaces like this that the SPKLU ceases to be merely an energy utility. It transforms into an integral part of retail business strategy.

Herry Muharyadi, Director of WTC Surabaya, noted that the decision to install a charging

station stemmed from shifting consumer behavior when electric vehicles began to be introduced more widely around 2022.

WTC, operating under an IT and Community concept, reached out to PLN to provide electric vehicle charging facilities, making WTC one of the pioneering retail centers in East Java to host an SPKLU.

“When a car requires charging time, vehicle owners typically step into the shopping center, whether to shop for necessities or sit at a coffee shop. Because their car remains visible, visitors feel secure,” Herry said.



“The presence of the SPKLU serves as both a facility and an attraction for retail destinations. The economic benefits don’t stop there; they form an economic ecosystem felt from the electricity provider down to our tenants,” Wahjuono said.

Here, another link in the chain becomes clear: vehicles require energy, energy brings consumers to retail centers, and retail centers gain the opportunity to retain customers for longer periods.

Yet, that chain still requires one crucial component: the skilled people capable of developing, operating, maintaining, and testing the technology.

Campuses as Electric Vehicle Laboratories

In East Java, the momentum of the energy transition is taking root. Electric vehicles represent more than just a shift from fossil fuels to batteries; they require a comprehensive ecosystem developed from upstream to downstream.

Dafit Ari, a lecturer in Environmental Engineering and Bioenergy at the Jember State Polytechnic, pointed out that electric vehicles cannot be viewed solely when they are cruising down the road.

There is a long journey before a vehicle reaches the hands of the consumer. A Life Cycle Assessment (LCA) approach is essential to evaluate a vehicle's impact across its entire lifecycle, Dafit noted.

"This is where LCA plays a vital role. We cannot look at electric vehicles only when they are in use; we must calculate the mass and energy balance from upstream to downstream," he said.

This means raw materials, production processes, energy sources, vehicle operation, and post-consumer battery management must all be factored into the equation.

This very challenge brought us back to Surabaya, specifically to the Automotive Science Techno Park (STP) at Sepuluh Nopember Institute of Technology (ITS).

There, electric vehicles are not just discussed in classrooms. Students actively develop and test vehicles engineered for various specialized needs.

Student team advisor Bambang Sudarmanta showcased vehicles developed by their team. These range from converted two-wheelers and four-wheelers to three-wheeled vehicles tailored for medium industries, as well as specialized utility vehicles.

"This opportunity is unlocked by East Java's massive base of vehicles. One of our strategic steps is converting internal combustion engine (ICE) two-wheelers into electric vehicles," Bambang said.

According to him, two-wheelers serve as a realistic entry point because their energy

requirements are lower and prototyping costs are significantly cheaper compared to four-wheeled vehicles.

Students Go Beyond Theory

Cahya Dwi, an Automation Engineering Technology student, explained that they are involved in everything from literature studies and design simulations to electrical schematic drafting, manufacturing, and testing.

"Students are engaged in every single step, from assembling components and programming the battery management system, or BMS, to conducting road tests and simulations to ensure stable vehicle performance," Cahya said.

This hands-on experience serves as essential preparation for industry demands that require real-world problem-solving skills and multi-system integration, she highlighted.

Within the same Science Techno Park, some vehicles have already moved beyond the laboratory walls. A red electric bus has been operating in Surabaya since 2022.

There are also electric vehicles specifically engineered for challenging geographical terrains. Ten such units have been dispatched to Papua to support local community mobility.

This technology highlights a key reality: electric vehicles cannot be built using a one-size-fits-all approach. It is user needs that determine the design.

Research Goes Beyond the Battery

Research at ITS extends beyond batteries. The team has also developed batteries equipped with an app-based monitoring system. Battery health can be tracked virtually so that anomalies can be diagnosed remotely.

However, Bambang reminded that the challenges of the electric ecosystem are far broader. Technology, batteries, infrastructure, certification, and human resources must all be developed in tandem.

Dependence on imported components must also be reduced through the domestic development of parts.

“ITS research must evolve into technologies whose products are widely used in the field. From that utilization, we can gather real-world data and usage metrics to achieve proper validation. This is how the EV ecosystem matures and prepares for commercialization,” Bambang said.

The issue then shifts once again. As electric vehicles multiply, infrastructure expands, research progresses, and user numbers climb: where will the driving energy come from, and what happens when their primary components reach the end of their lifecycle?

Emissions Drop, New Waste Looms

Joni Hermana, a Professor of Environmental Engineering at ITS, noted that from an environmental standpoint, vehicle electrification indeed offers an opportunity to curb emissions.

Based on research he references, vehicle electrification can reduce greenhouse gas emissions by approximately 26.73% to 28.58%. However, that figure must not overshadow other pressing challenges.

“The success of the energy transition is not measured solely by the number of electric vehicles on the road. The ecosystem governing EV management must be properly prepared, including what happens after the battery lifespan ends,” Joni said.

Batteries have a finite service life. In the context of electric vehicles, their usable lifespan typically reaches around eight years, depending on the technology and usage patterns.

This gives rise to a new dilemma: where do these spent batteries go? If left unmanaged, battery waste poses a serious environmental hazard.

Therefore, he argues, governments and industries must plan for battery waste management from the moment electric vehicles are introduced to the market, rather than waiting for stockpiles to accumulate.

“If adequate waste processing facilities are not ready in the near term, regulations must

be issued mandating that EV manufacturers should take responsibility for post-consumer waste through an Extended Producer Responsibility (EPR) program," he stated.

EPR places accountability on producers for their products even after their functional lifespan expires. Consequently, the energy transition cannot stop merely at shifting power sources from fossil fuels to electricity.

Questions remain regarding the origin of the electricity supply, infrastructure readiness, industrial capacity, human resource capabilities, battery technology, and the ultimate fate of batteries once vehicles are retired.

Steering the Course of East Java's Electric Vehicle Transition

The momentum of electric vehicle innovation has successfully taken root behind the garage doors of the ITS campus. Naturally, multi-stakeholder support is crucial to propel these technologies into the domestic industrial mainstream.

Aditya Mahalana, Senior Researcher at the International Council on Clean Transportation (ICCT), pointed out that a persistent gap remains between policy, research, and industrial sector needs. Accelerating electrification demands greater contributions from various actors and stronger communication among policymakers.

Regional governments can take proactive steps to foster demand. "A combination of push and pull policies can be deployed. 'Pull' policies aim to entice the public to adopt electric vehicles, and 'push' policies tend to be tougher and less popular, such as restricting conventional vehicles or imposing higher taxes and tariffs on fossil-fuel cars," Aditya explained.

Meanwhile, Fadhil Hasan of the National Energy Council (DEN) emphasized that Indonesia must ensure its capacity and capability to independently develop and manufacture EVs, ranging from electric motors to supporting components.

"Campus research and prototypes require backing through funding, industry integration, regulation, standardization, and manufacturing muscle to transform into commercial products. Right now, downstream commercialization remains our biggest challenge," he noted.

DEN highlights the necessity for robust cross-sectoral collaboration to bridge the gaps, particularly among government ministries and agencies such as Bappenas, DEN, the Ministry of Energy and Mineral Resources (ESDM), BRIN, the Ministry of Industry, and various associations to connect universities with industries and ensure research breakthroughs successfully reach commercial markets.

From the congested streets of Surabaya, an ojek driver's grievances pulled us into the network of charging stations. That single thread drew us further, winding through shopping malls and industrial hubs, into university laboratories and research prototypes, right up to the edge of our next big hurdle: battery waste.

These pieces reveal that East Java's electric vehicle supply chain is beginning to take shape. Yet, that chain is not yet fully resilient. Vehicle numbers may multiply annually. Charging stations will continue to rise. Research will yield new prototypes.

However, without supporting industries, skilled human resources, rigorous testing systems, cleaner energy sources, and proper battery disposal mechanisms, the energy transition risks merely shifting pollution from the tailpipe to somewhere else.

East Java is building an electric vehicle ecosystem. The preparedness of this ecosystem functions like an interconnected chain. Policy serves as the compass setting the direction, ensuring that research does not sit gathering dust in laboratories, that every innovation finds the right market, that industries receive support during their transformation, and that the public benefits from accessible, clean transportation.

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https://enewsindo.co.id/2026-09-15/menelusuri-mata-rantai-kendaraan-listrik-jawa-timur

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Renita Sukma Melati

Renita Sukma Melati (25) has been a journalist at Bisnis Indonesia since 2025. Her reporting focuses on various economic issues, including green issues and energy transition, analyzed from an economic perspective. Previously, Renita wrote in-depth reports examining the national waste emergency and the effectiveness of the government's waste-to-energy (WtE) solutions.

Smart Transition Policy Needed to Balance Fiscal Health and Energy Independence

Renita Sukma Melati

Electric Vehicles (EVs) often face skepticism due to Indonesia's power supply that still relies on coal. Yet, with 90% of transport pollution originating on the roads, shifting to EVs has proven capable of significantly cutting emissions from upstream to downstream. Why does shifting to electric vehicles remain a vital step for Indonesia's energy transition? Electric vehicles are gaining traction in Indonesia alongside government pushes to curb emissions in the transportation sector, particularly in Jakarta. Data from the Institute for Essential Services Reform (IESR) notes that the sector accounts for roughly 27% of Indonesia's total greenhouse gas emissions, with about 90% of transportation emissions stemming from road transit.

Although it produces no direct tailpipe emissions, electric vehicles are not yet entirely free of a carbon footprint. The paradox of EVs as a climate solution lies far upstream, specifically within the lengthy nickel battery manufacturing process that serves as their heartbeat.

EV battery production requires nickel, while Indonesia's nickel processing industry still heavily relies on captive coal-fired power plants (PLTU). This reality sparks a major concern: rather than breaking away from dirty energy, Indonesia risks carving out new extractive pits that prolong the life of coal.

Research by the International Council on Clean Transportation (ICCT) indicates that even when calculated from a life-cycle assessment perspective, EVs retain the upper hand. For passenger electric cars, for instance, life-cycle emissions remain 47–54% lower than those of gasoline-powered vehicles.

Meanwhile, for electric motorcycles, emissions are roughly 26–35% lower than

conventional bikes. This potential for emissions reduction can expand even further as Indonesia's power grid increasingly incorporates renewable energy.

"While we eliminate emissions on the downstream or consumer side, we can simultaneously phase out emissions on the upstream side. Just imagine if we were still using conventional fuels. Those emissions would remain scattered and decentralized," said ICCT researcher Ilma Nugroho.

The National Electricity Supply Business Plan for 2025–2060 projects an increasingly green electricity supply. In fact, the government aims for renewable energy to dominate roughly 74% of the electricity supply by 2060. However, the energy transition cannot happen overnight. Accelerating EV adoption on the roads without greening the upstream nickel industry is akin to treating a symptom while ignoring the root illness. Both must be addressed concurrently for clean air and future energy security.

Ultimately, a well-managed energy transition can secure energy independence while easing the state's fiscal burden.

This news video was aired on YouTube Bisnis Indonesia on September 11, 2026. It is accessible through the following link:

https://www.youtube.com/watch?v=P6S7U8YGPTA

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