

# Electric Two-Wheelers in Vietnam

Photo by Ather Energy on Unsplash

## What Germany can learn from Vietnam's electric two-wheeler market

### Key takeaways:

- Electrification of two-wheelers in urban areas offers a significant opportunity to decarbonize transportation, one of the most emission-intensive sectors in both Germany and Vietnam.
- Vietnam's electric two-wheeler adoption rates have seen a remarkable growth due to its affordability, increasing local production capacities, and joint ventures with world-class enterprises, e. g. Vinfast and Bosch.
- Compared to electric cars, electric two-wheelers are more competitive in terms of affordability, maneuverability, and accessibility.
- The growing market in Vietnam could offer opportunities for German companies to export electric two-wheelers or enter joint ventures and provide technology for the charging infrastructure.
- Conversely, Germany could learn from Vietnam on how to incentivize its citizens to shift towards low-carbon two-wheelers in urban areas.

### Introduction

Today, approximately eight out of ten individuals in Vietnam rely on two-wheelers (2Ws) [1] as their primary means of getting around. With a staggering 670 vehicles per 1,000 people, there were 65.2 million 2Ws on the road in 2020 according to the Vietnam Register. These figures put Vietnam on the top rankings in Southeast Asia in terms of 2W ownership rate and greenhouse gas (GHG) emission concentration level from 2Ws. The transport sector accounts for almost one fifth of the total GHG emissions in Vietnam, to which the road transport sub-sector, especially 2Ws due to their large share in transport mode, are contributing the most [2].

Following the country's pledge of reducing emission to net zero by 2050, Vietnam is committed to electrifying nearly the entire vehicle fleet by mid-point of the century according to its national strategy for reducing carbon-dioxide (CO<sub>2</sub>) and methane emissions in the transport sector [3].

Besides the political will, the domestic private sector is proving its capability to lead the electric vehicle (EV) development, particularly in the electric two-wheeler (E2W) sector.

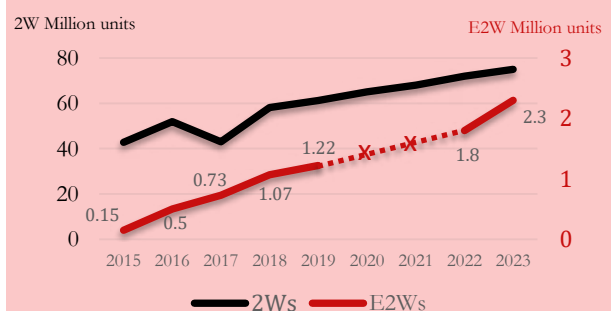
This fact sheet provides an overview of Vietnam's dynamic E2W landscape, highlighting its evolution, key industry players, and key insights for countries like Germany to explore a sustainable alternative to their emission- and energy-intensive modes of transport in urban areas.

### Overview of the E2W market

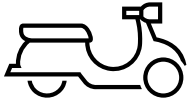
The dominance of motorcycles in Vietnam is a relatively recent phenomenon, gaining momentum following the economic reforms known as Doi Moi in 1986. This period marked a pivotal shift towards market-oriented policies that facilitated foreign investment, particularly from Taiwan and Japan. These investments catalyzed Vietnam's motorbike industry, with foreign investors capturing a significant 90 % share of the 2W market in the country [4]. Leading brands such as Honda, Yamaha, Piaggio, Suzuki, and SYM quickly established themselves as household names across the country.

Since the mid-2000s, Vietnam has witnessed the emergence of E2Ws, introducing new prospects amidst ongoing technological advancements. Despite the modest share of regis-

Graph 1. The number of registered 2Ws and E2Ws over the period of 2015 – 2023 (Million units) [5]

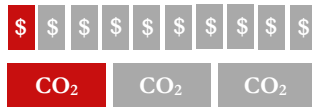


2.3 Mil. units



(as of 12/2023)

E2Ws versus ICE 2Ws



E2Ws cost one-tenth as much to operate and maintain and emit one-third as much CO<sub>2</sub> as internal combustion engine (ICE) 2Ws. [6]

tered E2Ws in the total 2W market (around 2.3 % in 2023) [7], the growth rate of E2Ws has witnessed an upward direction (see Graph 1) [8], which makes Vietnam the largest E2W market in the ASEAN region and the second largest E2W market worldwide, after China [9].

E2Ws have gained traction over the last two decades in Vietnam due to multiple drivers. Notably, E2Ws with smaller battery capacities and lead-acid technologies once dominated the market, catering primarily to elderly and student demographics due to their affordability and exemption from licensing requirements.

Initially, E2Ws in Vietnam were fully imported from China, Japan, and Korea. Since 2018, the domestic manufacturers such as VinFast, Pega, and Selex Motors have started to lead the charge, buoyed by strategic partnerships with global entities like Samsung SDI and Bosch, enhancing local production capabilities and technological advancements. The collaboration with world-class partners has increased trust among users towards local E2W brands.

**Key Vietnamese brands with promising initiatives**

Pega (est. 2012)	Introducing its new model claiming to be the first Artificial Intelligence (AI) -enabled E2W that are made in Vietnam.
VinFast (est. 2017)	Strategically buying batteries from the world's best manufacturers, notably Bosch being used for its Klara model.
Selex Motors (est. 2018)	Primarily targeting cargo delivery business sector; developing its own battery swapping ecosystem; pioneering the first carbon credit project for E2Ws.

At the same time, in the race for consumer attention, some foreign brands increased their focus on the Vietnamese E2W market. For example, Yadea, a Chinese company offering affordable E2Ws, has opened its second plant in Vietnam with a nearly fivefold manufacturing capacity to the first one. In September 2023, BMW Motorrad has introduced its E2W model CE04 in Vietnam for the first

time. BMW and other German brands could further target the higher-price market segment of E2W in Vietnam.

Vietnam's charging infrastructure faces challenges due to a lack of standardization and regulation. Yet, private companies are actively working to bridge this gap. Notably, VinFast is at the forefront of this effort, with 150,000 charging ports spread across all 63 provinces. To ensure accessibility, they have ensured that a station is available every 3.5 kilometers.

**Policy and regulatory frameworks**

In Vietnam, the policy framework for E2W development is evolving amidst ambitious national goals for sustainable transport and emissions reduction. Central to this framework is the Decision No. 876/QD-TTg, which outlines a trajectory towards electrification in the transport sector, aiming for net-zero emissions by 2050. This decision emphasizes the production, assembly, and infrastructure development for electric vehicles (EVs), including E2Ws, over the next decade.

In Vietnam, the safety landscape for 2Ws, including electric ones, is marked by significant challenges and ongoing improvements. Statistically, motorcyclists were responsible for 70 % of all traffic accidents in the country, totaling more than 15,000 events in 2020, with nearly 90 % of accident victims being motorcyclists [10]. The implementation of mandatory helmet laws in 2007 has been pivotal, drastically reducing severe head injuries and fatalities among motorcyclists. A study by the AIP Foundation and FIA Foundation highlighted that increased helmet usage over 10 years (2007-2017) potentially prevented around 500,000 head injuries and 15,000 fatalities [11].

However, the transition to E2Ws presents unique safety considerations. E2Ws, being quieter than conventional motorcycles, pose increased risks of accidents, particularly in urban settings where noise serves as an auditory cue for other road users. Moreover, concerns about fire hazards from lithium-ion batteries and challenges navigating congested streets and flood-prone areas are additional safety factors influencing adoption decisions.

**Outlook for future developments**

Looking ahead, Vietnam's E2W market, while nascent, offers promising entry points for international collaboration in knowledge exchanges and business development, hence a shared vision of zero-emission transportation and sustainable mobility.

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ANNEX

- Two-wheelers in this document refer to motorcycles (engine displacement of 50 cm<sup>3</sup> or greater, and a maximum speed of more than 50 km/h); and mopeds (engine displacement of not more than 50 cm<sup>3</sup> and a maximum speed not exceeding 50 km/h). Electric bicycles are not counted here as two-wheelers. Please see below the table differentiating electric bicycles, electric mopeds, and electric motorcycles according to the National Technical Regulation on Electric Bicycles of the Ministry of Transport. Available at: <http://vr.gov.vn/vn/tin-tuc-su-kien/tin-tuc-chung/tu-van-ve-xe-may-dien-xe-dap-dien-881.html> (Accessed 1 July 2024).

Criteria	Electric bicycles	Electric mopeds	Electric motorcycles
Maximum speed (km/h)	≤ 25	≤ 50	> 50
Weight (kg)	≤ 40	≤ 118	> 118
Motor power (kW)	≤ 0.025	≤ 4	> 4

- Le, H., Posada, F., and Yang, Z. (2022). *Electric two-wheeler market growth in Vietnam: An overview*. International Council on Clean Transportation’s Briefing Paper. Available at: <https://theicct.org/wp-content/uploads/2022/10/E2Ws-Vietnam-Briefing-A4-v4.pdf> (Accessed 25 June 2024).
- The Prime Minister, Decision No. 876/QĐ-TTg date July 22, 2022: Decision on approving the action program for transition to green energy and mitigation of carbon emissions and methane emission from transportation, <https://vanban.chinhphu.vn/?pageid=27160&docid=206188>.
- Le, H., Posada, F., and Yang, Z. (2022). *Electric two-wheeler market growth in Vietnam: An overview*. International Council on Clean Transportation’s Briefing Paper. Available at: <https://theicct.org/wp-content/uploads/2022/10/E2Ws-Vietnam-Briefing-A4-v4.pdf> (Accessed 25 June 2024).
- Please note that due to the negligibly small proportion of E2Ws in the total 2Ws, this graph attempts to highlight the development trend of E2Ws rather than their volume in the entire 2Ws market. Therefore, although both measure units are million units, there is a separate vertical axis illustrating the total number of registered E2Ws in Vietnam. The figures in this graph have been extracted from different sources. Details of the sources are as follows:

	E2Ws (Mil. Units)	Source	2Ws (Mil. Units)	Source
2015	0.15	Please note that this figure represent only 10 % of the total number of E2Ws in circulation due to an absence of mandatory registration pre-2015 according to an	42.8	<a href="https://vietnamnet.vn/dan-viet-so-huu-xe-may-nhieuthu-2-the-gioi-252388.html">https://vietnamnet.vn/dan-viet-so-huu-xe-may-nhieuthu-2-the-gioi-252388.html</a> (Accessed 27 June 2024)

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		article published by the Ministry of Transport (available <a href="#">here</a> , accessed 26 June 2024).		
2016	0.5	TDIS (Transport Development & Strategy Institute). Transport and Logistics Statistic Yearbook; Transport Development & Strategy Institute: Hanoi, Vietnam, 2018. Cited at: <a href="https://www.mdpi.com/2071-1050/15/9/7411#B25-sustainability-15-07411">https://www.mdpi.com/2071-1050/15/9/7411#B25-sustainability-15-07411</a> (Accessed 27 June 2024)	52	Vietnam's Association of Motorbike Manufacturers (VAMM). Available at: <a href="https://vamm.vn/nam-2030-xe-may-van-la-phuong-tien-chu-dao-tai-viet-nam/">https://vamm.vn/nam-2030-xe-may-van-la-phuong-tien-chu-dao-tai-viet-nam/</a> (Accessed 27 June 2024)
2017	0.73	TDIS (Transport Development & Strategy Institute). Transport and Logistics Statistic Yearbook; Transport Development & Strategy Institute: Hanoi, Vietnam, 2018. Cited at: <a href="https://www.mdpi.com/2071-1050/15/9/7411#B25-sustainability-15-07411">https://www.mdpi.com/2071-1050/15/9/7411#B25-sustainability-15-07411</a> (Accessed 27 June 2024)	43	<a href="https://tapchicongthuong.vn/thi-truong-xe-dien-hai-banh-viet-nam--nhu-cau--dac-diem-va-thuc-trang-49181.htm">https://tapchicongthuong.vn/thi-truong-xe-dien-hai-banh-viet-nam--nhu-cau--dac-diem-va-thuc-trang-49181.htm</a> (Accessed 27 June 2024)
2018	1.07	Le, T., Nguyen, L., and Do, T. (2021). Study of electric mobility development in Viet Nam. Report for NDC Transport Initiative for Asia. Available at: <a href="#">Study of electric mobility development in Viet Nam [Nghiên cứu phát triển phương tiện giao thông điện tại Việt Nam] — NDC Transport Initiative for Asia</a> (Accessed 25 June 2024).	58.2	Le, T., Nguyen, L., and Do, T. (2021). Study of electric mobility development in Viet Nam. Report for NDC Transport Initiative for Asia. Available at: <a href="#">Study of electric mobility development in Viet Nam [Nghiên cứu phát triển phương tiện giao thông điện tại Việt Nam] — NDC Transport Initiative for Asia</a> (Accessed 25 June 2024).
2019	1.22	Le, T. Promoting E-mobility in Vietnam. Available at: <a href="#">Nghiên cứu xây dựng tiêu chí lựa chọn thành phố thí điểm phương tiện giao thông điện tại Việt Nam (asew-expo.com)</a> (Accessed 25 June 2024).	61.3	<a href="https://vietnamnet.vn/en/vietnam-ranks-fourth-among-countries-with-largest-number-of-motorcycles-552924.html">https://vietnamnet.vn/en/vietnam-ranks-fourth-among-countries-with-largest-number-of-motorcycles-552924.html</a> (Accessed 25 June 2024).

2020	Not available	Due to COVID-19, there is no official data on this	65	<a href="https://vnexpress.net/thi-truong-xe-may-viet-se-khong-tang-truong-dot-bien-4370037.html">https://vnexpress.net/thi-truong-xe-may-viet-se-khong-tang-truong-dot-bien-4370037.html</a> (Accessed 27 June 2024).
2021	Not available	Due to COVID-19, there is no official data on this	68	<a href="https://tuoitre.vn/xe-may-se-phai-kiem-dinh-khi-thai-tu-1-1-2025-20240630142227123.htm">https://tuoitre.vn/xe-may-se-phai-kiem-dinh-khi-thai-tu-1-1-2025-20240630142227123.htm</a> (Accessed 27 June 2024).
2022	1.8	TDIS (Transport Development & Strategy Institute). Transport and Logistics Statistic Yearbook; Transport Development & Strategy Institute: Hanoi, Vietnam, 2018. Cited at: <a href="https://www.mdpi.com/2071-1050/15/9/7411#B25-sustainability-15-07411">https://www.mdpi.com/2071-1050/15/9/7411#B25-sustainability-15-07411</a> (Accessed 27 June 2024)	72	Vietnam’s Association of Motorbike Manufacturers (VAMM). Available at: <a href="https://www.24h.com.vn/xe-may-xe-dap/co-hon-72-trieu-xe-may-sao-nguoi-viet-van-mua-hang-trieu-xe-moi-moi-nam-c748a1488227.html">https://www.24h.com.vn/xe-may-xe-dap/co-hon-72-trieu-xe-may-sao-nguoi-viet-van-mua-hang-trieu-xe-moi-moi-nam-c748a1488227.html</a> (Accessed 27 June 2024)
2023	2.3	Ministry of Transport. Available at: <a href="https://tuoitre.vn/xe-may-dien-trong-buc-tranh-tuong-lai-xanh-cua-viet-nam-20240123152656392.htm">https://tuoitre.vn/xe-may-dien-trong-buc-tranh-tuong-lai-xanh-cua-viet-nam-20240123152656392.htm</a> (Accessed 27 June 2024)	75	Ministry of Transport. Available at: <a href="https://tuoitre.vn/xe-may-dien-trong-buc-tranh-tuong-lai-xanh-cua-viet-nam-20240123152656392.htm">https://tuoitre.vn/xe-may-dien-trong-buc-tranh-tuong-lai-xanh-cua-viet-nam-20240123152656392.htm</a> (Accessed 27 June 2024)

6. This finding was extracted from a report titled “Mainstreaming electric mobility in Vietnam (focusing on two-wheelers)” published by the United Nations Environment Programme (UNEP). The project was funded by the International Climate Initiative (IKI) led by the Federal Ministry for Economic Affairs and Climate Action, with the participation of the research group from the University of Transport Technology, experts from Ministry of Transport, National Traffic Safety Committee, Vietnam Registry and Vietnam Association of Motorcycle Manufacturers. More information available at <https://ikinews.climatechange.vn/electric-two-wheelers-project-completes-research-work/> (Accessed 26 June 2024).
7. Please see the source for the figure in 2023 in the table listed in the note #5.
8. Graph 1 illustrates an upward direction with an assumption that there were neither an exponential growth nor significant drop between 2020 and 2021 due to COVID-19.
9. Vietnam News, 2023. *Partnerships key to developing electric two-wheelers: experts* [Online]. Available: <https://vietnamnews.vn/economy/1535498/partnerships-key-to-developing-electric-two-wheelers-experts.html> (Accessed 26 June 2024).

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10. [https://www.unescap.org/sites/default/d8files/event-documents/3\\_Viet%20Nam%27s%20road%20safety%20national%20targets%20and%20action%20plan.pdf](https://www.unescap.org/sites/default/d8files/event-documents/3_Viet%20Nam%27s%20road%20safety%20national%20targets%20and%20action%20plan.pdf) (Accessed 26 June 2024).
11. <https://www.aip-foundation.org/new-report-aip-foundation-fia-foundation-marks-10-year-anniversary-vietnams-universal-helmet-law/> (Accessed 26 June 2024).