

Hanoi's transition to fossil fuel free streets

A bold step for sustainability

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Figure 1. Only e-scooter shall pass, in the style of Phai. (Image: author)

Summary: Hanoi will start banning gasoline motorcycles in July 2026, beginning in the city center and expanding to broader areas by 2030, to implement a decision formulated eight years in its 2017's masterplan. The policy aims to address severe air pollution (PM2.5 levels ten times WHO guidelines) and position Vietnam as a leader in sustainable urban transport, though achieving clean air will requires equally strong measures on coal power plants and other polluting activities. While the transition presents significant social and economic challenges—particularly for the migrant motorcycle-dependent workers—it creates opportunities for domestic manufacturers like VinFast to challenge Honda's market dominance and demonstrates Vietnam's commitment to enter a new stage of development.

I. Introduction

The decision to ban gasoline motorcycles from Hanoi's historic center next summer (Phạm Minh Chính, 2025) marks Vietnam's entry into a global movement toward sustainable urban mobility. The scale of the required transformation is remarkable. Hanoi currently hosts 1.1 million cars, 5.6 million gasoline motorcycles and 1.3 million electric ones (Doan Loan, 2025), not to forget 1.2 million vehicles entering regularly from other provinces.

All gasoline motorcycles, many over a decade old and significantly more polluting than the standards – will be banned from entering the historic city center, that is inside Ring Road 1, on 1 July 2026 (see Figure 2). By January 2028, gasoline motorcycles and cars will be banned from entering the expanded urban core, that is the zone within Ring Road 2. Restrictions will extend further to the greater metropolitan area, i.e. the zone inside Ring Road 3, by 2030.

While some may appear surprised, it is not a rushed decision but the culmination of eight years of deliberate planning that began with Decision 5953/QĐ-UBND in August 2017 (Nguyễn Đức Chung, 2017). The initiative elevates Hanoi to the level of international commitments and initiatives like the Fossil Fuel Free Streets Declaration (C40 Cities Climate Leadership Group, 2017).

This analysis examines six critical dimensions of Hanoi's transition to fossil fuel free streets. We first explore the strategic timing and global context driving this decision, then quantify the expected improvements in air quality and public health. The social and economic challenges—particularly for motorcycle-dependent workers—receive detailed attention, followed by an assessment of how the ban could reshape Vietnam's automotive industry and create opportunities for domestic manufacturers. We then consider the policy's role as a test case for Vietnam's broader environmental governance ambitions, before concluding with lessons for other developing cities considering similar transitions.

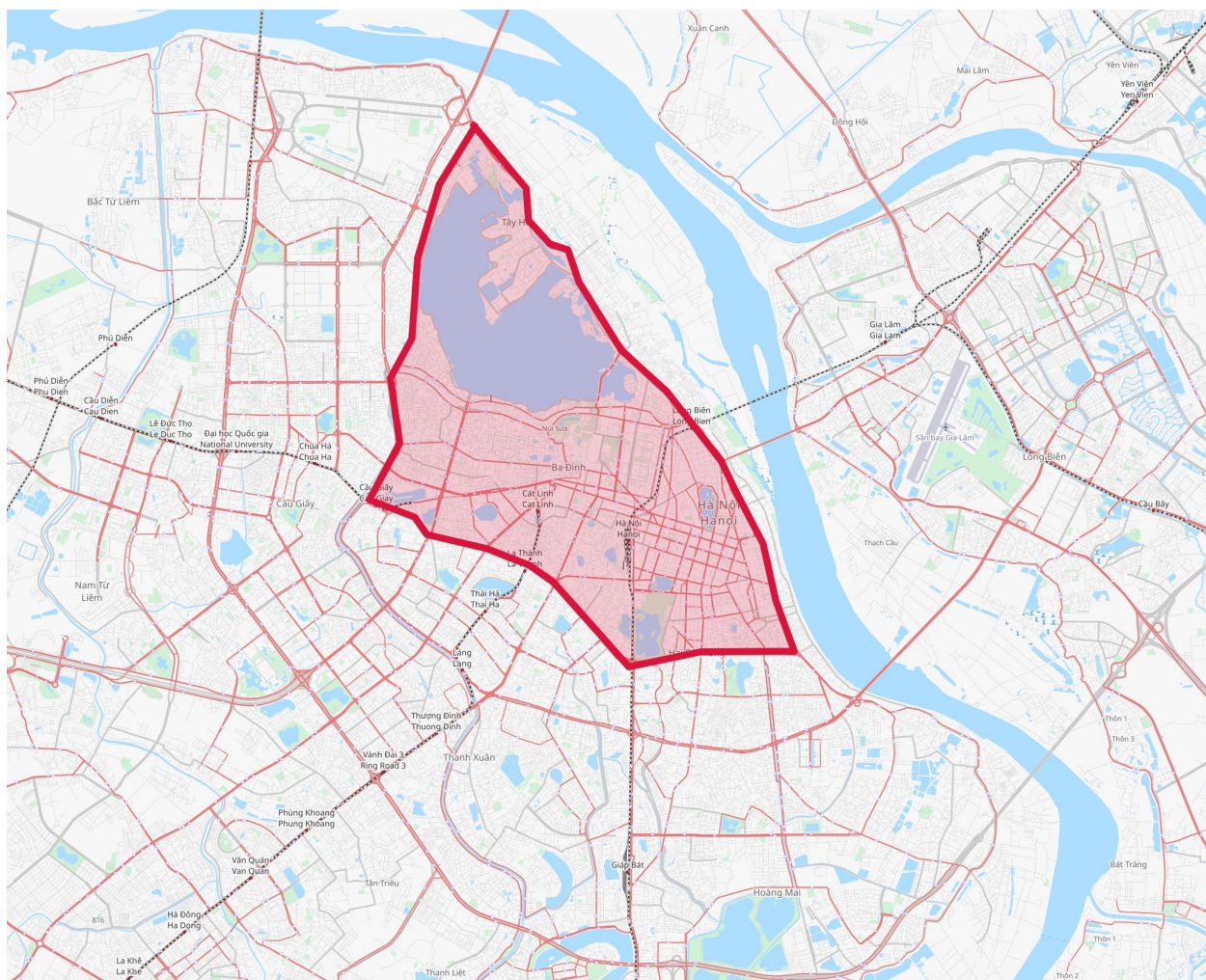


Figure 2: The July 2026 gasoline motorcycle ban zone (Map: author with uMap / OSM transport data)

2. Why this decision, why now?

For Hanoi, as for the rest of the world, the question is not whether to transition away from fossil fuels, but when and how. No internal combustion engines car will be sold in European Union's after 2035, for example (European Parliament and European Council, 2023). Most major cities worldwide are moving toward clean transport systems, and early adoption brings competitive advantages in developing green industries and attracting investment. Vietnam's commitment to net zero by 2050 makes motorcycle electrification a natural first step, particularly given that motorcycles represent the dominant form of urban transport in ASEAN (Huu and Ngoc, 2021, fig. 11).

The timing reflects both opportunity and necessity. Until recently, electric alternatives were either unavailable or technologically immature. Electric vehicle technology has matured to the point where electric motorcycles compete with their fossil fuel counterparts. For example, we looked at the manufacturer's websites to compare VinFast's

latest e-scooter release, the Evo Grande, with Honda’s classic motorcycle, the Wave Alpha. Table 1 reveals that electric motorcycles have achieved price parity while offering substantial operational cost savings.

Table 1. Comparative Analysis: VinFast Evo Grande vs. Honda Wave 2025

Feature	VinFast Evo Grande (electric)	Honda Wave (petrol)
Retail Price (Hanoi)	~21 million VND (~\$800)	~22 million VND (~\$840)
Fuel Cost (per 100 km)	~2,000-3,000 VND (\$0.08-0.11)	~25,000-35,000 VND (\$0.95-1.34)
Range	134 km (268 km with second battery)	215 km per tank
Top Speed	70 km/h	70-80 km/h
Charging/Refueling	~10 hours (home charging)	~5 minutes (petrol station)
CO ₂ Emissions	~20-30 g CO ₂ /km	~60-90 g CO ₂ /km
Noise Pollution	Very low	High

This explains why, in the last years, Vietnam's electric vehicle market has experienced dramatic growth. The electric two wheelers market is dynamic, with the e-mopeds category experiencing a +112.6% growth and the e-motorcycles category growing 52.6% (M. C. D. Team, 2025). However, the average lifespan of a motorcycle in Vietnam is 16.9 years (Kurogi Daiki et al., 2021), so under normal attrition Hanoi retires only about 330 000 motorcycles per year.

Infrastructure readiness represents the single greatest implementation risk despite eight years of planning since 2017. Hanoi's existing power infrastructure cannot support widespread EV charging deployment in residential areas, while the city's public transport serves only 8-12% of daily trips against a 20-25% target. With less than twelve months until the July 2026 deadline, the scale of required infrastructure deployment is unprecedented—Ho Chi Minh City's experience shows that current charging stations meet only 10% of projected electric motorcycle demand (Tieu Bac et al., 2025; VNS, 2025).

The January 2028 expansion to include cars within Ring Road 2 compounds these challenges, as this broader restriction requires exponentially more charging infrastructure and public transport capacity. Success depends on emergency measures: streamlined regulatory approvals currently taking 6-9 months, coordinated deployment of workplace charging mandates, and resolving the financing gap where V-Green's 10 trillion VND (\$404 million) announced private investment over two years addresses only a fraction of infrastructure needs. Without addressing these bottlenecks, the ambitious timeline risks becoming a policy failure that undermines public confidence in Vietnam's broader electrification goals.

3. How much will air quality improve?

The health case for motorcycle electrification is compelling.

Hanoi's air quality consistently ranks among Southeast Asia's worst, with PM_{2.5} levels around 50 µg/m³—nearly twice the national guideline of 25 µg/m³ (Le, 2021), or five times the 2005 WHO guideline of 10 µg/m³. WHO's 2021 global air quality guidelines are even more strict, the PM_{2.5} annual mean limit was lowered to 5 µg/m³.

Studies show that air pollution causes tens of thousands of premature deaths annually in Vietnam (WHO, 2018). A rigorous detailed study of the mortality burden due to PM_{2.5} exposure among adults (age >25) living in Hanoi in 2017, found that the attributable deaths due to exposure to PM_{2.5} in Hanoi above the national guideline was 2,696 deaths or 34.3 per 100,000 inhabitant (Nhung et al., 2022). Another peer-reviewed estimate of potential health and economic benefits on adults aged 25 and above across Vietnam's 63 provinces in 2021 found that the reduced levels of PM_{2.5} and NO₂ during the COVID-19 lockdown resulted in 3,807 and 2,451 avoided deaths (Hoang et al., 2023).

Vehicle emissions contribute 46% of fine particulate matter (PM_{2.5}), with motorcycles responsible for over 90% of volatile organic compounds from traffic sources. The Hanoi Department of Natural Resources and Environment identifies road traffic and associated road dust as contributing 58-74% of local air pollution depending on season. The ban will certainly reduce pollution.

However, realistic expectations are crucial. Improvements in motorcycle emissions could contribute to a 5 µg/m³ reduction in PM_{2.5} levels (Le, 2021), which is not enough by itself to reach the desired clean air quality. While motorcycle electrification will improve air quality measurably, it addresses only one source of Hanoi's air pollution. The motorcycle ban should be framed as a flagship element within a comprehensive air quality strategy that also targets coal power plants, open-field crop burning, construction dust, and vehicles outside the restriction zone.

Noise reduction is another direct environmental benefit of the ban. According to national standards, the maximum permitted noise level for schools is 55dB during the day (Hai Yen Thi Phan and Takashi Yano, 2009; Nguyen Tan, 2021). A recent measurement study found out that thirty schools in Hanoi are at high risk of noise pollution, meaning exposed to over 75dB during active class hours, and over 85dB account for over 10% of the time (Anh et al., 2022).

While airports and industrial zones are important sources of noise, traffic volume represent the first problem with noise pollution in Vietnam according to (Nguyen et al., 2025). There is consensus that transitioning to electric vehicles can reduce urban traffic noise, particularly in slow-moving, stop-and-go environments typical of city centers. Electrification is not a complete solution by itself: broader urban noise reduction strategies include reducing overall motorized traffic, reducing horn blowing, as well as controlling construction and entertainment activities.

Greenhouse gas reductions will be modest in the short term, but symbolically important. An electric motorcycle saves approximately 40 gCO₂/km compared to the conventional alternative (see Table I again, depending on electricity source). With average annual travel of 5,000 km per motorcycle, individual savings amount to 200 kg CO₂ per year. The electrification of 450,000 motorcycles saves less than 0.1 MtCO₂ annually—a small fraction of Vietnam's 40 MtCO₂ transport sector emissions in 2023 (ATO, 2024).

The long-term impact depends on system-wide transformation. Vietnam has 77 million motorcycles nationwide; their full conversion could save 15 MtCO₂ annually. Combined with grid decarbonization and technology enabling electric vehicles to support renewable energy integration, the cumulative climate benefits become substantial.

Safety and congestion: The fossil fuels motorcycle ban will not fix these problems, but it is an opportunity to boost public transport before people switch to cars. Hanoi is lagging behind its 2017 Master Plan targets, which aimed for public transport to account for 20-25% of trips by 2025, compared to the current 8-12% modal share. The city's 2017 transportation strategy called for 450km of metro lines by 2030, but only two lines totaling 28km are currently operational, representing just 6% of planned capacity.

The Guangzhou City 2007 case illustrate that after a motorcycle ban, travel needs do not decrease but people report their choice to other mode of transportations. The ban caused a 5.1% decrease of travel by motorcycles, about 2% increase of travel by each of public transport and bicycles, and a little increase by cars. By May 2008, 50% and 19% of motorcycles users had turned to public transport and bicycles, and 11%, 10%, and 4% of them selected private cars, subways, and taxis. The net effect on congestion was a modest decrease: the road space used by additional private cars trips was less than the road space freed by the banned motorcycles. The win could have been bigger, if a sufficient number of taxis had been available in the city, and the public transport service optimized (Deng et al., 2009).

Recent successes in Hanoi include the introduction of modern electric buses and the opening of the second metro line, but much more remain to be done. Besides buses and metro, sustainable cities promote active transportation modes: Hanoi's infrastructure for walking and cycling can be improved. Besides, compared to Guangzhou, Hanoi has a choice of modern technological solutions like ride hailing cars and motorbikes, carsharing, or shared bicycle fleets which can be introduced.

4. How to minimize the disruptions to people's livelihoods?

First, starting restrictions in Ring Road 1—Hanoi's wealthiest area—demonstrates social equity in policy design. Rather than imposing immediate costs on everybody in Vietnam, the phased approach requires affluent households to bear initial transition burdens while infrastructure and support systems develop for broader implementation.

That said, the social dimensions of Hanoi's transition require careful attention to avoid replicating the harsh outcomes experienced in Chinese cities. The motorcycle economy employs thousands of workers in Hanoi, including delivery drivers, motorcycle taxis, mechanics, and fuel retailers. Geographic and skills mismatches between declining and emerging sectors demand active intervention. The concerns are real and urgent. Delay won't solve them—only active policy intervention will.

Affordability concerns: In a city where per capita annual income is VNĐ 82 million (\$3 240) on average (Anh Tam, 2025), a VNĐ 20 million price tag is prohibitive for many. Low income households do not have the cash to replace an old Honda Wave by a new Vinfast Evo Grande. Hanoi's proposed financial support of VNĐ 3-5 million (\$114-\$191) per vehicle covers only a small fraction of this cost gap. The city's comprehensive support package includes 100% coverage of registration fees and license plate issuance until 2030, subsidized loan programs, and potential trade-in rebates for fossil fuel vehicles.

Socially effective support policies need to reach the right beneficiaries. Based on a large statistical study, Kieu et al. (2024) examined factors causing a positive view of the ban, grouping them in four categories: Socio-economic status; Public transport perception; Motorbike dependence; and Automobile affinity. Unsurprisingly, home and car owners have a better view of the ban than migrant workers who rely on their motorbikes for livelihood activities. That study clarifies the profile of the most impacted populations.

Employment Transition Support: Successful transitions require 18+ months for comprehensive retraining programs, particularly for motorcycle mechanics adapting to electric vehicle systems. Singapore's approach of providing substantial transition support

and early retirement options for older workers offers a model for managing employment disruptions equitably. The informal economy presents particular challenges, as many motorcycle-dependent workers operate outside formal employment systems and lack access to traditional retraining programs.

China's experience with motorcycle bans is particularly instructive. As early as 2017, the vast majority of large and medium-sized cities across China restricted motorcycles (Chen et al., 2021; Guo et al., 2020). The Guangzhou 2007 ban was accompanied by a panel of support measures directed towards residents. But leaving aside migrant workers, particularly middle-aged men whose motorcycle taxi was the only income, was a source of trouble to the public order (Xu, 2015, 2014). Vietnam could face similar difficulties since, like China, it operates a household registration system (Ho Khau) to regulate city residency and related benefits.

5. **Can Vietnamese brands beat Honda and Yadea?**

The motorcycle industry in Vietnam is the 4th largest in the world, and the 3rd for electric vehicles (M. C. D. Team, 2025). The market is mature and around 3 million vehicles per year. In 2020, Honda had a 71.8% market share, followed by Yamaha 15.8% (Huong Le et al., 2022). Year 2024 was moderately positive with 2.9 million sold, but the first half of 2025 was better with 1.6 million unit sold.

Hanoi's ban fundamentally resets Vietnam's motorcycle market, creating opportunities for domestic manufacturers to challenge Honda's historical dominance. The policy creates strong demand signals encouraging both domestic and international investment in Vietnam's EV sector. But traditional manufacturers including Honda, Yamaha, and Suzuki have been late to implement electrification strategies—Honda has only launched the Neo's and ICON e: electric models, while Yamaha introduced its Neo's model in 2022. These companies have expressed concerns about the aggressive timeline in Hanoi.

Vietnamese Market Leadership: VinFast's position as both EV manufacturer and charging infrastructure provider creates unique competitive advantages. The company's integrated approach—controlling vehicle production, charging networks, and battery swapping services—mirrors successful Chinese models while avoiding dependency on foreign technology. As a result of its dominance in the e-scooters segment, Vinfast has reached third place in the market thanks to a +501% sales increase in 2025's first half, far ahead of Yadea (+37.5%), Dibao, Pega and Honda (+6.2%) growth rate.

Including electric bicycles, Vietnam's annual production of electric two wheelers was over 1 million units per year in 2020 (Huong Le et al., 2022). With two plants in Hai Phong and Hà Tĩnh, VinFast's production capacity could extend to about 1 million units by 2026. Still, Yadea Electric Motorcycle Company is building its second plant in Bac Giang for an annual capacity of 2 million electric motorcycles.

Trade and Industrial Benefits: Electrification reduces Vietnam's dependence on fuel imports while building domestic green industry capacity. The transition could strengthen Vietnam's position in regional supply chains, particularly as neighboring countries implement similar policies. Thailand's "EV 30@30" policy targeting 30% electric vehicle production by 2030, and Indonesia's battery production capabilities. Successful industrial transformation requires coordinated policy support beyond the ban itself. Technical standards, supportive regulations, and adequate infrastructure remain essential for Vietnamese manufacturers to compete effectively with established international brands (Thailand BOI, 2024).

Smart grid technology: Vietnam's accelerated electric vehicle transition creates domestic demand for battery technology, smart charging infrastructure, and energy management systems. The convergence of electric mobility and renewable energy through smart charging creates opportunities for Vietnamese manufacturers to develop integrated solutions for ASEAN markets, potentially establishing the country as a regional hub for clean energy-transport technologies.

Hanoi municipality plans to support about 450,000 electric scooters for next year. The Evo Grande has a 400W charger, so when they are all charging they draw 180 MW of power demand. This is small compared to the 5.608 MW peak power demand for Hanoi observed at the end of July 2025 (Thuy Linh, 2025). Looking forward to 2030, we can expect about millions of electric vehicles. If each has a 1 kW charger (already available for the Evo Grande at 1.1 million VND, i.e. \$42), then the power draw is counted in GW. The grid impact requires serious consideration then.

To combat the evening peak power demand, many cities in The Netherlands already pause charging stations between 4pm and 9pm. Almost no electric vehicle on Vietnam's market has smart charging capability. But with proper regulations enforcing smart bidirectional charging for electric vehicles, Hanoi could soon have a multi-GWh distributed battery energy storage system. Electric scooters can not only avoid aggravating the problem, they could be part of the solution. Developing domestic expertise in vehicle-to-grid (V2G) systems not only supports grid resilience, but also positions Vietnam to move up the clean tech value chain by exporting integrated smart energy solutions across the ASEAN region

6. **Is this Vietnam's green turning point?**

The July 2025 directive 20/CT-TTg on environmental protection has much higher stakes than just the transition to fossil fuel free streets in the capital. The directive requires all central and local government entities to focus comprehensively on air, water, and soil protection, positioning the Hanoi ban as a national symbol of renewed commitment to sustainable development goals.

Institutional Coordination

Directive 20 reasserts the Ministry of Natural Resources and Environment's role in directing and guiding ministries, branches, and localities on environmental protection. The directive accelerates realization of a national environmental surveillance system—essential infrastructure for enforcing pollution limits and monitoring transition progress. Community participation mechanisms embed citizen engagement in both transport transition and comprehensive environmental protection.

Financial coordination through environmental fees, green transport incentives, and private sector partnerships creates a unified approach to sustainable urban investment. The motorcycle ban becomes a test case for Vietnam's capacity to implement environment-aware development at scale, with implications extending far beyond Hanoi's borders.

Regional and Global examples

Hanoi will be closely watched by other cities Vietnam and abroad, to see how the ban works compared to alternative policy frameworks offering different pathways to similar goals. Low Emission Zones represent more gradual transitions—London's congestion charge (£15 daily fee) and Berlin's progressive emissions standards achieved significant pollution reductions while maintaining economic flexibility. Stockholm's congestion tax and Milan's Area C access charges demonstrate how cities can achieve environmental goals through economic incentives rather than outright bans, potentially reducing social resistance while maintaining policy flexibility.

In ASEAN, Jakarta's Low Emission Zone development and Bangkok's comprehensive EV infrastructure targets demonstrate regional momentum toward sustainable urban transport, while Indonesia's subsidy program offering Rp 7 million per electric motorcycle for 1 million units between 2023-2024 shows how neighboring countries support electric vehicle adoption through direct financial incentives.

In Colombia, Medellín's comprehensive transport transformation demonstrates how developing cities can achieve measurable environmental and social gains through integrated mobility policies. The city's multimodal system—combining electric metro, cable cars connecting marginalized hillside communities, bus rapid transit, and motorcycle restrictions during pollution episodes—reduced red alert pollution days from 30 in 2016 to just 1 in 2018. Specific achievements include bus fleet modernization of 506 vehicles with cleaner technologies (reducing 4,066 tons CO₂ and 5.4 tons PM_{2.5}), while the metro system alone saves over 200,000 tons of CO₂ annually serving 800,000+ daily passengers. By targeting mobile sources responsible for 80% of the city's air pollution while maintaining equitable access through cable cars serving informal settlements, Medellín exemplifies how transport electrification can deliver both environmental improvements and social inclusion.

7. Conclusion: what does success look like?

Hanoi's transition to fossil fuel free streets is not only an environmental necessity, but also a strategic opportunity. The decision aligns with global trends while reflecting eight years of careful planning since the 2017 announcement. Rather than a rushed policy, this demonstrates how Vietnam has learned from international experience—particularly China's harsh implementations—to develop a more inclusive approach.

The success of this initiative depends entirely on implementation quality across immediate infrastructure needs and long-term social support systems. The technology exists, market demand is growing, and financial mechanisms are in place. What matters now is coordinated execution that ensures no one is left behind during the transition.

This policy extends beyond transportation in Hanoi to become a pivotal test case for Vietnam's sustainable development model. History will judge whether the initiative succeeds in "laying the foundation for the country to firmly enter a new era of development" as envisioned in Directive 20. The evidence suggests that with proper implementation, Hanoi can demonstrate how developing cities can leapfrog to clean technologies while maintaining social equity and economic growth.

The path forward requires maintaining momentum while remaining responsive to implementation challenges. Hanoi's success could inspire similar transitions across Southeast Asia and beyond, contributing to global efforts to build livable, sustainable cities for the 21st century.

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