



Integrating Electric 2&3 Wheelers into Existing Urban Transport Modes in Developing and Transitional Countries

August 2023

Philippines

INTRODUCTION

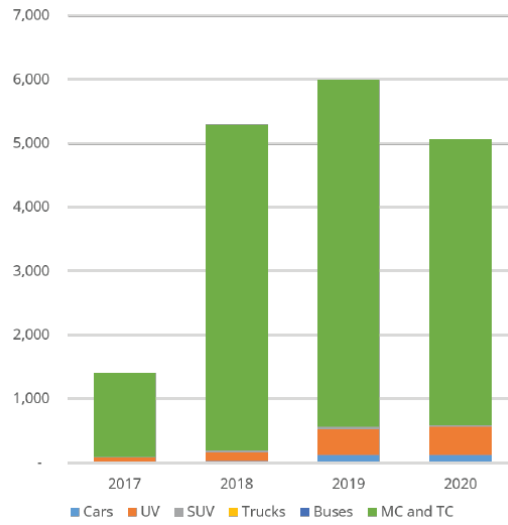
MARKET OVERVIEW

The electric vehicle (EV) industry in the Philippines has witnessed continuous growth, driven by both government and private sector initiatives to promote related policies and technologies.

As part of the project in the Philippines, a survey has been conducted by Clean Air Asia to collect more data about the specifications of EVs in the market. The results indicate that electric 2&3 Wheelers (E2&3Ws) serving as both public transport and personal vehicles are predominant, with a share of 75% of total registered EVs, while the remaining 25% are electric four-wheelers¹. The survey furthermore finds that more than 200 EV models are available in the e-bike, e-motorcycle, or e-trike categories. Figure 1 shows the estimated EV stock in the country. These estimates are based on cumulative EV registrations over the past three years. Electric tricycles and motorcycles (TC and MC) dominate the electric vehicle stock in the country.

¹ Aldaba, Rafaelita (2021). Presentation at the 9th Philippine EV Summit.

Figure 1: Estimated electric vehicle stock by segment, 2017-2020



Source: Estimated electric vehicle stock

A paper published by the International Council for Clean Transportation (ICCT, 2020) analyzing the 2&3W market in selected ASEAN member countries finds that the Philippines is ranking second in terms of E2W sales share in the region, amounting to 1.34% of total two-wheeler sales in 2020, which corresponds to about 22,000 vehicles. The top five E2W brands in the Philippines were TailG (China), with 54.6% of the market share, followed by the local brand Motostar (Philippines) at 28.9%, and other international brands like Yadea (China) at 4.7%, Rejus (Unknown) at 4.5%, and Vmoto (China) at 3.1%.

Figure 2: E2W sales and market share for selected ASEAN countries in 2019 and 2020



Source: International Council on Clean Transportation (ICCT), 2022 working paper – Market analysis of two- and three-wheeler vehicles in key ASEAN member states

The ICCT paper also finds that E2Ws with lead-acid batteries in the Philippines are the most common technology option, making up 86.4% of the market. Table 1 provides an overview of technical specifications according to companies’ brochures. Such information needs to be interpreted with care – many of the performance indicators will require real-world driving verifications, which is why regulation of the sector is important.

Table I: Top 10 best-selling E2W models in the Philippines, 2020

Rank	Brand	Model	Number Sales	Battery Capacity (kWh)	Range (km)	Max Speed (km/h)	Battery Type	Country of Origin
1	TailG	Linshia	7,890	0.960	90	55	Lead acid	China
2	TailG	Turtle King	4,382	1.320	100	55	Lead acid	China
3	MotorStar	Viber	2,436	0.462	80	45	Lead acid	Philippines
4	MotorStar	e-bike TDL 165Z	2,038	1.008	40	45	Lead acid	Philippines
5	MotorStar	e-scooter TDR554Z	2,013	1.008	60	45	Lead acid	Philippines
6	Rejus	MIUS	1,060	1.152	40	65	Li-ion	n/a
7	Vmoto	n/a	1,006	n/a	n/a	n/a	n/a	China
8	Yadea	M6	490	1,440	65	45	Lead acid	China
9	Terra motors	A4000i	354	1,920	65	65	Li-ion	Japan
10	Honda	PCX electric	228	2,060	40	60	Li-ion	Japan
Total			21,897					

Source: International Council on Clean Transportation (ICCT), 2022, working paper – Market analysis of two- and three-wheeler vehicles in key ASEAN member states

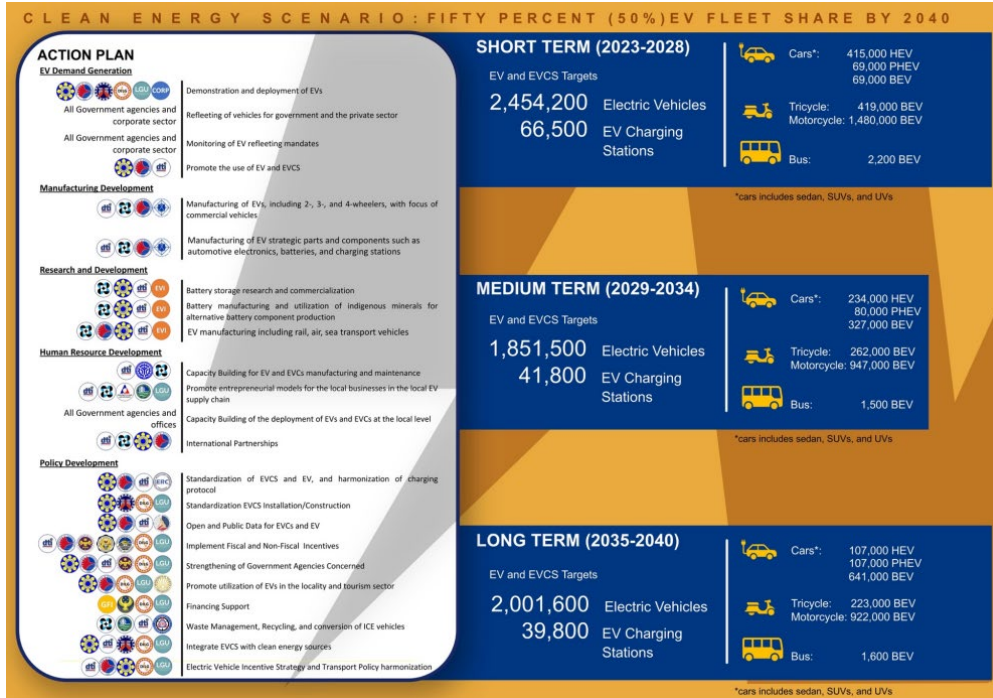
Compared to the E2W market, the E3W market in the Philippines is much smaller, totaling 2,364 E3Ws sold in 2020. These E3Ws, often used for public transport, often have a capacity for at least four passengers and predominantly use Lithium-Ion batteries. The available battery capacity ranges from 1.2kWh up to 5kWh. Most units use slow charging via onboard chargers that take 6 to 8 hours for a full charge, though some operators deploy battery-swapping. E3Ws are already used in various provinces, including Metro Manila, Rizal, Cavite, and Boracay, with daily operational hours ranging from 6 to 16.

E 2&3 WHEELERS TARGETS AND POLICIES

In April 2022, Republic Act No. 11697, "Electric Vehicle Industry Development Act (EVIDA)" was enacted in the Philippines. This act established a national policy to promote the adoption of electric vehicles. EVIDA provides a framework for developing the local EV industry, introducing demand programs for specific markets, human resource training, and research and development. The act furthermore mandated the creation and annual updating of a Comprehensive Roadmap for the Electric Vehicle Industry (CREVI), which was initially published in April 2023². This roadmap sets targets for EV adoption and provides guidance for the supply and demand aspects of the industry, including the electric 2- and 3-wheeler sectors. Under the Clean Energy Scenario, the roadmap suggests registration of almost 4.5 million E2&3Ws up to 2040 (Figure 3).

² https://www.doe.gov.ph/sites/default/files/pdf/energy_efficiency/CREVI%20as%20of%2005-04-2023.pdf

Figure 3: EV sales targets under the Clean Energy Scenario of the CREVI



Source: Comprehensive Roadmap for the Electric Vehicle Industry

The roadmap also provides a comprehensive analysis of the policy framework incentivizing the local production of vehicles, which often does not differentiate between ICE and electric vehicles. The Philippine EV Roadmap comprises four components: 1. EV and EV charging station deployment, 2. EV manufacturing, 3. Human resource development, and 4. Research and development. In addition, the roadmap includes action points to support the removal of the EV import tariffs, implement vehicle fuel economy labelling through the Energy Efficiency and Conservation Act (RA 11285), enact a carbon tax law, and support the Public Utility Vehicle Modernization Program (PUVMP). Further, the roadmap aims to direct the modernization program to favour EV adoption through laws, policies, and incentives.

Two of these action points have been met: the removal of EV import tariffs and the implementation of vehicle fuel economy labelling. These are achieved with the Philippine President signing an executive order to implement zero EV import tariffs (EO 12) and the Philippine Department of Energy issuing the Department Circular No. 2023-05-0017 for fuel economy labelling.

Table II: Overview of national legislation and policies relevant to EV market creation

Policies and Legislations	EV cost reduction	Industry development	Demand generation	Charging infrastructure development	Used battery and power supply management
Executive Order No. 877-A, s. 2010: The Comprehensive Motor Vehicle Development Program					
Executive Order No. 12: Temporarily Modifying the Rates of Import Duty on Electric Vehicles, parts, and components under Section 1611 of Republic Act No. 10863, otherwise known as the “Customs Modernization and Tariff Act”					
Republic Act No. 10963: Tax Reform for Acceleration and Inclusion (TRAIN)					
BOI Memorandum Circular no. 2021-001: 2020 Investment Priorities Plan					
Executive Order No. 182, s. 2015: Comprehensive Automotive Resurgence Strategy Program or “CARS Program”					
Executive Order 226: Omnibus Investment Code					
Executive Order No. 488: Amendment to tariff and customs code of 1978 for assembly of alternative fuel vehicles					
Republic Act No. 7916: Special Economic Zone Act of 1995					
Republic Act No. 10771: Philippine Green Jobs Act of 2016					
Republic Act No. 11285: Energy Efficiency and Conservation Act					
Republic Act No. 11534: Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act					
Administrative Order No. 227, s. 2008: Preference in procurement of goods and services from the Philippines					
DOTr Department Order No. 2017-011 : Public Utility Vehicle Modernization Program (PUVMP)					
LTO Administrative Order No. 2021-039: Guidelines for Electric Motor Vehicles					
EVCS Policy Guidelines (DC2021-07-0023)					
Republic Act No. 7718: Amended BOT Law					
Republic Act No. 11234: Energy Virtual One-Stop Shop Act					
Republic Act No. 9513: Renewable Energy Act of 2008					
Green Energy Option Program (DC2018-07-0019)					
Republic Act No. 6969: Toxic Substances and Hazardous and Nuclear Wastes Control Act					
Republic Act No. 9003: Ecological Solid Waste Management Act					
Department Circular No. DC 2022-03-0004: Guidelines for the Endorsement of Energy Efficiency Strategic Investments to the Board of Investments for Fiscal Incentives					

Source: Comprehensive Roadmap for the Electric Vehicle Industry

COUNTRY PROJECT - PHILIPPINES

PROJECT SUMMARY

Green Delivery' Program: Electric 2- and 3-wheelers in Pasig City

In 2019, Pasig City launched the 'Green Delivery' pilot demonstration, aimed at integrating E2&3Ws into the daily operations of the Philippine Postal Corporation (PHLPost). The pilot aimed at evaluating the potential to reduce fuel use and greenhouse gas emissions related to mail delivery while reducing noise and air pollution at the same time.

In addition to the E2&3Ws, four hybrid charging stations integrating solar power supply in addition to a grid connection were tested at the Mega Plaza Parking 2 in Pasig City to gain experience with EV charging and renewable power integration.

City/Country: Pasig City, Philippines

Timeframe: E2&3W pilot: March to August 2020, Charging pilot: On-going

Partners: Clean Air Asia, Pasig City government, and the Philippine Postal Corporation

INTERVENTIONS

1. 'Green Delivery' Pilot Demonstration

In 2019, Pasig City launched the 'Green Delivery' pilot to electrify its mail delivery vehicles. After a series of consultations with the Pasig City government and the City Traffic and Transport Management Office (CTDMO), PHLPost's branch in Pasig City was chosen as the strategic partner for this pilot. 30 units of electric 2&3Ws were donated by TailG, a Chinese electric vehicle manufacturer, and deployed within PHLPost's fleet. Each of these electric vehicles was equipped with a GPS tracking device. This device recorded data on various parameters like location, speed, battery status, and overall vehicle usage.



Figure 4: E3Ws used in the pilot with PHLPost



2. EV Charging Solution in Pasig City

Clean Air Asia, in collaboration with UNEP and supported through the International Climate Initiative (IKI), developed charging infrastructure at Pasig City Hall to cater for e-trikes already in use by the local government. The first of four coin-operated hybrid charging pods connected to the power grid and complemented by a solar system was launched in July 2022. The charging pods at the Mega Plaza Parking 2 can charge up to 8 E3Ws simultaneously. The chargers are connected to a 12kW solar system, capable of saving 1,440kWh/month (Table 3)

Table 3: Technical specifications of the charging pods and solar grid tie system in Pasig City

EV charging solution	Image	Specifications
Coin-operated Charging Pod	 (4 units)	<ul style="list-style-type: none"> • Kw 220V EV CHARGING TOWER (Power Charging Station) • 2 slots Electronic Keypad with Timer (up to 99 min) • 2.2 kW per Outlet maximum of 20A per Outlet • With Programmable Timer (2 timers per tower) • 20A Aircon Outlet slot (2 outlets per tower) with OMNI WP Cover • With Digital Power Monitor (2 digital power monitor)
Solar Grid Tie System	 (1 set comprised of 12 panels)	<ul style="list-style-type: none"> • 500Q 2187 x 1102 x 35mm • 26.50kg • 500 Peak Power Watts • 42.8 Maximum Power Voltage • 11.69 Maximum Power Current • 51.7 Open Circuit Voltage • 12.28 Short Circuit Current • 20.7% Module Efficiency

Source: Clean Air Asia, 2022

IMPACTS AND RESULTS

The 30 E3Ws piloted with PHLPost were planned to run over six months from March to August 2020. During the first month, these vehicles completed 2,880 trips, covering a total distance of 8,349 km. Due to COVID, the number of trips recorded from April to August 2020 declined because of community quarantine restrictions. During that time, Pasig City repurposed these vehicles for COVID-19-related missions. For example, these vehicles were used to transport frontline workers and COVID-19 patients to quarantine facilities. In addition, the vehicles were lent to other volunteer groups, for example, to distribute food to people in need.

The charging pilot is still ongoing. The pilots are part of a campaign by Pasig's City Mayor to increase the number of EVs. For example, the Pasig City local government recently approved an ordinance exempting electric vehicles from the number coding system in the city. As such, EVs are included in the list of exempted vehicles that are not regulated by a scheme whereby the last numbers of the numberplate are used to prohibit the use of specific corridors on certain days for vehicles with the respective number plates.

LESSONS LEARNED AND RECOMMENDATIONS

During the planning for the installation of the charging pods in Pasig City, key considerations were taken into account to ensure their strategic placement, maximized usability, and security.

The pilot encountered several challenges which needed to be addressed:

- Availability of grid power supply at the required capacity (in kW).
- Flood-proof installation of the chargers.
- Adaptation of the charging business model to the clients.
- Proper monitoring and maintenance of the chargers.
- Proper monitoring of the power drawn from the solar system to estimate the carbon footprint of the hybrid system.

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