WORKING PAPER 2022-19

JUNE 2022

Market analysis of two- and three-wheeler vehicles in key ASEAN member states

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Keywords: Two- and three-wheelers, electric two- and three-wheelers, ASEAN countries mopeds.

1. Introduction

In many of the 10 member states of the Association of Southeast Asian Nations[1] (ASEAN), two-wheelers (2Ws) and three-wheelers (3Ws) are dominant transport modes. In Vietnam, for example, at the end of 2020, more than 80% of travel demand in the country was met by the country's 65.2 million registered 2Ws.[2] Two-wheeler sales in key ASEAN member states that track monthly and annual sales data (the "ASEAN Seven" nations of Indonesia, Thailand, the Philippines, Vietnam, Cambodia, Malaysia, and Singapore) grew steadily between 2010 and 2019, with annual sales peaking in 2019 at nearly 15 million units, some 22.1% of the 2W global market.[3] Two-wheeler sales declined to 10.9 million vehicles in the first COVID year, 2020, but still accounted for 18.1% of 2W sales worldwide. The large share of 2Ws in ASEAN countries generates significant challenges to air quality, noise levels, road safety, and greenhouse gas emissions (GHG), with adverse impacts on health and the environment. These impacts have led governments to take corrective actions, including promoting public transport, introducing stringent vehicle emission standards, implementing low-emission zones, and promoting electric vehicles. However, the implementation and effectiveness of these actions vary significantly across countries.

This paper provides an overview of the two- and three-wheeler (2&3W) market in the ASEAN Seven member states in 2019 and 2020. The paper also analyzes and compares the 2&3W markets in a subset of four countries whose data is further segmented by

1 ASEAN member states include Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

2 Vietnam Register, http://www.vr.org.vn/.

3 "ASEAN 2021. Two-Wheeler Industry Recovery is Slow and Still 2.5 Million Below Pre-Covid Level," MotorcyclesData, accessed February 22, 2022, https://www.motorcyclesdata.com/2021/10/21/ASEAN-motorcycles-industry/.

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Acknowledgments: The authors thank Francisco Posada, Sunitha Anup, Anh Bui, Ashok Deo, and Gary Gardner for their inputs and critical reviews of an earlier version of this report. This publication is part of NDC Transport Initiative for Asia (NDC-TIA). NDC-TIA is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation, and Consumer Protection (BMU) supports the initiative on the basis of a decision adopted by the German Bundestag. For more visit: https://www.ndctransportinitiativeforasia.org/

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fleet characteristics (e.g., body type, engine displacement), brand, and top-selling models. These four countries—Indonesia, Thailand, the Philippines, and Vietnam—are known collectively in this paper as the "ASEAN Four" market leaders. The 2&3W sales in these four market leaders accounted for 91.4% of total 2&3W sales in the ASEAN Seven countries in this study. In addition, the paper describes and analyzes the uptake of electric two-wheelers (E2Ws) and electric three-wheelers (E3Ws), characteristics of E2W and E3W fleets, market share by brand, and top-selling models of these four countries. This paper's profile of the 2&3W market in the ASEAN region could be used to support future policy development in mitigating the negative impacts of 2&3Ws and in building sustainable transport in the region. Future policy initiatives, for example, might be used to support production of E2Ws and E3Ws, to promote and integrate E2Ws and E3Ws in transport systems, and to limit the increase in the number of internal combustion engine (ICE) 2&3Ws. The paper can also shed light on the impact of the COVID-19 pandemic on 2&3W markets in the region as the time frame covers 2019 and 2020. Table 1 presents the ASEAN country groupings as used in this paper.

Table 1. ASEAN country groupings as used in this paper

Group Name	Members	Defining characteristics
ASEAN Seven members	Thailand, Malaysia, Indonesia, Vietnam, the Philippines, Singapore, and Cambodia	ASEAN countries that keep monthly and annual sales data
ASEAN Four leading markets	Indonesia, Thailand, the Philippines, Vietnam	ASEAN countries that keep monthly and annual sales data, as well as data on market share by brand and key features. These four are the largest ASEAN markets.

This paper begins by introducing data sources and data availability on the 2&3W market in the ASEAN Seven countries. Monthly and annual 2&3W sales in 2019 and 2020 are analyzed and presented in section 3. Then, the 2&3W market shares, by brand and key features of 2&3W fleets, are analyzed and compared, focusing mainly on the ASEAN Four countries that have data available at the model level, and with results presented in sections 4 and 5. Section 6 presents the top selling 2&3W models in these four countries. Section 7 describes E2W and E3W market shares, by major brand and key features, in the ASEAN Four nations. Finally, the key findings of the paper are summarized in Section 8.

2. Data description

For this analysis, a database of 2&3W fleets sold in Thailand, Vietnam, Indonesia, the Philippines, Malaysia, Singapore, and Cambodia in 2019 and 2020 was developed. The database was compiled mainly from

» MotorCycle Data (https://www.motorcyclesdata.com/),

» public websites of manufacturers (e.g., www.honda.com.vn/, https://gesitsmotors.com/en/), and

» showroom information (e.g., https://thegioixechaydien.com.vn/).

Table 2 summarizes the data availability, broken down by brand, model, and key characteristics of 2&3W fleets in the ASEAN Seven countries in 2019 and 2020. As shown, the data on vehicle brand is 100% available for all countries. Data on vehicle models, body type, engine displacement, and number of wheels are 100% available for the ASEAN Four countries. However, the data availability on characteristics of electric 2&3W models (including battery capacity, battery type, top speed, max range, and battery removability) varies among these four countries. Data on 2&3W models and fleet characteristics were unavailable for Cambodia, Malaysia, and Singapore.

Table 2. Data availability of 2&3W characteristics in ASEAN Seven countries

Year	Nation	All vehicles				ICE 2/3Ws	Electric 2/3Ws				
		Brand	Model	Body Type	Wheels	Engine Displacement (cc)	Battery Capacity (kWh)	Battery Type	Top Speed (km/h)	Max Range (km)	Battery removible
2019	Cambodia	100%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Malaysia	100%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Singapore	100%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Indonesia	100%	100%	100%	100%	100%	98.9%	98.9%	98.9%	98.9%	98.9%
	Thailand	100%	100%	100%	100%	100%	69.4%	79.7%	79.5%	79.5%	65.0%
	Philippines	100%	100%	100%	100%	100%	85.2%	96.0%	96.0%	96.0%	94.2%
	Vietnam	100%	100%	100%	100%	100%	94.3%	98.9%	98.9%	98.9%	98.1%
2020	Cambodia	100%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Malaysia	100%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Singapore	100%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Indonesia	100%	100%	100%	100%	100%	98.5%	98.1%	98.5%	98.5%	97.1%
	Thailand	100%	100%	100%	100%	100%	90.9%	92.3%	92.3%	91.5%	90.0%
	Philippines	100%	100%	100%	100%	100%	95.9%	95.9%	95.9%	95.9%	95.5%
	Vietnam	100%	100%	100%	100%	100%	98.2%	99.4%	99.4%	99.4%	98.3%

Note. n/a = not available

Note that there are different definitions and classifications of 2&3Ws among countries. Therefore, to synchronize the analysis and data in this paper, definitions and classifications of 2&3Ws have been adopted from MotorCycles Data.[4] Regarding 2Ws, four vehicle body types were included in the analysis, including moped, underbone, scooter, and motorcycle. The definition of these body types is presented in Table 3.

Table 3. Definitions and classification of 2Ws by body type

Body type	Examples
Moped • Operates by engine or pedals like a bicycle (sometimes does not have pedals) • Engine below seat, slim frame • Engine displacement < 50 cc • Speed < 30 km/h	 Hero XL-HD  Honda Ruckus
Underbone • No structural member connecting the headstock to the structure under the front of the seat, and no fuel tank or similarly styled appendage in the space between the rider's knees • Single tube frame supports the entire bike • Chain drive, pedal shifting • Fuel tank under the seat • Maximum engine displacement 150 cc	 Yamaha Jupiter 125  Honda Winnex X150
Scooter • A step-through frame; platform for the riders' feet • Engine enclosed within bodywork • Compartment located under the seat • Automatic clutch and continuously variable transmission • Engine capacity: 50 cc single-cylinder to 850 cc twin-cylinder	 Piaggio - Vespa  Yamaha - Majesty
Motorcycle • Various models: naked, touring/cruiser, sport bike, enduro type • Fuel tank usually in front of rider	 Suzuki Bandit 1250S  Honda Africa Twin

4 Motorcycles Data (2020). "Global Models Classification." https://www.motorcyclesdata.com/data-center/global-models-segmentation.

Regarding 3Ws, three different body types were sold in the region in 2019 and 2020, including scooter 3Ws, 1X2 trikes, and commercial 3Ws. Figure 1 gives examples of these body types.

(a) Scooter 3W (Piaggio MP3 300[5])

(b) 1X2 Trike 3W (Yamaha NIKEN[6])

(c) Commercial 3W (BEMAC 68VM[7])

Figure 1. Examples of 3W body types

3. Overview of 2/3-wheeler market sales

Total 2&3W sales by country in 2019 and 2020 in ASEAN Seven markets

Figure 2 presents the annual sales of 2&3Ws in the ASEAN Seven countries in 2019 and 2020. In this paper, the terms 2&3W market, 2W market, and 3W market refer to markets for both internal combustion (ICE) and electric vehicles. In total, 10.9 million vehicles (of all types) were sold in 2020, a reduction of 28.9% compared to 2019, mainly because of the COVID-19 pandemic effects. The 2&3W markets declined in 2020 in all seven countries compared with 2019. In both years, Indonesia had the largest 2&3W market, followed by Vietnam and the Philippines; Singapore had the smallest market. In 2020, 3.7 million 2&3Ws were sold in Indonesia, whereas the number of 2&3Ws sold in Singapore was 11,300. Three-wheelers were offered in three countries including Indonesia, the Philippines, and Thailand. However, 3W sales in these countries were relatively small, accounting for only 0.01% of Thailand's 2&3W market, 0.06% of Indonesia's 2&3W market, and 0.78% of the Philippines' 2&3W market, in 2020. The market share of 3Ws in these three countries was very small, accounting for only 0.14% of 2&3W fleet in the ASEAN Seven countries.

In 2020, Indonesia experienced the deepest drop in 2&3W sales among the seven countries, declining by 43.7% compared to 2019. Singapore and the Philippines also experienced significant sales declines in 2020, shrinking by 41.5% and 30% compared to 2019, respectively. Vietnam, Thailand, Malaysia, and Cambodia were the least affected countries; total 2&3W sales in 2020 were 13.6%, 9.7%, 8.6%, and 19.8% lower, respectively, than in 2019.

5 https://www.piaggio.com/gb_EN/models/mp3/mp3-300-hpe-2020/
6 https://www.yamaha-motor.co.th/bigbike/niken/overview
7 https://www.bemac-philippines.com/en/electric-tricycles/models/68vm-passenger

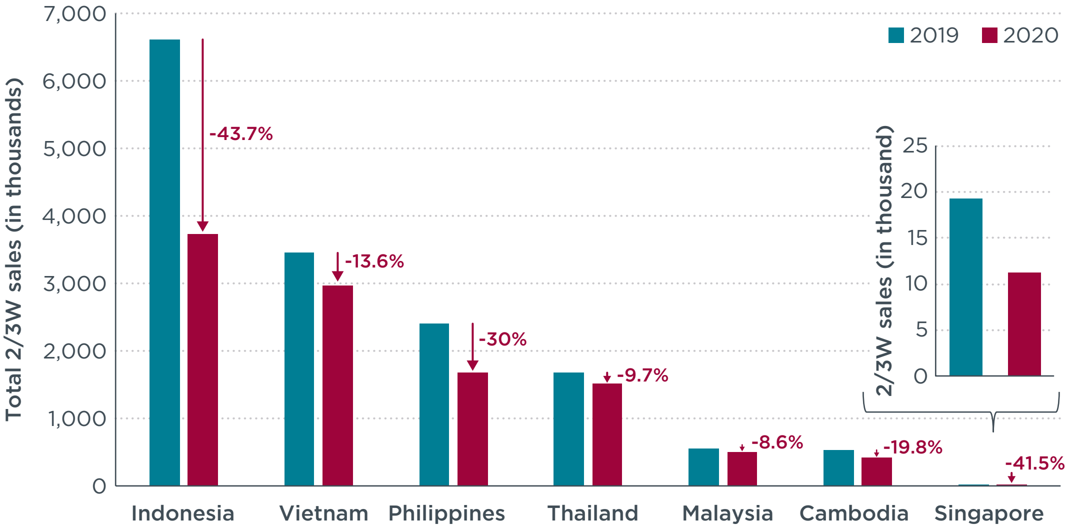
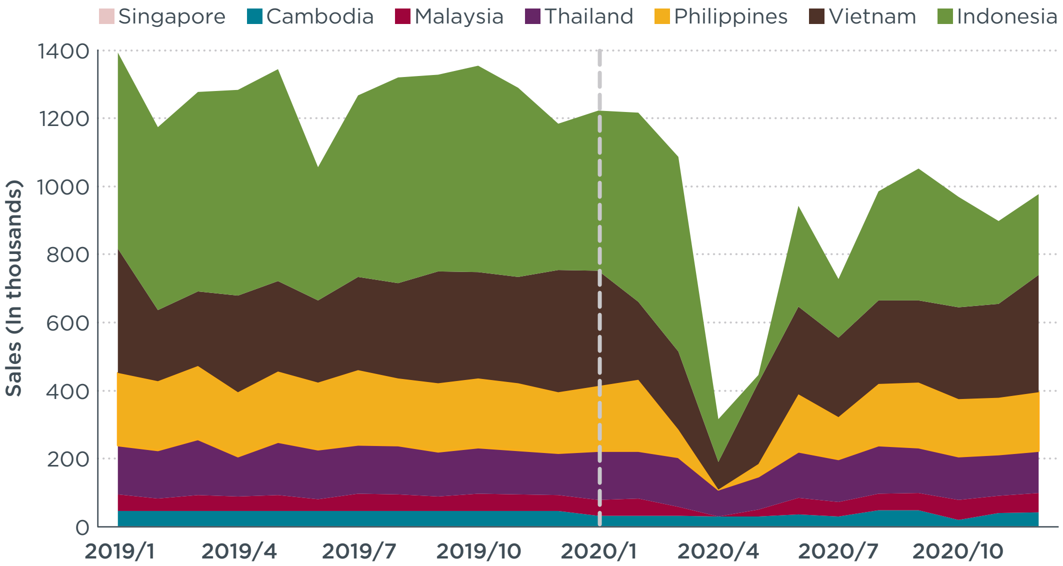


Figure 2. Total annual sales of 2&3Ws in the ASEAN Seven countries in 2019 and 2020

Monthly sales of 2&3Ws in 2019 and 2020 in the ASEAN Seven markets

Figure 3 shows monthly sales of 2&3Ws in 2019 and 2020, illustrating the seasonal pattern of vehicle purchases and the impact of the COVID pandemic on vehicle sales. In general, there was no clear seasonal pattern in 2&3W sales in the region. In 2019, monthly sales in Singapore, Cambodia, Malaysia, Thailand, and the Philippines were relatively stable. In Vietnam, vehicle sales in January and December were slightly higher than in other months in general. At the end of 2019 and the beginning of 2020, essentially the onset of the COVID pandemic, the 2&3W market in ASEAN Seven countries declined sharply, with the deepest drop coming in April 2020. At that time, several countries were under lockdown, which strongly affected the production and distribution of 2&3Ws in these countries. However, after April, the 2&3W market in the region gradually recovered. Vietnam, Thailand, and Malaysia recovered to near-previous levels. An exception was Indonesia, where the 2&3W market in 2020 was still far below 2019 levels, which contributed significantly to the contraction of the 2&3W market in the ASEAN region in 2020.



Note: Sales of 2&3W in Singapore were quite small and are not shown in the figure

Figure 3. Monthly sales of 2&3Ws in the ASEAN Seven countries in 2019 and 2020

2W and 3W sales in Indonesia, Vietnam, Thailand, and the Philippines in 2019 and 2020

Figure 4 shows annual sales of 2Ws and 3Ws in 2019 and 2020 in Indonesia, Vietnam, the Philippines, and Thailand, the ASEAN Four leading markets. Indonesia had the largest 2W market in the region and the Philippine 3W market was the largest in the region in both years.

Regarding the 2W market, shown in Figure 4a, Indonesia and the Philippines were the most affected in 2020; the 2W market in these countries declined by 43.7% and 29.9%, respectively, compared to 2019. In comparison, the other countries experienced smaller declines, with Thailand's growth at -9.7% and Vietnam's at -13.6%. As shown in Figure 4b, only three countries sold 3Ws: Indonesia, Thailand, and the Philippines. In Vietnam, 3Ws are not a common transport mode, and their use is strongly restricted. Thus, 3W sales in Vietnam are very small and may not register in the database. Indonesia and the Philippines, the two largest 3W markets, also had the biggest market losses among three countries. In 2020, 3W sales in Indonesia and the Philippines fell by 40.1% and 40.5%, respectively, compared to 2019. Thailand had the lowest 3W sales among three countries but was the only one to experience growth. The number of 3Ws sold in Thailand increased from 76 vehicles in 2019 to 132 vehicles (a 73.7% increase) in 2020.

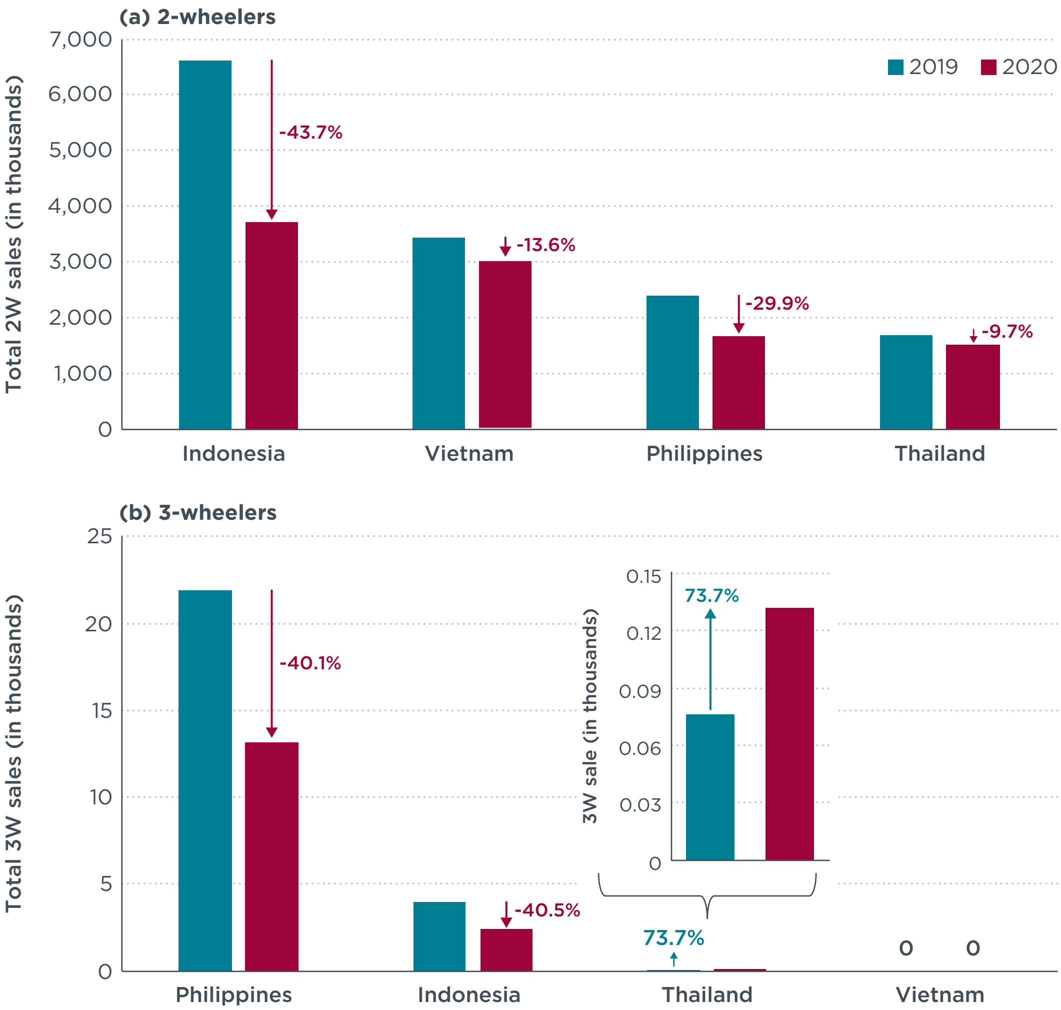


Figure 4. Comparison of 2W and 3W sales by country, ASEAN Four nations, 2019 and 2020

E2W and E3W sales by country in 2019 and 2020

The number of E2Ws sold in the ASEAN Four nations in 2019 and 2020 is presented in Figure 5. The trend for E2Ws was the opposite of the trend in the 2&3W market: in 2020, sales of E2Ws increased in all four countries compared with 2019. Although Thailand sold the fewest E2Ws among four countries, it experienced the largest growth. Vietnam was the leading country in E2W sales in the region, with more than 250,000 E2Ws sold in 2020, an increase of 43.5% compared to 2019.

E3W sales were much smaller, and only occurred in the Philippines and Thailand. In 2019, E3Ws were offered for sale only in the Philippines, with total sales of 2,595 vehicles. In 2020, 2,433 E3Ws were sold in Thailand and the Philippines, of which 2,364 vehicles were sold in the Philippines and 69 in Thailand.

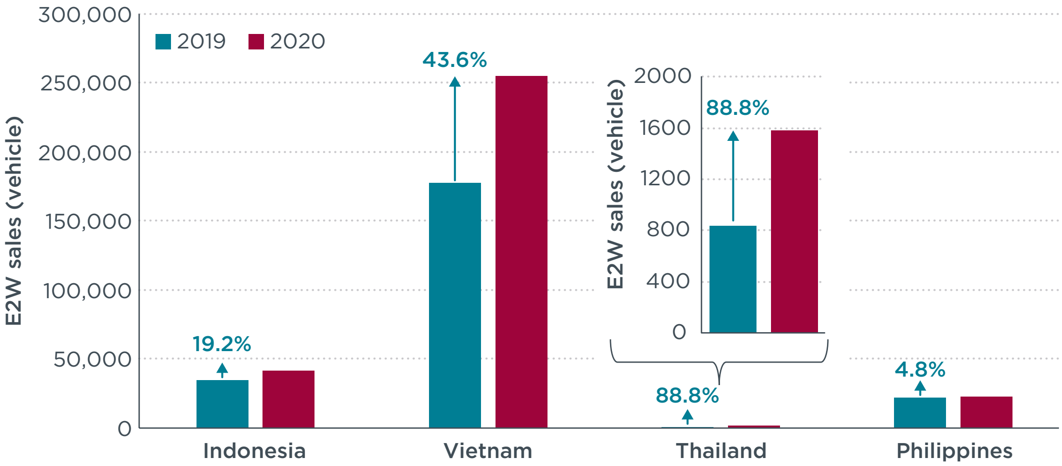


Figure 5. Comparison of E2W sales by country, ASEAN Four nations, 2019 and 2020

E2W market share

The market share of E2Ws in Indonesia, Thailand, and the Philippines is relatively small, less than 1.5% of all 2Ws sold, whereas the market share in Vietnam was approximately 8.5% in 2020. In 2019, only 1.7% of the 2Ws sold in the ASEAN Four countries were E2Ws, compared to 3.2% in 2020 (an increase of 95.3% compared to 2019). In 2019, the share of E2Ws was still very low across the ASEAN Four, with less than 1% of the market share in Indonesia (0.52%), Thailand (0.05%), and the Philippines (0.9%). However, the share of E2Ws in Vietnam was far greater, 5.14%. In 2020, the market share of E2Ws grew significantly in all four countries. The share of E2Ws in the Philippines doubled from 0.52% in 2019 to 1.1% in 2020 and increased from 0.9% in 2019 to 1.34% in Indonesia. Thailand had the smallest E2W market share among the four countries, but growth was robust; it doubled from 0.05% to 0.1% between 2019 and 2020. Meanwhile, as in 2019, Vietnam had the largest share of E2Ws among the four countries, and it grew substantially, to 8.54% of the 2W market. The change in E2W market share between 2019 and 2020 is shown in Figure 6.

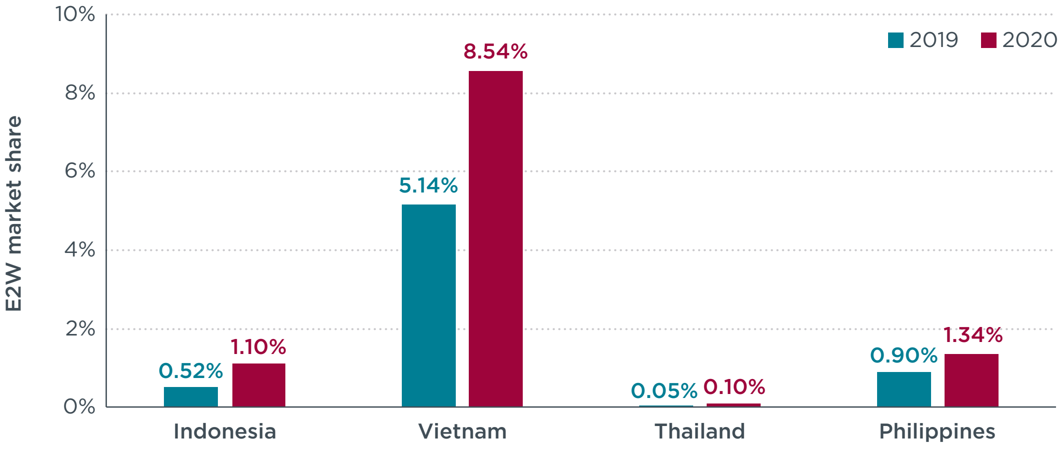


Figure 6. Change in E2W market share, ASEAN Four nations, 2019 and 2020

4. Comparison of 2&3W market share by major brands

This section presents the 2W and 3W market share by brand for Indonesia, Vietnam, Thailand, and the Philippines, the ASEAN Four nations that maintain segmented data. Although the 2W market declined sharply in 2020 compared to 2019, there were only slight changes in the market shares of key 2W brands in all countries. In contrast, 3W market share by brand changed significantly between 2019 and 2020.

2W market

The 2W market share by major brand in the ASEAN Four nations is shown in Figure 7. In 2020, there were 34, 32, 75, and 36 brands offering 2Ws in Indonesia, Vietnam, Thailand, and the Philippines. This paper analyzes the top five major brands in each country and each year. These five accounted for more than 95% of total 2W sales in Indonesia, Vietnam, and Thailand, and more than 83% in the Philippines.

The majority of 2Ws sold in these countries were from Honda and Yamaha, accounting for 67.4% and 18.2% of 2020 sales, respectively, or 85.6% for the two firms together. The market shares of these two brands were relatively similar between 2019 and 2020. Regarding the other three brands in each country, the ranking positions were changed, and some brands were listed in the top five brands in 2019 but not included in the top five brands in 2020.

Honda had the largest share of 2W markets in all four countries, especially in Indonesia (77.5%), Thailand (77.7%), and Vietnam (71.8%). In the Philippines, Honda's share was 27.5%. Yamaha was a distant second in these countries, with a 2W market share of 18.2%, 15.8%, and 15.8% in Indonesia, Vietnam, and Thailand, respectively. The Philippines' 2W market was more diverse, with Kawasaki, Rusi, and Suzuki also being common brands.

In general, the 2W market in these four countries was dominated by Japanese brands, including Honda, Yamaha, Kawasaki, and Suzuki. Piaggio, an Italian brand, was also among the top five in Thailand. Several local brands also landed in the top five 2W brands in these countries: Viar and Gesits in Indonesia, Vinfast and Pega in Vietnam, GPX in Thailand, and Rusi in the Philippines. Despite being in the top five, the market shares of these firms were relatively small and similar in both years, except VinFast in Vietnam. The 2W market share of VinFast in Vietnam increased significantly, from 1.4% in 2019 to 3.7% in 2020.

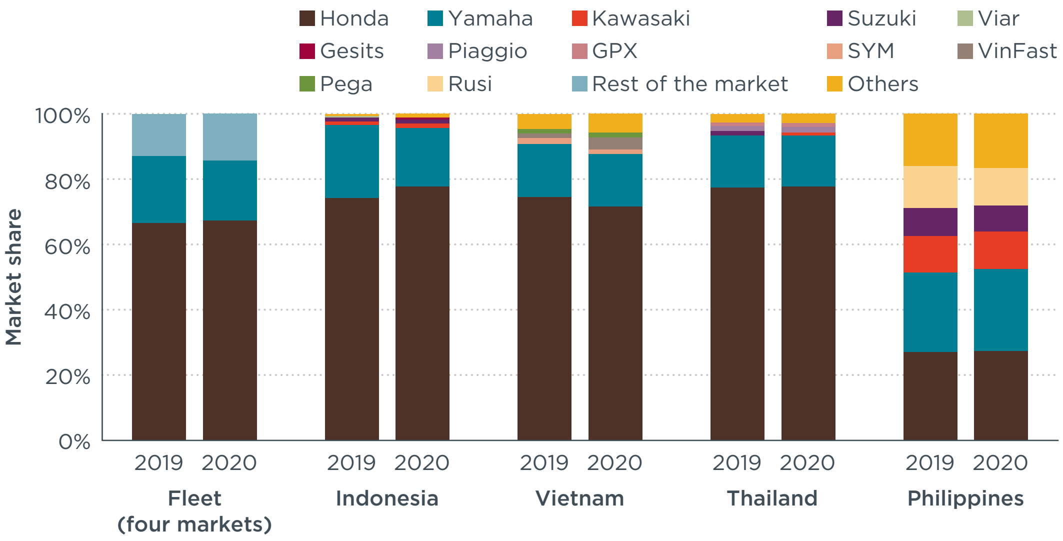


Figure 7. Segmentation of the 2W market by brand in the ASEAN Four nations, 2019 and 2020

3W market

Figure 8 shows the 3W market share by brand in Indonesia, Thailand, and the Philippines in 2019 and 2020. Several brands, such as Yamaha and Piaggio, sold both 2Ws and 3Ws in these countries. The 3W market share by brand was different between 2019 and 2020, particularly in Indonesia and Thailand. Piaggio was the only brand that offered 3Ws in all three countries, and it had the largest market share in Indonesia. Piaggio's 3W market share in Indonesia increased significantly, from 50.7% in 2019 to 76.8% in 2020. Bajaj, an Indian brand, was a large 3W brand in Indonesia and the Philippines; it sold 38.9% of the 3Ws in these countries in 2020 but did not offer their 3Ws in Thailand. Similarly, Yamaha was a large 3W brand in Thailand and the Philippines, but it did not offer 3Ws in the Indonesian market. As the largest and most diverse 3W market in the region, the Philippines saw little change in the 3W market share by brand between 2019 and 2020. In 2020, 42.8% of 3Ws sold in the Philippines were from Bajaj, followed by TVS, another Indian brand, with 17.8%. In Thailand, in 2019, 3Ws were sold by Yamaha and Piaggio only, but in 2020, four more brands offered 3Ws and Yamaha still had the largest 3W market share in both years. Several local brands also offered 3Ws in these countries, including Rusi in the Philippines, and BIZ NEX Motor and Tuktuk in Thailand.

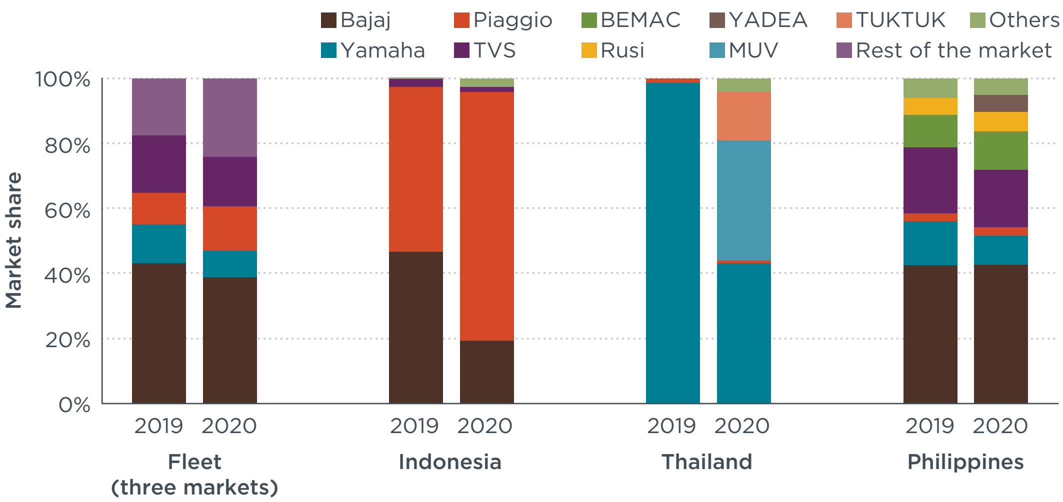


Figure 8. Segmentation of 3W market share by key brands in Indonesia, Thailand, and the Philippines, 2019 and 2020

5. Comparison of 2&3W market share by key characteristics

This section analyzes and compares the characteristics of the 2W and 3W fleets of the ASEAN Four countries. As the top four 2&3W markets in the ASEAN region, their 2&3W sales shares accounted for 91.4% of sales in the seven countries in this study, so they can be considered representative of the ASEAN region. Characteristics compared include body type, engine displacement, and fuel types. Data on 2&3W fleet characteristics of other ASEAN countries are not available; thus, they are not described in this section.

2W market characteristics

By body type

Two-wheeler body types varied greatly among the four countries and are presented in Figure 9. In general, scooters were the most common in all four countries, accounting for 60.1% of the 2019 2W fleet, and 62% of the 2020 fleet. The next most common type was underbone 2Ws with a market share of 24.8% in 2019 and 25.8% in 2020. Motorcycles had the lowest market share 2Ws in the four countries, at 15.1% in 2019 and 12.3% in 2020. Two-wheeler market shares by body type between 2019 and 2020 in Vietnam and Thailand did not change greatly. But the Philippines experienced a significant change in market share by body type between these two years.

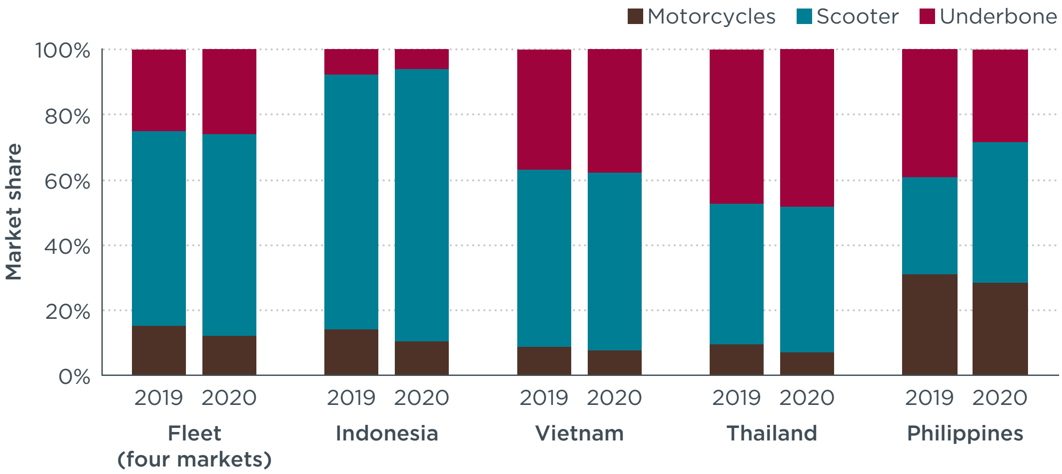


Figure 9. The 2W market share by body types, ASEAN Four nations, 2019 and 2020

In all four countries, the scooter has become more common in 2W markets. The share of scooters was highest in Indonesia, accounting for 78.2% of Indonesia's 2W market in 2019 and 83.6% in 2020. Next were Vietnam (54.5% in 2020) and Thailand (44.5% in 2020). Only 29.7% of the 2Ws sold in the Philippines in 2019 were the scooter body type, but the market share of this vehicle type increased to 43.2% in 2020. Three countries (not including Vietnam) experienced an increase in the market share of scooters between 2019 and 2020. Underbone 2Ws were most popular in Thailand, with a market share of 47.3% in 2019 and 48.4% in 2020, followed by Vietnam and the Philippines. Indonesia had the lowest share of underbone 2Ws among four countries, accounting for only 7.6% of Indonesia's 2W market in 2019, a share that declined to 5.8% in 2020.

The Philippines had the largest share of motorcycles among the four countries, 31% in 2019 and 28.5% in 2020. Indonesia was next, with a share of 14.2% in 2019 and 10.6% in 2020. Motorcycles had smaller shares in 2W markets in Thailand and Vietnam, with only 7.2% in Thailand and 7.8 % in Vietnam in 2020. In general, the market share of motorcycles in 2020 was reduced in all four countries compared with 2019.

By engine displacement

Figure 10 shows the distribution of the 2W market by engine displacement in Indonesia, Vietnam, Thailand, and the Philippines. In general, the 2W market segmented by engine displacement did not change greatly across the four countries between 2019 and 2020. Two-wheelers with engine displacement between 100 cc and 125 cc were the most popular in all countries, accounting for 62.9% of the 2W market in the four countries. In 2020, the market shares of this vehicle type were 52.9% in Indonesia, 65.7% in Vietnam, 76.3% in Thailand, and 68.1% in the Philippines. Two-wheelers with engine displacement smaller than 50 cc were least popular in all four countries, with a share of only 0.5%. These small 2Ws were more common in Vietnam than in other countries, accounting for 1.5% of Vietnam's 2W market in 2020.

In 2020, 13.6% of 2Ws sold in the ASEAN Four had engine displacement greater than 150 cc. These engines accounted for 18.8% and 18.1% of the Philippines' 2W market in 2019 and 2020, respectively. Market shares in the other three countries were smaller but increased between 2019 and 2020, in contrast to the Philippine market share. Two-wheelers with engine displacement between 125 cc and 150 cc experienced the largest reduction in market share, falling from 13% in 2019 to 10% in 2020. The Philippines experienced the largest decrease, declining from 18% in 2019 to 11.9% in 2020. Two-wheelers with engine displacement between 50 cc and 100 cc, the most common size in Indonesia and Vietnam, accounted for 14.9% of Indonesia's 2W market and 13.3% of Vietnam's 2W market in 2020. All internal combustion 2Ws in the four countries were powered by gasoline.

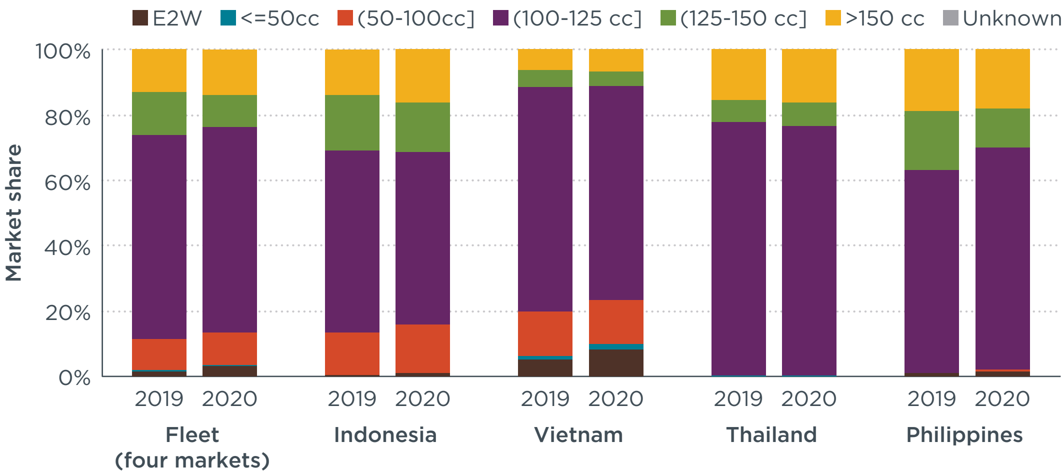
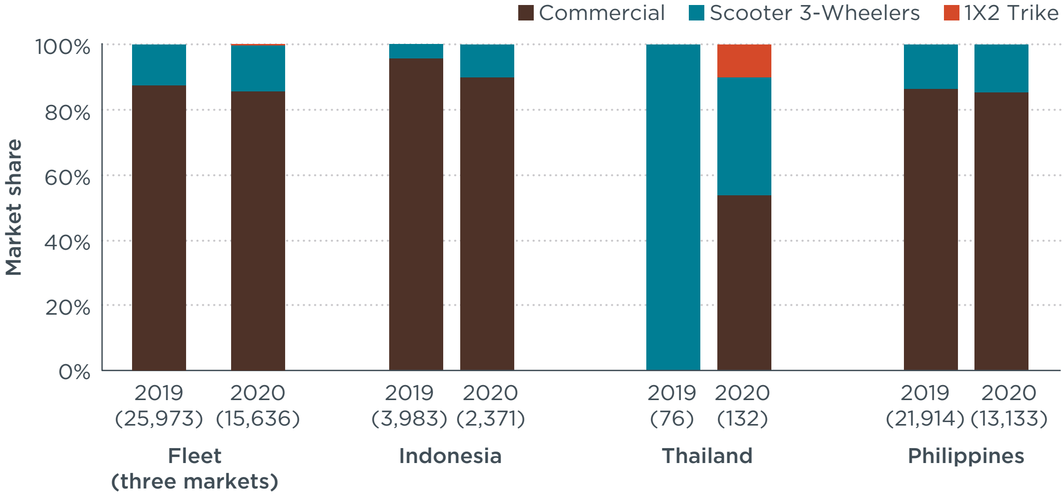


Figure 10. The 2W market share by engine displacement, ASEAN Four nations, 2019 and 2020

3W market characteristics

By body type

The 3W market segmented by body type in Indonesia, Thailand, and the Philippines in 2019 and 2020 is shown in Figure 11. In 2020, 86% of 3Ws sold in three countries were commercial 3Ws, whereas only 13.9% were scooter 3Ws and 0.1% were 1x2 trike 3Ws. In general, Thailand experienced a significant change in the 3W market segmented by body type, whereas Indonesia and the Philippines experienced slight changes. Commercial 3Ws were the most popular in Indonesia and the Philippines, accounting for 90.1% and 85.5% of 3W market in Indonesia and the Philippines in 2020, respectively. Scooter 3Ws were not common in these two countries and had a significantly smaller share than commercial 3Ws, with only 9.9% of Indonesia's 3W market and 14.5% of the Philippines' 3W market in 2020. In contrast, all 3Ws in Thailand were scooter 3Ws in 2019, but their share fell substantially to 36.4% in 2020. In 2019, 1x2 trike 3Ws were not offered in all three countries, but they accounted for 9.8% of the 3W market in Thailand in 2020. It should be noted that the 3W market in Thailand was much smaller than in the other two countries, but its 3W market was more diverse in vehicle type in 2020.



Note: numbers in parenthesis indicate total sales of 3Ws.

Figure 11. The 3W market share by body type in Indonesia, Thailand, and the Philippines in 2019 and 2020

By engine displacement

Figure 12 shows the 3W market share segmented by engine displacement in Indonesia, Thailand, and the Philippines in 2019 and 2020. In general, 3Ws with engine displacement between 175 cc and 200 cc had the largest share of the 3W market in all three countries, followed by 3Ws with engine displacement smaller than 125 cc. In 2020, 54.2% of 3Ws sold in all countries had engine displacement between 175 cc and 200 cc and all of them were commercial 3Ws. Some 20.6% of 3Ws had engine displacement less than 125 cc; 62% of these were commercial 3Ws whereas 38% of them were scooter 3Ws. Three-wheelers with engine displacement between 125 cc and 150 cc were not offered in any of the three countries in both years. Three-wheelers with engine displacement greater than 200 cc were not popular in all countries, accounting for only 1.6% of the 3W market in three countries in 2020, and 95% of them were scooter 3Ws. Figure 13 shows the 3W market segmented by engine displacement and body type in 2019 and 2020.

Thailand and Indonesia experienced large changes in the 3W market segmented by engine displacement between 2019 and 2020. Three-wheelers with engine displacement less than 125 cc were the most common in Indonesia, whereas 3Ws with engine size between 175 cc and 200 cc dominated the 3W market in the Philippines. In 2020, 69.5% of Indonesia's 3Ws had engine displacement less than 125 cc, and 64.3% of Philippine 3Ws had engine displacement between 175 cc and 200 cc. In 2019, 3Ws with engine displacement between 150 cc and 175 cc were common in Indonesia and Thailand, accounting for 46.7% in Indonesia's 3W market and 53.9% in Thailand's 3W market. However, the share of these 3Ws declined sharply in these two countries in 2020, to 19.2% in Indonesia, and to 9.3% in Thailand. Three-wheelers with engine displacement greater than 200 cc were not popular in three countries and had much smaller share in the 3W market. However, in 2020, the share of this vehicle type in the 3W markets of Indonesia and Thailand increased significantly, reached 9.9% (compared to 1.8% in 2019) in Indonesia and 10.1% (compared to 1.3% in 2019) in Thailand. Although the 3W market in the Philippines fell sharply in 2020 (decreasing by 45% compared to 2019), the 3W market segmented by engine displacement was relatively similar over these two years.

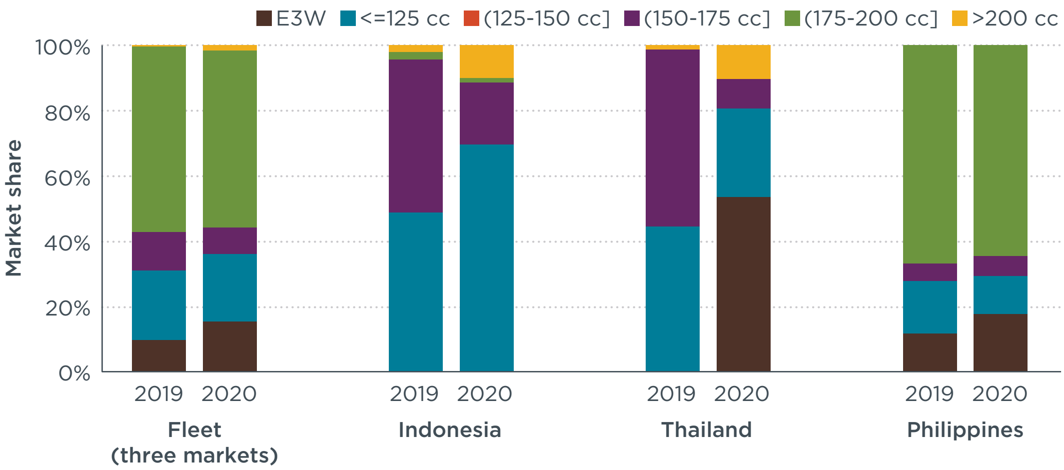


Figure 12. The 3W market segmented by engine displacement, ASEAN Four nations, 2019 and 2020

Regarding E3Ws, 10% of 3Ws sold in Indonesia, Thailand, and the Philippines in 2019 were E3Ws, a share that increased to 15.6% in 2020. In 2019, this type of vehicle was not sold in Indonesia or Thailand, but in the Philippines it accounted for 11.8% of the 3W market, which increased to 18% in 2020. E3Ws accounted for 53.5% of the 132 three-wheelers sold in Thailand in 2020.

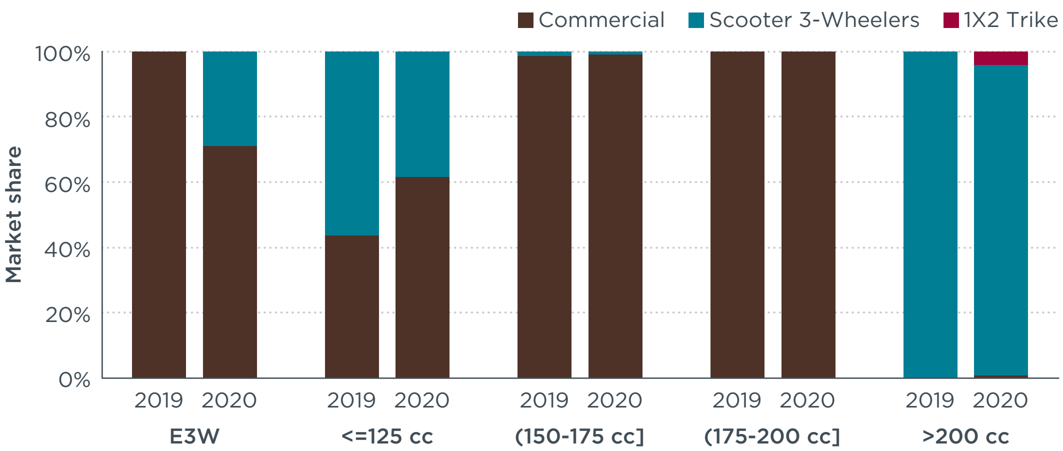


Figure 13. The 3W market segmented by engine displacement and body type

6. Top-selling 2&3W models

This section presents the top 10 best-selling 2W and 3W models in the ASEAN Four nations in 2019 and 2020.

Top 10 best-selling 2W models

Thailand had the most diverse 2W market segmented by models; more than 600 2W models were sold in this country in 2020, followed by the Philippines with around 400 models and Vietnam and Indonesia, with approximately 300 models each. The top 10 best-selling 2W models, ranked by market share from highest to lowest, and by key characteristics of each country, are shown in Table 4. All these models were internal combustion 2Ws. The top 10 best-selling models in Indonesia, Thailand, and Vietnam were from Honda and Yamaha only. However, in the Philippines, one model manufactured by Kawasaki and two models by Suzuki were also listed in the top 10 best-selling models in 2020. In general, the top-selling models and their market shares changed little in Indonesia, Thailand, and Vietnam between 2019 and 2020, whereas significant change occurred in the Philippines. The 2W model named Click 125 from

Honda and the CT 125 from Kawasaki ranked 56th and 20th among the best-selling 2W models in the Philippines in 2019, becoming the first and seventh best-selling models in 2020. Four models listed in the top 10 best-selling models in this country in 2019 were replaced by other models in 2020.

In 2020, the market share of the top 10 best-selling models accounted for 78.9% of the 2W market in Indonesia, 74.3% in Vietnam, 80.8% in Thailand, and 51.9% in the Philippines. Two-wheel scooters dominated the top-selling models in Indonesia (eight models) and Thailand (seven models), although underbone 2Ws were more popular in Vietnam (six models). In 2020, the best-selling model was Beat 110 (27.7%) in Indonesia, Vision (16.7%) in Vietnam, Wave 110i (33.8%) in Thailand, and Click 125 (10.2%) in the Philippines; all four models belonged to Honda. Regarding engine displacement, the top three best-selling models in Indonesia, Thailand, and Vietnam had engine displacement below 125 cc. Many 2W models with engines larger than 125 cc were also listed in these countries' top 10 best-selling models. However, the market shares of these models were relatively low compared to the top three models.

Table 4. Top 10 best-selling 2W models in ASEAN Four nations, 2019 and 2020

(a) 2019

Rank	Brand	Model	Market share	Engine size (cc)	Body type	Brand	Model	Market share	Engine size (cc)	Body type
	Indonesia					**Thailand**				
1	**Honda**	BEAT 110	27.2%	108	Scooter	**Honda**	Wave 110i	36.7%	109	Underbone
2	**Honda**	SH100	13.1%	100	Scooter	**Honda**	SH125	10.6%	124	Scooter
3	**Honda**	VARIO 125	8.2%	124	Scooter	**Honda**	PCX 150	5.9%	153	Scooter
4	**Honda**	VARIO 150	6.5%	149	Scooter	**Honda**	WAVE 125 I	5.7%	124	Underbone
5	**Yamaha**	Fino 125	5.3%	124	Scooter	**Honda**	Click 125	5.2%	124	Scooter
6	**Honda**	PCX 150	5.0%	153	Scooter	**Yamaha**	Filano 125	3.9%	124	Scooter
7	**Yamaha**	MIO 125	4.2%	124	Scooter	**Honda**	SUPER CUB 110	3.5%	109	Underbone
8	**Yamaha**	Vixion 150	2.9%	150	Motorcycle	**Honda**	Click 150	3.3%	150	Scooter
9	**Honda**	CB150	2.3%	150	Motorcycle	**Yamaha**	Finn 115	2.4%	115	Scooter
10	**Honda**	Supra X Helmin 125	2.3%	125	Underbone	**Honda**	MSX125	1.7%	124	Motorcycle
Total			**77.2%**					**78.7%**		
	Philippines					**Vietnam**				
1	**Yamaha**	Aerox 155	10.1%	155	Scooter	**Honda**	Vision 110	17.3%	110	Scooter
2	**Honda**	BEAT 110	6.5%	108	Scooter	**Honda**	WAVE 100	13.3%	97	Underbone
3	**Rusi**	DL100	5.8%	125	Underbone	**Honda**	Air Blade 125	9.8%	124	Scooter
4	**Honda**	XRM125	5.8%	124	Underbone	**Yamaha**	Sirius 110	8.1%	110	Underbone
5	**Suzuki**	Smash115	4.4%	115	Underbone	**Honda**	LEAD 110	6.5%	124	Scooter
6	**Honda**	TMX125	4.3%	124	Motorcycle	**Honda**	SH125 MODE	6.1%	124	Scooter
7	**Kawasaki**	KLX150	4.0%	144	Motorcycle	**Honda**	Wave RSX FI	5.3%	109	Underbone
8	**Honda**	WAVE 110	4.0%	109	Underbone	**Yamaha**	Exciter150	4.5%	150	Underbone
9	**Suzuki**	Raider150	3.9%	150	Underbone	**Honda**	Future FI	4.3%	125	Underbone
10	**Kawasaki**	CT 100	3.8%	102	Motorcycle	**Honda**	Winner	3.5%	149	Underbone
Total			**52.5%**					**78.8%**		

(b) 2020

Rank	Brand	Model	Market share	Engine size (cc)	Body type	Brand	Model	Market share	Engine size (cc)	Body type
	Indonesia					**Thailand**				
1	**Honda**	BEAT 110	27.7%	108	Scooter	**Honda**	Wave 110i	33.8%	109	Underbone
2	**Honda**	SH100	14.9%	100	Scooter	**Honda**	WAVE 125 I	10.6%	124	Underbone
3	**Honda**	VARIO 125	9.1%	124	Scooter	**Honda**	SH125	10.6%	124	Scooter
4	**Honda**	PCX 150	6.9%	153	Scooter	**Honda**	PCX 150	6.7%	153	Scooter
5	**Honda**	VARIO 150	6.5%	149	Scooter	**Yamaha**	Filano 125	4.9%	124	Scooter
6	**Yamaha**	MIO 125	4.1%	124	Scooter	**Honda**	Click 150	3.9%	150	Scooter
7	**Yamaha**	Fino 125	3.8%	124	Scooter	**Honda**	Click 125	3.6%	124	Scooter
8	**Yamaha**	Aerox 155	2.1%	155	Scooter	**Yamaha**	Finn 115	2.5%	115	Scooter
9	**Honda**	CB150	1.8%	150	Motorcycle	**Honda**	Super cup 110	2.3%	109	Underbone
10	**Yamaha**	Vixion 150	1.8%	150	Motorcycle	**Yamaha**	NMAX 150	1.9%	155	Scooter
Total			**78.9%**					**80.8%**		
	Philippines					**Vietnam**				
1	**Honda**	Click 125	10.2%	124	Scooter	**Honda**	Vision	16.7%	110	Scooter
2	**Yamaha**	Aerox 155	6.5%	155	Scooter	**Honda**	Wave Alpha	13.3%	97	Underbone
3	**Honda**	BEAT 110	5.4%	108	Scooter	**Honda**	Air Blade	9.4%	124	Scooter
4	**Yamaha**	NMAX 150	5.2%	155	Scooter	**Yamaha**	Sirius /R/RC/RL	6.7%	110	Underbone
5	**Honda**	TMX125	4.8%	124	Motorcycle	**Honda**	SH mode	5.9%	124	Scooter
6	**Honda**	XRM125	4.5%	124	Underbone	**Honda**	LEAD	5.5%	124	Scooter
7	**Kawasaki**	CT 125	4.0%	124	Motorcycle	**Honda**	Future FI	4.9%	125	Underbone
8	**Yamaha**	MIO S 125	3.9%	124	Scooter	**Honda**	Wave RSX FI	4.8%	109	Underbone
9	**Suzuki**	Raider150	3.8%	150	Underbone	**Honda**	Winner	3.9%	149	Underbone
10	**Suzuki**	Smash115	3.5%	115	Underbone	**Yamaha**	Exciter150	3.2%	150	Underbone
Total			**51.9%**					**74.3%**		

Best-selling 3W models

In contrast to 2W sales, the number of 3W models sold in Indonesia, Thailand, and the Philippines was relatively small; only five were sold in Indonesia, nine in Thailand, and nine in the Philippines in 2020.

Table 5 shows all 3W models sold in these countries in 2019 and 2020. Key characteristics of these models are also described in this table. In each country, 3W models were ranked based on their market share, from largest to smallest. The majority of 3Ws offered in these countries were internal combustion 3Ws, and commercial 3Ws were the most common. Thailand experienced the largest change in 3W offerings and their market shares over the two years. The number of 3W models sold in the country increased from three in 2019 to nine in 2020, and NEX1 (an E3W) from BIZ NEX Motor was the highest-selling model in 2020. In total, there were two E3W models sold in Thailand and the Philippines in 2019, and five in 2020. Some 3W models sold in Thailand had much higher engine displacement than those sold in the other two countries in 2020.

Table 5. The 3W models sold in Indonesia, Thailand, and the Philippines, 2019 and 2020

(a) 2019

Rank	Brand	Model	Sales in 2019 (vehicles)	Market share (%)	Engine displacement (cc)	Body type	Country of origin
Indonesia							
1	Piaggio	APE 125	1,860	46.7%	123	Commercial	Italy
2	Bajaj	RE-4S	1,860	46.7%	173	Commercial	India
3	TVS	Kargo 200	101	2.5%	200	Scooter 3-wheel	India
4	Piaggio	MP3 125	89	2.2%	124	Scooter 3-wheel	Italy
3	Piaggio	MP3 300 YOURBAN	69	1.7%	278	Commercial	Italy
6	Peugeot	Metropolis 400i	4	0.1%	399	Scooter 3-wheel	France
Total			**3,983**	**100.0%**			
Thailand							
1	Yamaha	Tricity 155	41	53.9%	155	Scooter 3-wheel	Japan
2	Yamaha	Tricity 125	34	44.7%	124	Scooter 3-wheel	Japan
3	Piaggio	MP3 500 LT SPORT ABS	1	1.3%	493	Scooter 3-wheel	Italy
Total			**76**	**100.0%**			
Philippines							
1	Bajaj	RE COMPACT 4S	9,380	42.8%	198	Commercial	India
2	TVS	King 200	4,480	20.4%	200	Commercial	India
3	Yamaha	Tricity 125	2,965	13.5%	124	Scooter 3-wheel	Japan
4	BEMAC	68VM	2,155	9.8%	E3W	Commercial	Japan
5	Rusi	Chariot 175	1,176	5.4%	175	Commercial	Philippines
6	Motoposh	Trke 200	780	3.6%	200	Commercial	Philippines
7	Piaggio	APE 125	538	2.5%	123	Commercial	Italy
8	Terra Motors	T4	440	2.0%	E3W	Commercial	Japan
Total			**21,914**	**100.0%**			

(b) 2020

Rank	Brand	Model	Sales in 2020 (vehicles)	Market share (%)	Engine displacement (cc)	Body type	Country of origin
Indonesia							
1	Piaggio	APE 125	1,649	69.5%	123	Commercial	Italy
2	Bajaj	RE-4S	455	19.2%	173	Commercial	India
3	Piaggio	MP3 300 YOURBAN	172	7.3%	278	Scooter 3-wheel	Italy
4	Peugeot	Metropolis 400i	62	2.6%	399	Scooter 3-wheels	France
5	TVS	Kargo 200	33	1.4%	200	Commercial	India
Total			2,371	100.0%			
Thailand							
1	BIZ NEX Motor	NEX1	49	37.1%	E3W	Commercial	Thailand
2	Yamaha	Tricity 125	35	26.5%	124	Scooter 3-wheel	Japan
3	E-tuk Factory	e-Tuk Classico	20	15.2%	E3W	Commercial	Netherlands
4	Yamaha	Tricity 155	12	9.1%	155	Scooter 3-wheel	Japan
5	Yamaha	NIKEN	10	7.6%	847	1X2 Trike	Japan
6	ASM	ATT6	3	2.3%	n/a	1X2 Trike	n/a
7	Piaggio	MP3 300 YOURBAN ERL	1	0.8%	278	Scooter 3-wheel	Italy
8	SRTT	TUK TUK SRTT	1	0.8%	550	Commercial	n/a
9	THAI	TUK TUK TT 550 ESD	1	0.8%	550	Commercial	n/a
Total			**132**	**100.0%**			
Philippines							
1	Bajaj	RE COMPACT 4S	5,623	42.8%	198	Commercial	India
2	TVS	King 200	2,336	17.8%	200	Commercial	India
3	BEMAC	68VM	1,545	11.8%	E3W	Commercial	Japan
4	Yamaha	Tricity 125	1,198	9.1%	124	Scooter 3-wheel	Japan
5	Rusi	Chariot 175	798	6.1%	175	Commercial	Philippines
6	Yadea	A3 Mini	700	5.3%	E3W	Scooter 3-wheel	China
7	Motoposh	Trke 200	481	3.7%	200	Commercial	Philippines
8	Piaggio	APE 125	333	2.5%	123	Commercial	Italy
9	Terra Motors	T4	119	0.9%	E3W	Commercial	Japan
Total			**13,133**	**100.0%**			

7. Electric two- and three-wheelers

In this section, we focus on E2W and E3W markets in the ASEAN Four nations in 2020 only, because the market share of E2Ws and E3Ws in these countries was relatively small in 2019.

E2W market

E2Ws by brand

Various brands of E2Ws were sold in 2020 in the ASEAN Four countries, but only a few major brands dominated the E2W market. Figure 14 shows the 2020 E2W market share by major brands in Indonesia, Vietnam, Thailand, and the Philippines. Several brands offered their vehicles in all four countries, such as Yadea and NIU. However, their market share in these countries varied significantly. E2W markets in Indonesia and Vietnam were dominated by local brands, Gesits in Indonesia and VinFast in Vietnam. These brands are recently established, but they have already gained position in E2W markets in their respective countries. In 2020, 64.9% of the E2Ws in Indonesia were sold by Gesits, and 43.4% of the E2Ws in Vietnam were sold by VinFast. With strong support from local governments, these local brands could potentially become leaders in E2W markets in their home countries as well as in the ASEAN region.

Unlike Indonesia and Vietnam, E2W markets in Thailand and the Philippines were dominated by foreign brands—a Taiwanese brand (DECO) in Thailand, and a Chinese brand (TailG) in the Philippines. DECO sold 61% of the E2Ws in Thailand and TailG sold 54.6% of the E2Ws in the Philippines. The top five E2W brands and their countries of origin are shown in Table 6. Many Chinese brands fall in the top five E2W brands in the ASEAN Four countries.

Table 6. Top 5 E2W brands in the ASEAN Four nations, 2020

Indonesia		Vietnam		Thailand		Philippines	
Brand	**Country of origin**	**Brand**	**Country of origin**	**Brand**	**Country of origin**	**Brand**	**Country of origin**
Gesits	Indonesia	**VinFast**	Vietnam	**DECO**	Taiwan	**TailG**	China
BF Goodrich	Indonesia	**Pega**	Vietnam	**AJ**	Thailand	**Motostar**	Philippines
Viar	Indonesia	**DIBAO**	Taiwan	**NIU**	China	**Yadea**	China
Honda	Japan	**Yadea**	China	**STAR8-V**	Thailand	**Rejus**	Unknown
Yadea	China	**Anbico**	Vietnam	**SWAG**	Singapore	**VMoto**	China

In addition to brands offering E2Ws solely, some large ICE 2W brands such as Honda and Piaggio also offered E2Ws in several countries. For example, Honda, the largest 2W brand in the ASEAN four countries, sold its E2Ws in Indonesia, Thailand, and the Philippines, but not in Vietnam. Although Honda had the largest 2W market share in these countries, its E2W market share was still very limited, with only 3.3% in Indonesia's E2W market, 1.2% in Thailand's E2W market, and 1% in the Philippine E2W market. In general, Honda and Yamaha efforts to develop the E2W market in the ASEAN region were very limited. Accelerating the deployment of electric vehicles in the region will require actions to encourage these major 2W brands to shift to the manufacture of E2W.

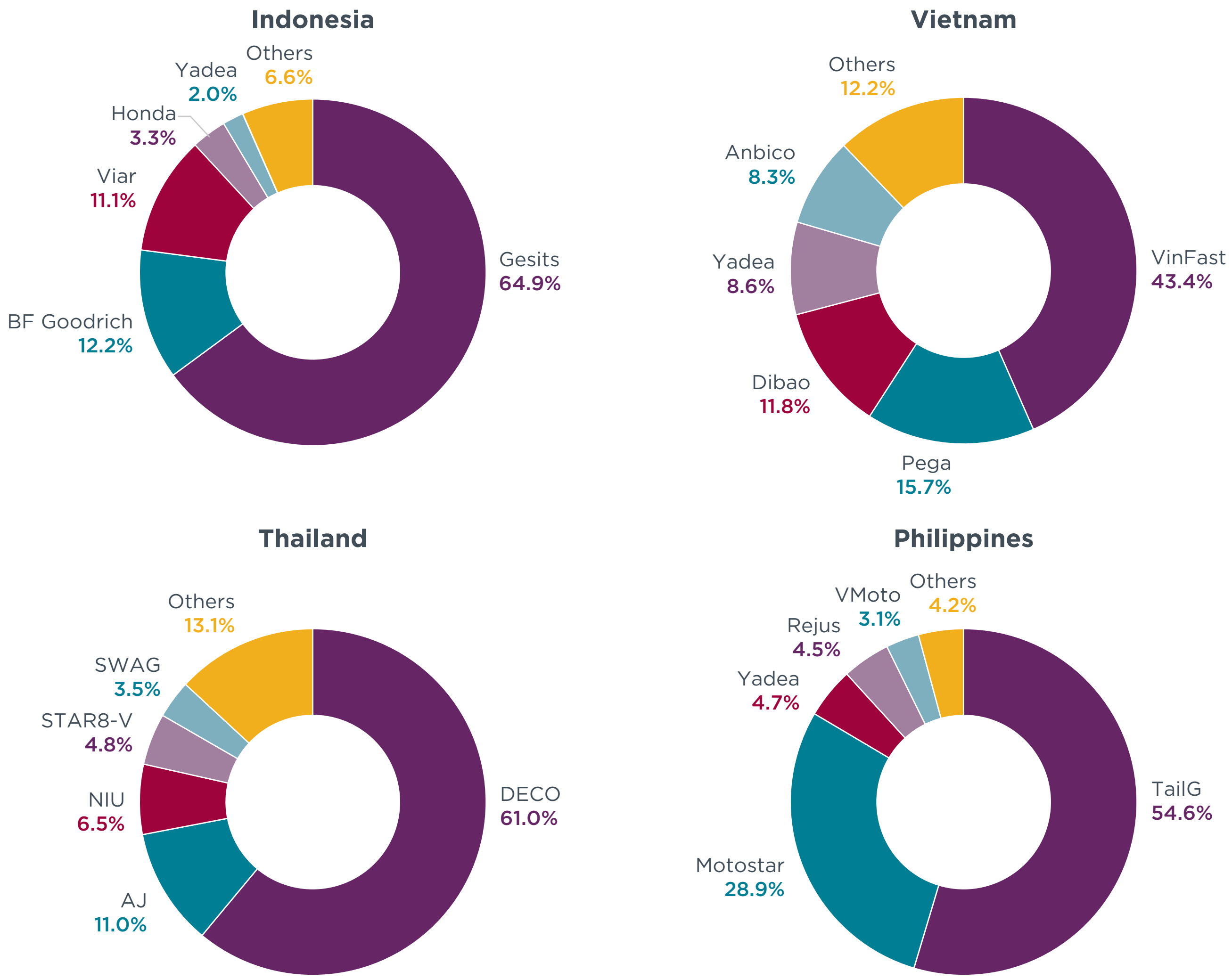


Figure 14. E2W market share by brand, ASEAN Four nations, 2020

E2Ws by battery type

Figure 15 shows E2Ws segmented by battery type in Indonesia, Vietnam, Thailand, and the Philippines in 2020. Some 67.8% of E2Ws sold in these countries used lead acid batteries; only 31% used lithium-ion batteries. E2Ws with lithium-ion batteries dominated E2W markets in Indonesia and Thailand, accounting for 83.1% of Indonesia's E2W market and 77.3% of Thailand's E2W market. E2Ws with lead acid batteries were most common in the Philippines and Vietnam, with a share of 86.4% of the E2W market in the Philippines and 75% in Vietnam. In Thailand, several E2W models were offered with both lead acid and lithium-ion battery options (presented as lead acid/Li-ion in Figure 15), and customers can buy either vehicle with lead acid batteries or lithium-ion batteries. This type of vehicle accounted for 0.8% of Thailand's E2W market.

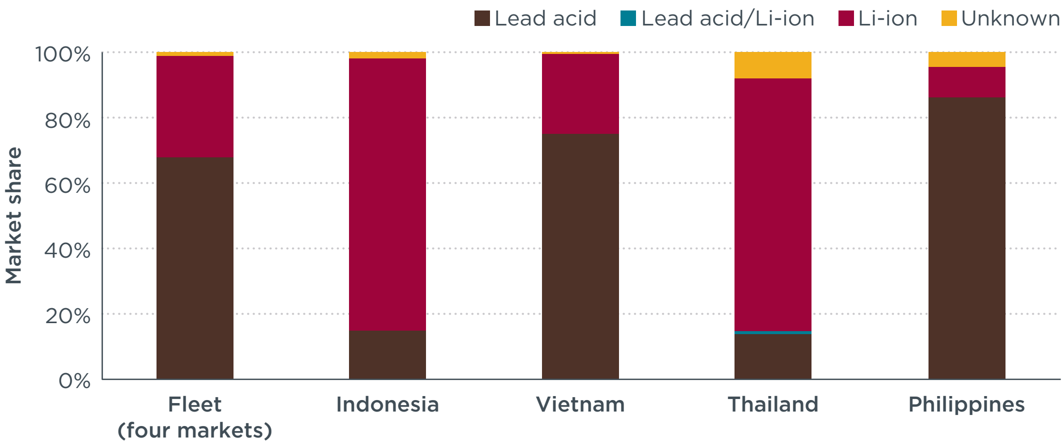


Figure 15. The E2W market segmented by battery type in the ASEAN Four nations, 2020

E2Ws by removable battery type

Figure 16 presents the E2W market in ASEAN Four countries in 2020 segmented by battery portability, which is the ability to remove the battery from vehicles for charging or swapping. Only 30.7% of E2Ws sold in these countries had removable batteries whereas 68.1% had unremovable batteries. In general, battery portability tracks well with battery type. The lithium-ion batteries in most E2Ws sold in these countries can be removed, explaining why the number of E2Ws with removable batteries in Indonesia and Thailand was greater than in Vietnam and the Philippines. In Indonesia, 83% of E2Ws have removable batteries, followed by Thailand with 75%. Only 4.1% of E2Ws in the Philippines have removable batteries whereas up to 91.4% of Philippine E2Ws do not.

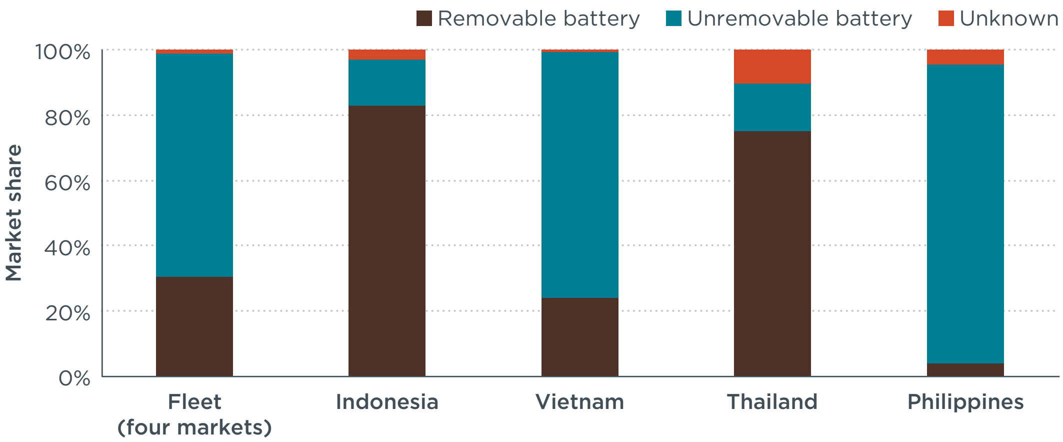


Figure 16. The E2W market segmented by battery removability in the ASEAN Four nations, 2020

E2Ws by battery capacity

Figure 17 shows the E2Ws in Indonesia, Vietnam, Thailand, and the Philippines in 2020 segmented by battery capacity. E2Ws with battery capacity between 1 kilowatt hour (kWh) and 1.5 kWh was most common in all four countries, accounting for 86.6% of all E2Ws sold in these countries. This vehicle type accounted for 81.5% of Indonesia's E2W market and 91.3% of Vietnam's E2W market. In the Philippines, E2Ws with batteries less than 1 kWh were also common, accounting for 46.6% of the E2W market. The market share of E2Ws with battery capacity greater than 1.5 kWh was negligible in Indonesia, the Philippines, and Vietnam, but reached 47.5% in Thailand.

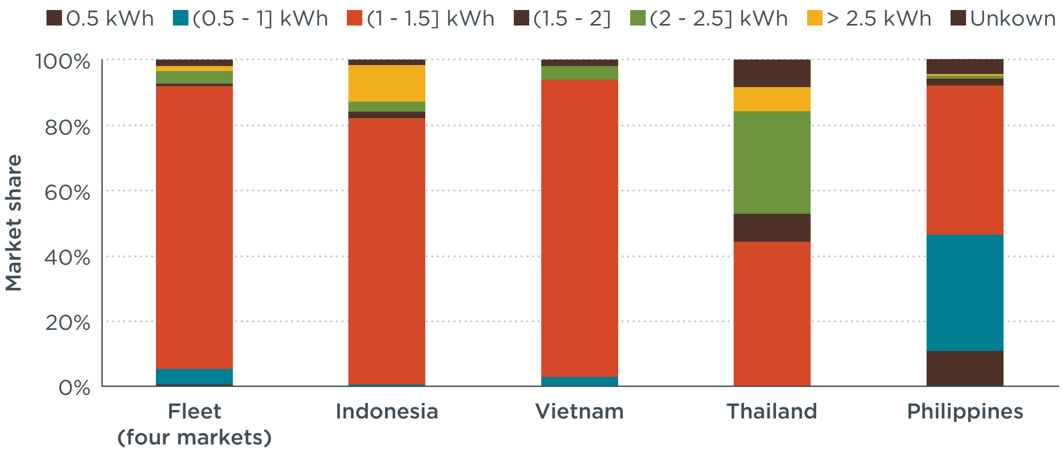


Figure 17. The E2W market segmented by battery capacity in the ASEAN Four nations, 2020

E2Ws by maximum speed

Figure 18 shows E2Ws in 2020 segmented by maximum speed, which varies greatly by country. In total, E2Ws with maximum speed less than 50 kilometers per hour (km/h) had the largest shares in the E2W market in all four countries, accounting for 70.8%. This was because the majority of Vietnam's E2W fleet, the largest E2W market among the ASEAN Four, had a maximum speed of less than 50 km/h. Of Indonesia's E2W market, 64.9% had maximum speeds in the range of 60 to 70 km/h. E2Ws with a maximum speed below 50 km/h were dominant in Vietnam's E2W market, with 83.2% of the E2W market share in this country. E2Ws with maximum speed ranging from 50 to 60 km/h were more common in the Philippines than in other countries. Thailand had the more diverse fleet in terms of the distribution of maximum speed; in addition, the country had the highest share (34.1%) of E2Ws with maximum speeds greater than 70 km/h. E2Ws with speeds greater than 70 km/h were not common in Indonesia, Vietnam, or the Philippines.

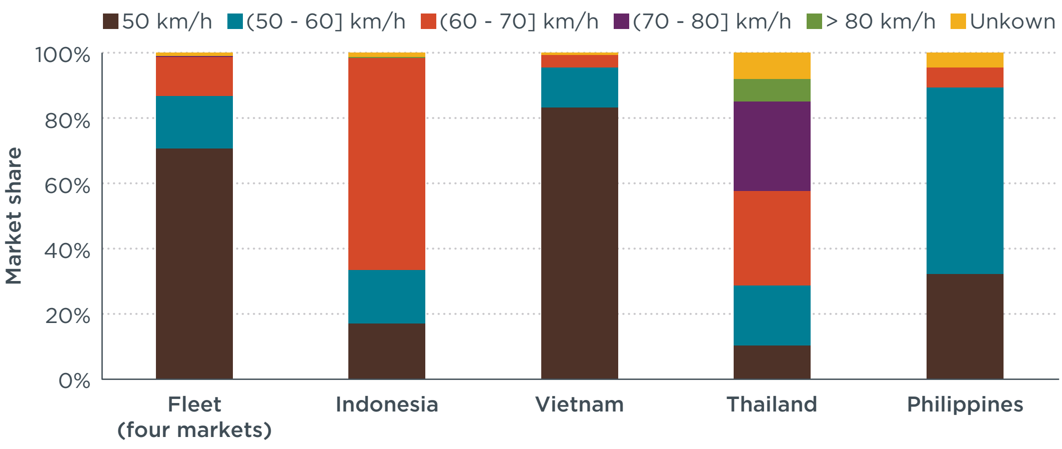


Figure 18. The E2W market segmented by maximum speed in the ASEAN Four nations, 2020

E2Ws by range

Figure 19 shows the distribution of E2Ws by range, which is the maximum travel distance when batteries are fully charged, in the ASEAN Four nations. In total, 46.3% of E2Ws sold in these four countries had ranges between 70 km and 90 km, followed by E2Ws with ranges between 50 km and 70 km (23%) and between 90 km and 100 km (10.3%).

The majority of E2Ws in Indonesia had a lower range than E2Ws in the other three countries, with 69.9% of E2Ws in Indonesia having a range of less than 50 km. E2Ws with a travel range between 70 km and 90 km were more popular in Vietnam, Thailand,

and the Philippines than in Indonesia, with E2W market shares of 53.7%, 37.9%, and 46.8 % respectively, in these countries. Among the ASEAN Four, Thailand had the largest share of E2Ws with a range between 50 km and 70 km, at 34.9%. E2Ws with the travel distance greater than 110 km accounted for a smaller market share in all four countries; Thailand had the largest share of this vehicle type among the four countries (12.9%).

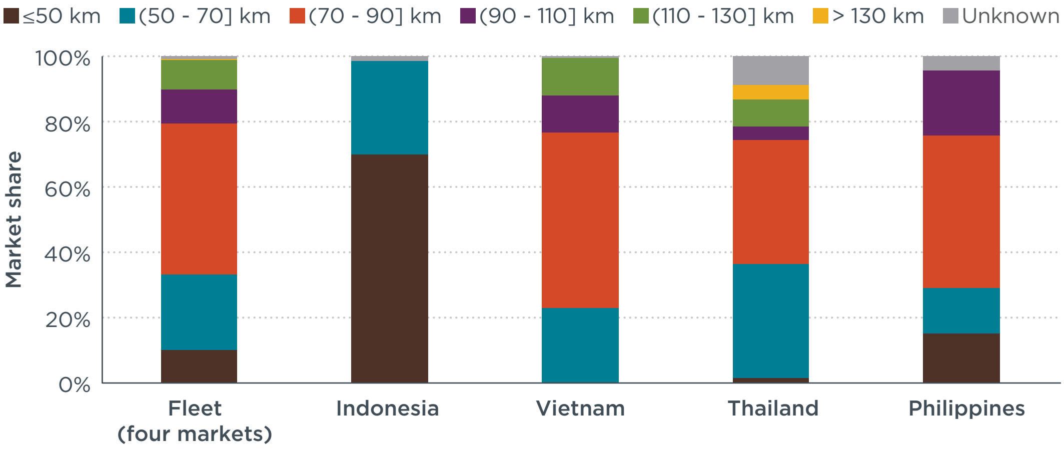


Figure 19. The E2W market segmented by range in the ASEAN Four nations, 2020

Top 10 best-selling E2W models

The top 10 best-selling E2W models (ranked by sale volume, from highest to lowest) in the ASEAN Four nations is presented in Table 7. The number of ICE 2W models far outnumbers the E2W models available in these four countries. In 2020, only 17 E2W models were sold in Indonesia, 59 in Thailand, 18 in the Philippines, and 30 in Vietnam. Thailand had the smallest E2W market among four countries, but the E2W market was the most diverse in terms of models. The top 10 best-selling models accounted for a large share of E2Ws in all four countries and had the highest share in Indonesia (98%) and the Philippines (97.4%). E2Ws with lithium-ion batteries were more common in Thailand and Indonesia, whereas E2Ws with lead acid batteries were more popular in the Philippines and Vietnam.

Table 7. Top 10 best-selling E2W models in 2020 in the ASEAN Four nations, by country

Indonesia									Thailand							
Rank	**Brand**	**Model**	**Number sales**	**Battery capacity (kWh)**	**Range (km)**	**Max speed (km/h)**	**Battery type**	**Country of origin**	**Brand**	**Model**	**Number sales**	**Battery capacity (kWh)**	**Range (km)**	**Max speed (km/h)**	**Battery type**	**Country of origin**
1	**Gesits**	Gesits	26,522	1.44	50	70	Li-ion	Indonesia	**DECO**	Super Ace	330	2.160	80	80	Li-ion	Taiwan
2	**Viar**	Q1	4,520	2.76	60	60	Li-ion	Indonesia	**DECO**	Hannah	226	1.200	70	65	Li-ion	Taiwan
3	**BF Goodrich**	BF-BE	3,469	1.2	55	45	Lead acid	Indonesia	**DECO**	Luciano	115	1.200	70	65	Li-ion	Taiwan
4	**Honda**	PCX electric	1,353	2.06	40	60	Li-ion	Japan	**DECO**	Sylla	98	2.160	80	80	Li-ion	Taiwan
5	**BF Goodrich**	BF-Q7	844	1.2	55	45	Lead acid	Indonesia	**DECO**	CJDS60	91	n/a	n/a	n/a	n/a	Taiwan
6	**Yadea**	C-LINE	797	1.344	50	45	Li-ion	China	**STROM**	Panther PNT-L	62	5.8	185	95	Li-ion	India
7	**Vmotor**	E-max 90S	733	1.92	60	45	Lead acid	China	**AJ**	C-LION	55	1.440	120	60	Lead acid	Thailand
8	**BF Goodrich**	BF-CG	659	1.44	60	58	Lead acid	Indonesia	**AJ**	Q5	55	1.200	85	50	Lead acid	Thailand
9	**NIU**	Unknown	588	n/a	n/a	n/a	n/a	China	**DECO**	Ekon	48	1.200	70	60	Li-ion	Taiwan
10	**ECGO**	ECGO2	557	1.248	60	43	Li-ion	Indonesia	**AJ**	C-LIKE	44	1.440	120	60	Lead acid	Thailand
Total			**40,042**								**1,124**					

Philippines									Vietnam							
Rank	**Brand**	**Model**	**Number sales**	**Battery capacity (kWh)**	**Range (km)**	**Maximum speed (km/h)**	**Battery type**	**Country of origin**	**Brand**	**Model**	**Number sales**	**Battery capacity (kWh)**	**Range (km)**	**Maximum speed (km/h)**	**Battery type**	**Country of origin**
1	**TailG**	Linshia	7,890	0.960	90	55	Lead acid	China	**VinFast**	Klara A2	64,300	1.320	80	50	Lead acid	Vietnam
2	**TailG**	Turtle King	4,382	1.320	100	55	Lead acid	China	**VinFast**	Klara S	19,050	1.320	120	48	Li-ion	Vietnam
3	**MotorStar**	Viber	2,436	0.462	80	45	Lead acid	Philippines	**VinFast**	Impes	17,000	1.320	68	50	Li-ion	Vietnam
4	**MotorStar**	e-bike TDL165Z	2,038	1.008	40	45	Lead acid	Philippines	**NIU**	n/a	15,776	1.200	80	45	Li-ion	China
5	**MotorStar**	e-scooter TDR554Z	2,013	1.008	60	45	Lead acid	Philippines	**Pega**	Aura	14,674	1.200	70	50	Lead acid	Vietnam
6	**Rejus**	MIUS	1,060	1.152	40	65	Li-ion	n/a	**Pega S**	Pega S	10,343	2.304	120	65	Lead acid	Vietnam
7	**Vmoto**	n/a	1,006	n/a	n/a	n/a	n/a	China	**VinFast**	Ludo	10,050	1.320	70	35	Li-ion	Vietnam
8	**Yadea**	M6	490	1.440	65	45	Lead acid	China	**Gogoro**	JVC Royal	7,990	1.200	90	50	Lead acid	Taiwan
9	**Terra Motors**	A4000i	354	1.920	65	65	Li-ion	Japan	**Pega**	Xmen	7,778	1.200	100	50	Lead acid	Vietnam
10	**Honda**	PCX electric	228	2.060	40	60	Li-ion	Japan	**Yadea**	E3	7,185	0.960	60	45	Lead acid	China
Total			**21,897**								**174,146**					

Note: n/a = not available.

E3W market

The 2020 E3W market was much smaller than the E2W market. In total, only 2,433 E3Ws were sold in Thailand and the Philippines in 2020, of which 2,364 vehicles were sold in the Philippines and 69 in Thailand. Table 8 shows all five E3W models, including sales and key features of these models; three models were sold in the Philippines and two models in Thailand. Two commercial E3W models were sold in the Philippines equipped with lithium-ion batteries with a battery capacity of 5kW. The T4, offered by Terra Motors, had a lower maximum speed than BEMAC's 68VM, but the T4 had significantly greater range when the battery was fully charged. The E3Ws offered in Thailand had a higher battery capacity than the E3Ws offered in the Philippines. NEX1 from BIZ NEX Motor had a battery capacity of 7.4 kWh, and e-Tuk Classico from the E-tuk factory had a battery capacity of 7 kWh. E-Tuk Classico had two battery options, lead acid and lithium-ion. Both options had a battery capacity of 7kW, but the maximum travel distance was only 80 km for vehicles equipped with lead acid batteries and up to 100 km for vehicles equipped with lithium-ion batteries.

Table 8. E3W models sold in the Philippines and Thailand, 2020

<table>
<tr><th>Country</th><th>Brand</th><th>Model</th><th>Body type</th><th>Sale number (vehicles)</th><th>Battery capacity (kWh)</th><th>Top Speed (kmph)</th><th>Max Range (Km)</th><th>Battery Type</th><th>Country of origin</th><th>Market share (3W market only)</th></tr>
<tr><td>Philippines</td><td>BEMAC</td><td>68VM</td><td>Commercial</td><td>1545</td><td>5</td><td>50</td><td>60</td><td>Li-ion</td><td>Japan</td><td>11.8%</td></tr>
<tr><td>Philippines</td><td>Yadea</td><td>A3 MINI</td><td>Scooter 3-wheels</td><td>700</td><td>1.2</td><td>25</td><td>60</td><td>Lead acid</td><td>China</td><td>5.3%</td></tr>
<tr><td>Philippines</td><td>Terra Motors</td><td>T4</td><td>Commercial</td><td>119</td><td>5</td><td>45</td><td>100</td><td>Li-ion</td><td>Japan</td><td>0.9%</td></tr>
<tr><td>Thailand</td><td>BIZ NEX Motor</td><td>NEX1</td><td>Commercial</td><td>49</td><td>7.4</td><td>70</td><td>80</td><td>Li-ion</td><td>Thailand</td><td>37.1%</td></tr>
<tr><td rowspan="2">Thailand</td><td rowspan="2">E-Tuk Factory</td><td rowspan="2">e-Tuk Classico</td><td rowspan="2">Commercial</td><td rowspan="2">20</td><td rowspan="2">7</td><td rowspan="2">50</td><td>80</td><td>Lead acid</td><td rowspan="2">Netherlands</td><td rowspan="2">15.2%</td></tr>
<tr><td>100</td><td>Li-ion</td></tr>
</table>

8. Summary

This paper analyzed the 2&3W market in 2019 and 2020 in key ASEAN member states, including Thailand, Vietnam, Indonesia, the Philippines, Malaysia, Singapore, and Cambodia. In general, the 2&3W sales were impacted by COVID in 2020. In 2020, 10.9 million 2&3Ws were sold in seven ASEAN countries, accounting for 18.1% of global 2W sales. An analysis comparing the characteristics of the 2W and 3W fleets of the ASEAN Four nations showed these countries—Indonesia, Vietnam, the Philippines, and Thailand—are the top four 2&3W markets. The 2020 2&3W sales in these four markets accounted for 91.4% of sales in the seven countries in this study. Among these seven countries, Indonesia was the largest 2W market, but the Philippines was the largest 3W market. Vietnam had the largest E2W market among the ASEAN Four countries. Due to COVID, Indonesia experienced the deepest decline in 2&3W sales among the ASEAN Seven countries, dropping by 43.7% compared to 2019. Singapore and the Philippines also experienced significant sales declines in 2020, reduced by 41.5% and 30%, respectively, compared to 2019. The 2&3W market in the other countries was less affected.

Delving deeply into the 2&3W markets, segmented by vehicle characteristics and with a focus on the ASEAN Four nations, produced the following key findings.

2W market

» **The majority of 2Ws sold in four countries were from Honda and Yamaha**. Honda had the largest share of 2W markets in all countries, especially in Indonesia (77.5% in 2020), Thailand (77.7% in 2020), and Vietnam (71.8% in 2020). Although Yamaha was the second largest brand in Indonesia, Thailand, and Vietnam, its 2W market share in these countries was much lower than Honda's. In 2020, the top five brands accounted for more than 95% of total 2W sales in Indonesia, Vietnam, and Thailand, and more than 83% in the Philippines.

» **The market share of the top 10 best-selling models accounted for a large share of the 2W market in all countries in 2020,** 78.9% in Indonesia, 74.3% in Vietnam, 80.8% in Thailand, and 51.9% in the Philippines. The top 10 selling models in Indonesia, Thailand, and Vietnam were from Honda and Yamaha exclusively, and all these models were internal combustion 2Ws.

» **The popularity of different 2W body types varied across countries.** Scooters were most popular in Indonesia (83.6% in 2020), whereas underbones gained a larger market share (48.4% in 2020) than scooters in Thailand.

» **2Ws with engine displacement between 100 cc and 125 cc were the most popular in all countries.** In 2020, the market shares of this vehicle type were 52.9% in Indonesia, 65.7% in Vietnam, 76.3% in Thailand, and 68.1% in the Philippines. 2Ws with smaller engine size (less than 100 cc) were more common in Indonesia and in Vietnam than in other countries.

» **The share of E2Ws increased in all four countries in 2020 compared to 2019**. Among the ASEAN Four, Vietnam had the largest share of E2Ws and experienced the greatest increase in E2W share, from 5.1% in 2019 to 8.5% in 2020. The E2W market shares in the Philippines and Indonesia were 1.3% and 1.1%, respectively, in 2020.

» **A variety of brands of E2Ws were sold in the four countries.** E2W markets in Indonesia and Vietnam were dominated by local brands—Gesits in Indonesia and VinFast in Vietnam. Conversely, E2W markets in Thailand and the Philippines were dominated by foreign brands, the Taiwanese brand DECO in Thailand and the Chinese bran TailG in the Philippines. Honda and Yamaha, the two largest 2W brands, also offered E2Ws in several ASEAN countries. However, their E2W market shares were significantly lower than other E2W brands.

» **The majority of E2Ws sold in four countries used lead acid batteries (67.8%).** E2Ws with lithium-ion batteries dominated E2W markets in Indonesia and Thailand, whereas E2Ws with lead acid batteries were more common in the Philippines and Vietnam.

» **E2Ws with battery capacity between 1 kWh and 1.5 kWh were the most common in all four countries**, accounting for 86.6% of all E2Ws sold in these countries. Especially in Indonesia and Vietnam, this vehicle type dominated the E2W market, accounting for 81.5% and 91.3%, respectively, of E2W sales. E2Ws with battery power of less than 1 kWh were more common in the Philippines than in the other three countries.

» **When segmented by maximum speed and range, the E2W market varied significantly across four countries.** The majority of E2Ws sold in the four countries had a maximum speed below 50 km/h and had maximum range of 70 to 90 km.

3W market

» **The market share of 3Ws in the 2&3W fleet in ASEAN countries was relatively small, with only 0.14% of the 2&3W market in the region in 2020.** Indonesia and the Philippines, the two largest 3W markets among four countries, also had the biggest market loss in 2020 (-40.1% in the Philippines and -40.5% in Indonesia, compared to 2019). Thailand's 3W market was small but it was the only country experiencing growth in 2020 when it increased by 73.7%.

» **In 2020, commercial 3Ws were the most common in Indonesia (90.1%), the Philippines (85.5%), and Thailand (53.8%).** Thailand had a considerably higher share of scooter 3-wheelers (36.4%) than Indonesia and the Philippines.

» **In 2020, 3Ws with engine displacement of less than 125 cc were the most common in Indonesia (69.5%).** Three-wheelers with engine displacement between 175 cc and 200 cc dominated the Philippine 3W market (64.3%).

» **Unlike the 2W market, the 3W market in 2020 was dominated by different brands:** Piaggio in Indonesia, Yamaha in Thailand, and Bajaj in the Philippines. The number of 3W models sold in 2020 in Indonesia, Thailand, and the Philippines was relatively small: only five in Indonesia, nine in Thailand, and nine in the Philippines.

» **The E3W market was much smaller than the E2 market**. In 2020, only 2,433 E3Ws, in five models, were sold in Thailand and the Philippines. Of those, 2,364 vehicles were sold in the Philippines and 69 in Thailand. In Thailand, E3Ws were more common than ICE 3Ws; 55.5% of 3Ws sold in Thailand in 2020 were E3Ws.

https://tinyurl.com/ndctia-survey