



# PHILIPPINES



# PASIG

Pasig e-cargo services



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# SCOPING STUDY SUMMARY

## Philippines

### COUNTRY OVERVIEW

Pasig, a highly urbanized city in Metro Manila, Philippines, had a night-time population of 755,300 in 2015 and is estimated to have a daytime population of over 1.2 million people. Pasig City has a land area of 34.32 sq km and comprises 30 barangays (administrative divisions). The Philippine GDP per capita is 2,989 US\$<sup>1</sup>. Its CO<sub>2</sub> emission in 2014 is 1.1 metric tons per capita<sup>2</sup>. Philippines is also a net importer of fossil fuels. The share of renewables in total gross generation mix in the country in 2015 is 25.4%<sup>3</sup>. The main public transport in the country includes jeepneys (15-person paratransit vehicles), buses, Asian Utility Vehicles (AUVs), or tricycles.

Many Pasig residents also own electric two- and three-wheeled vehicles, the most common types being those which are throttle controlled and powered by lead-acid batteries. A large number of Pasig residents also travel by bicycle; however, no census of these vehicles has been conducted yet.

1 The World Bank. (Undated). GDP per capita (current US\$). Retrieved from <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

2 The World Bank. (Undated). CO<sub>2</sub> emissions (metric tons per capita). Retrieved from <https://data.worldbank.org/indicator/EN.ATM.CO2E.PC>

3 Department of Energy. (Undated). Power Generation Mix – 2015 Powermix. Retrieved from <https://www.doe.gov.ph/energy-statistics?q=energy-resources/powermix>



# Overview

## Pasig

**Pasig**, a highly urbanized city in Metro Manila, Philippines, had a population of 755,300 in 2015 (evening) and is estimated to have a daytime population of over 1.2 million people. Pasig City has a land area of 34.32 sq km and comprises 30 barangays (administrative divisions). The Philippine GDP per capita is 2,989 US\$. Its CO<sub>2</sub> emission in 2014 is 1.1 metric tons per capita. Philippines is also a net importer of fossil fuels. The share of renewables in total gross generation mix in the country in 2015 is 25.4%. The main public transport in the country includes jeepneys (15-person paratransit vehicles), buses, Asian Utility Vehicles (AUVs), or tricycles.



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# Policy environment supporting electric mobility in Pasig

As in the Philippines's INDC, the country intends to undertake GHG (CO<sub>2</sub>e) emissions reduction of about 70% by 2030 relative to its BAU scenario of 2000-2030. Reduction of CO<sub>2</sub>e emissions will come from energy, transport, waste, forestry and industry sectors.

The Department of Energy formulated Alternative Fuels and Energy Technologies Roadmap 2017-2040 which includes a long-term goal of mainstreaming alternative fuel-vehicles, including EVs, in the transport sector. This department and the Department of Transportation (DOTr) have been both supportive of the EV industry and have undertaken programs on electric mobility. For instance, the Department of Energy is implementing a tricycle modernization program by replacing old and polluting 3-wheelers into electric tricycles in selected local government units (LGU).

Pasig City is among the few LGUs with an office dedicated for transportation concerns, the City Transportation and Development Management Office (CTDMO). The Pasig City government had also implemented several sustainable transport initiatives such as the Carless Sundays and the free bus service featuring Euro-IV buses that shuttle passengers within the Ortigas central business district.

There have likewise been several initiatives focusing on 2 and 3 wheeler (2/3w) modes. In 2011, Pasig City issued "Bicycle Transportation Promotion Ordinance of 2011" which calls for the designation of exclusive lanes for bicyclists on major streets<sup>1</sup>. In 2017, Pasig City launched a network of bicycle lanes within its jurisdiction. Two bicycle-sharing stations were launched in 2013 with the support of Asian Development Bank to serve as conceptual demonstration<sup>2</sup>, one of which was placed at Pasig City Hall. The bicycles are still being used, but there was no back-end operational support so the bicycles cannot go from one station to the other. Then, in March 2019, Pasig City launched their bicycle-sharing system. There are no electric 2w yet being introduced.

On the 3w, the Department of Energy turned over to Pasig City in March 2019 about 200 electric tricycles for the Pasig Electric Tricycle ("E-Trike") Program. However, no charging stations are widely available hence the hesitation of tricycle drivers to adopt the new technology.

UN Environment had likewise expressed support to provide electric 2-wheeler units as a pilot to PHLPost and some funding for supplementary infrastructure such as charging solutions for a pilot project supported by International Climate Initiative (IKI) from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). UN Environment and Clean Air Asia will support Pasig CTDMO in developing necessary local ordinances and other regulations in relation to the implementation of the project and to the sustainability of the initiative beyond the pilot duration.

1 Pasig City Ordinance No. 13. Series of 2011. Retrieved from <https://nbophilippines.files.wordpress.com/2015/02/pasig-bike-ordinance-scanned.pdf>

2 Clean Air Asia (Sep. 30, 2013). Bicycle Sharing Launched in Pasig City. Retrieved from <http://cleanairasia.org/node12100/>



## Project concept

### Pasig e-cargo services

The demonstration action in Pasig (Metro Manila) will focus on expanding the pilot of electric 2/3w operating exclusively within the territorial jurisdiction of Pasig City and setting up of charging stations. It includes testing of 50 e-cargo bikes for urban delivery transport services. On vehicle and charging technology, the demonstration project will develop a project concept focusing on E-cargo bikes (e-2/3 wheelers) for delivery of letters and parcels in partnership with Philippine Postal Corporation (PHLPost) and support for the set-up of public AC level charging stations (240V, up to 19.2 kW). The pilot project will also develop suitable business models and operations, such as financing scheme for e-2/3 wheelers in coordination with government financial institutions. Technical assistance for Pasig City on developing necessary local ordinances related to the implementation of the project will also be provided. Other activities include capacity-building and training for various stakeholders involved in e-freight services in the city, and the development of smart services (apps) and GPS and controlling center (Mobility as a Service (MaaS) App). The demonstration activities in Pasig will develop and undertake dissemination activities to share success and limiting factors based on Philippine context, with stakeholder involvement and participatory processes.

# Project

## demonstration activities

Some of the demonstration actions carried out during the implementation of pilot project are:

### Vehicle and charging technology

Development of project concept focusing on electric 2/3w cargo for delivery of letters and parcels in partnership with Philippine Postal Corporation (PHLPost), a government-owned and controlled corporation, as a substitute for conventional motorcycles. PHLPost will operate e-2/3w cargo, together with Pasig city. PHLPost will carry out these activities:

- Derive revenue from transport services according to pre-set rates
- Support the set-up of public AC level 2 charging stations (240 V, up to 19.2 kW) in barangay halls to obtain statistics on the use of e-2/3w

### Business models and operations

Development of a financing scheme for e-2/3w in coordination with government financial institutions such as the Land Bank of the Philippines and the Development Bank of the Philippines. Eligibility requirements and loan conditions will be developed with Pasig city and the banks for the purchase of either e-bikes or e-motorcycles. The procurement of e-2/3w will be done through Clean Air Asia following an agreement (i.e. MOA) with Pasig City government.

### Assessment

Assessment of the demonstration action on e-2/3w will be carried out considering the indicators. For the proper selection of electric 2-wheelers suitable for PHLPost Pasig, it is necessary to understand PHLPost's current operations, motorcycle fleet and areas serviced. The electric vehicles must be also suitable to the users, the terrain of area serviced and operational requirements of PHLPost. Following metrics are proposed which will measure the impacts of the planned pilot project.





<b>Metric</b>	<b>Notes</b>
<b>Letter carriers using motorcycles</b>	
Roundtrip distance travelled per day (km)	- Starting from PHLPost Pasig branch, to serviced areas, and back to PHLPost. - Letter carriers return set up to PHLPost Office
Average speed (kph)	- Minimum and maximum speeds - Apps to monitor (e.g. SpeedTracker, GPS Speedometer and odometer, SpeedView, Strava, etc.)
Average weight of letter carrier (kg)	- To determine maximum load capacity
Maximum weight of load/cargo (letters carried) (kg).	
Average number of letters and/or parcels delivered per day	- To determine efficiency of electric 2-wheelers
Average delivery time per day (hrs)	- From PHLPost office to serviced areas (and back)
Number of performed deliveries per day	- To determine actual delivery as compared to attempts.
Number of delivered items per day	- To determine number of stops
Hourly wage	- Monthly/hourly wage of letter carriers
Number of letter carriers using motorcycles	
Number of letter carriers not using motorcycles Specify also other modes of delivering letters	
<b>Motorcycle (internal combustion)</b>	
Number of motorcycles	- If letter carriers use more than one motorcycle
Acquisition cost	- To account for savings and cost estimate for using electric 2-wheelers instead
Repairs and maintenance cost	
Insurance cost (if any)	
Taxes and other fees (i.e. registration renewal, licenses) cost	
Type of fuel	- To calculate emissions (environmental impact)
Starting mileage	
Model Year (2005 and up; 2010 -2017)	- Indicate model year of most motorcycles and the range of model year
Number of years used for delivering letters	
Number of accidents per month	- Expected less accidents due to speed limit of electric 2-wheelers
<b>Engine specifications</b>	<b>Electric wheelers equivalent</b>
Dimensions	Dimensions
Net Weight	Net Weight
Maximum Speed	Maximum Speed
Standard Load Capacity	Standard Load Capacity
Motor Power	Power
Engine Type	
Engine Stroke	
	Range per charge
Battery Type and average lifespan	Battery Type and Capacity
Brake Type	Brake Type
Tyre dimensions	Tyre dimensions
Fuel Capacity	Charging Time
Modes	
Manufacturer	
<b>Operations</b>	
Areas covered by PHLPost Pasig	- Provide a high-resolution map showing even the narrow streets (if possible)
Budget for gasoline allowance of letter carriers using their personal motorcycles	- For cost-benefit analysis and business plan - Provide breakdown of allowance
Tracking of letter/parcel deliveries	- For quality service and assured deliveries.
Plans for expansion	- For e.g.: Additional letter carriers, expand serviced areas, include parcels up to a certain weight, extend delivery hours, etc.

## Technical assistance

- Technical assistance for city on developing required measures and local ordinances for EV adoption and on developing city-wide EV strategy
- Outreach and promotional events: Formulation of an awareness raising strategy in coordination with the concerned stakeholders

## Capacity building

- Training city for maintenance and repair: Service hubs in barangay halls for e-cargo-2/3w being piloted
- Training city for charging stations at barangay halls
- Training city on utilizing other government services (e.g. delivery of building or business permits)
- Training PHLPost and city on managing the e-2/3w fleet (including set-up of control center)
- Training course on e-cargo-2/3w cycling to PHLPost personnel, as PHLPost has its own personnel to do the delivery of letters

## Potential Scale-up /Replication

- Develop and undertake dissemination activities to share success and limiting factors based on Philippine context
- Develop implementation plan of expanding such PHLPost parcel delivery to other cities in the Philippines

## Local, Industry, knowledge and implementation support partners

- Pasig City Transportation and Development Management Office
- Pasig City Environment and Natural Resources Office
- Philippine Postal Corporation (PHLPost)
- Department of Transportation
- Department of Interior and Local Government
- Metropolitan Manila Development Authority
- Department of Public Works and Highways
- Land Bank of the Philippines and Development Bank of the Philippines - government financial institutions

# Project tentative plan for demonstration action

Project Component	Estimated unit cost (EUR)	Quantity	Estimated total (EUR)	Remarks
<b>Direct cost component</b>				
Hardware				
Electric 2/3 Wheeler Cargo (1,200 to 2,000 EUR)	2,000	50	100,000	Base models: Stefano Ferrari, Carriola, and Winora T2 BH Xenion 700
Batteries	300	50	15,000	Back-up batteries for the operations of PHLPost
Charging stations (1500 to 4500 EUR) in selected barangays	4,500	15	67,500	Public AC Level 2 Charging Station (240 V, up to 19.2 kW)
Installation Costs (2000 to 8000 EUR)	8,000	15	120,000	Average installation costs for public AC Level 2 Charging Stations (240 V, up to 19.2 kW)
GPS and control center for e2/3w	20,000	1	20,000	
<b>Subtotal</b>			<b>322,500</b>	
<b>Indirect cost component</b>				
Project Planning and Detailed Design	50,000	1	50,000	Includes stakeholder consultations, FGDs, engagement of specialists on e-mob, etc.
Capacity-building	20,000	1	20,000	On e2/3 and charging station operations, troubleshooting, and maintenance for PHLPost and Pasig City employees.
Outreach and Promotional Events	12,000	1	12,000	Formulation of a pilot awareness raising strategy in coordination with the concerned stakeholders
Technical Assistance: City-wide EV strategy; Measures and Ordinances for EV adoption	30,000	1	30,000	Related to the implementation of the project
Development of a Financing Scheme	10,000	1	10,000	Coordination with Government Financial Institutions in the Philippines, engagement of consultants on financing
<b>Subtotal</b>			<b>122,000</b>	
<b>Operations Start up</b>				
Charging Supervision and Maintenance	5,000	1	5,000	Charging Stations, Software, Control Center
<b>Subtotal</b>			<b>5,000</b>	
<b>Contingency</b>				
Contingency for price adjustments, importation expenses, etc.	50,000	1	50,000	
<b>TOTAL</b>			<b>499,500</b>	

# Project Financing and implementation

The proposed demonstration project concept on 'Pasig e-cargo services' was developed under Urban Pathways project and was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. The technical support on project proposal development and activities, provided by "Urban Pathways" project, was funded by the International Climate Initiative and implemented by UN-Habitat, Wuppertal Institute and UN Environment.





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