CITY ROADMAP FOR E-MOBILITY

PASIG, PHILIPPINES

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ABOUT

To present a roadmap to upscale Electric Mobility in Pasig

TITLE

City Roadmap for E-mobility Pasig

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DISCLAIMER

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All the pictures are provided by the SOL+ partners

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Project	SOLUTIONSPlus - Integrating Urban Electric Mobility Solutions in the Context of the Paris Agreement, the Sustainable Development Goals and the New Urban Agenda
About this report	This report details the e-mobility vision of the city of Pasig along with its proposed target objectives of electrification of three-wheelers for city government-owned fleets and public transport services. It outlines recommendations for implementation to achieve the said objectives.
Title	City Roadmap for E-mobility. Pasig City.
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Contributing partners	Pasig Transport
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Executive Summary

The City Government of Pasig is a highly urbanized city in Metro Manila, Philippines. It is served by multiple modes of public transportation, with an especially high population of 11,984 tricycles traversing the city. Like other cities in Metro Manila, Pasig City is exposed to greenhouse gas (GHG) emissions from road transport, with 12% of city-level GHG emissions attributed to road transport. To address environmental concerns, the Pasig local government unit (LGU) has implemented policies and programs to encourage the procurement of electric tricycles for public transport.

Policies and programs on tricycles and e-mobility in Pasig City covers urban planning, regulatory measures, economic and financial measures, the operations ecosystem, and public engagement. Two significant rollouts of electric tricycles have been the Asian Development Bank (ADB) and Department of Energy's (DOE) project on "Market Transformation through the Introduction of energy-efficient electric vehicles" and the Easy Pondong Pasigueño (EPP) Program. Both programs offered eligible Pasig City residents electric tricycles at subsidized prices to be paid off slowly. Moreover, the Pasig LGU has been the beneficiary of multiple e-mobility projects that resulted in the installation of city-owned solar-powered electric vehicle charging stations (EVCS) and even the creation of the Pasig E-Mobility Steering Committee.

Despite these programs and policies that support the adoption of electric tricycles in the city, the Pasig LGU has failed to achieve a full rollout of EVs. Gaps in the policies and programs revealed that more attention is needed on initiatives for urban planning, the operations ecosystem (i.e., charging and battery swapping facilities), and public engagement. The Pasig LGU has plans on a loan forgiveness program for electric tricycle recipients from the ADB and EPP program that were not able to pay their outstanding balances. In general, financing for public transport tricycles is a barrier to e-mobility adoption. Existing and accessible financing programs for public transport are usually government financing institutions (GFIs) that offer their programs to transport cooperatives part of the Public Utility Vehicle Modernization Program (PUVMP), limiting the options for tricycle operators and drivers and their respective associations (TODAs).

The Pasig LGU's vision for public transport electric tricycle extends beyond e-mobility and encompasses public transport systems and infrastructure and capacity-building for public transport operations. The Pasig LGU's vision aligns with the three pillars of city government's work (people, planet, profit), in that people's mobility and health are prioritized, natural resources and air quality are protected, and local public transport is patronized and even preferred.

The Pasig LGU's objectives are to increase the share of public transport and active transport users, to reduce the road transport's GHG emissions in the city, and to increase the EV share of all public transport electric tricycles. Achieving the objects involves a three-phase action plan for the short-term (2025-2028), medium-term (2028-2034), and long-term (2034 onwards). The short-term

focuses on the preparation of studies, plans, and policies for electric tricycles, EV support facilities, and financing mechanisms while the medium-term focuses on the implementation of these plans. For the long-term, the role of the Pasig LGU is to enforce previous plans and policies with the hopes that private sector will be more involved in the promotion of electric tricycles in the city.

At each phase, specific action items on urban planning, regulatory measures, economic and financial measures, the operations ecosystem, and public engagement are listed to achieve the desired state for the electrification of tricycles. Urban planning action items involve the development and implementation of key transportation plans such as the Route Rationalization Plan, Local Public Transport Route Plan (LPTRP), Sustainable Transport Master Plan, identification of green routes, establishment of the Poblacion Urban Renewal Area (PURA) as a Low Emissions Zone (LEZ), and the integration of EVCS installation requirements in the Pasig City Building Code. These plans are supported by regulatory measures to ensure their implementation.

Economic and financial measures action items focus on developing a loan forgiveness program for previous electric tricycle recipients as well as incentivization programs for the installation of EVCS and battery swapping systems. This incentivization program will also improve the operations ecosystem for e-mobility in the city to promote EV use. Another incentivization program is the relaunching of the EPP Program to encourage tricycle operators and drivers to acquire EVs, in consideration of the lessons learned from its previous deployment.

Given the various perspectives on modernization for the public transport sector, public engagement is crucial in the adoption of electric three-wheelers in Pasig City. Public engagement action items firstly focus on actively prioritizing the deployment of the city government EV fleet for public visibility and exposure of e-mobility in the city. Success stories from electric tricycle loan programs should be regularly shared and the formation of transport cooperatives for TODAs should be supported by the Pasig LGU. Additional training for technicians and mechanics to repair and maintain EVs is crucial to the operations of electric tricycles in the city.

Immediate next steps involve the construction of EVCS at the locations identified by the pre-feasibility study. The mobilization of planning teams for the LPTRP, Route Rationalization, and Sustainable Transport Master Plan is a crucial first step to streamline and optimize public transport electric tricycles. For all these actions, it is also important to involve and update key stakeholders such as the public and tricycle operators and drivers. Public support and public inclusion in this Roadmap can impact the success of the electrification of tricycles for public transport.

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List of Abbreviations

ASI – Avoid, Shift, Improve
CBD – Central Business District
CDA – Cooperative Development Authority
CDO – Cooperative Development Office
CDP – Comprehensive Development Plan
CENRO – City Environmental and Natural Resources Office
CHD – City Health Department
CLWUP – Comprehensive Land and Water Use Plan
CPDO – City Planning and Development Office
CREVI – Comprehensive Roadmap for the Electric Vehicle Industry
CRIO – Community Relations and Information Office
DOST – Department of Science and Technology
DOTr – Department of Transportation
DPWH – Department of Public Works and Highways
EPP – Easy Pondong Pasigueño
EST – Environmentally Sustainable Transport
EV – Electric vehicle
EVAP – Electric Vehicle Association of the Philippines
EVCS – Electric Vehicle Charging Station
EVIDA – Electric Vehicle Industry Development Act
FLEV – Flexible Electric Van
GFI – Government Financing Institution
GHG – Greenhouse Gas
HOA – Homeowners' Association
ICE – Internal Combustion Engine
LDIP – Local Development Investment Program
LEV – Light Electric Vehicle
LGU – Local Government Unit
LPTRP – Local Public Transport Route Plan
LTFRB – Land Transport Franchising and Regulatory Board
LTO – Land Transportation Office
MISO – Management Information Systems Office
MMDA – Metropolitan Manila Development Authority
MOA – Memorandum of Agreement
MRV – Measurement, Reporting, Verification
NGA – National Government Agency

NGO – Non-government Agency
OBA – Office of Barangay Affairs
OCM – Office of the City Mayor
OGS – Office of General Services
PIO – Public Information Office
PUJ – Public Utility Jeepney
PURA – Poblacion Urban Renewal Area
PUV – Public Utility Vehicle
TESDA – Technical Education and Skills Development Authority (TESDA)
TOD – Transit-Oriented Development
TODA – Tricycle Operators and Drivers' Association
TORO – Tricycle Operation and Regulatory Office
TWG – Technical Working Group

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Purpose	To provide a guideline for the City Government of Pasig in the visioning, planning, implementation, and timeline of the electrification of public transport three-wheelers in Pasig City.
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1. Background – Where are we now?

The City Government of Pasig has been a proponent of a clean and green environment for many administrative terms. This section outlines the urban mobility, public transport, and e-mobility in the city. Existing policies and programs on these are discussed, with a brief note on the SOLUTIONSplus project and pilot demonstration of a new e-mobility solution for the Pasig local government unit (LGU). Relevant stakeholders for the city's e-mobility initiatives as well as key players of this Roadmap are identified.

1.1. Urban mobility context in Pasig City

The City of Pasig is a highly urbanized city within the heart of Metro Manila, Philippines. The 2020 National Census[1] accounted for a population of 803,159 which is almost 6% of the total population of Metro Manila. Its land area covers 48.46 square kilometers which is comprised of two districts which are in turn composed of 30 barangays (the smallest administrative division in the Philippines). The calculated urban population density is 16,574 inhabitants per square kilometers.[2]

The City of Pasig is traversed by local and national roads.[3] The Department of Public Works and Highways (DPWH) is the national government agency (NGA) tasked with the ownership, planning, and maintenance of all national roads while each local government unit (LGU) is charged with the ownership, planning, and maintenance of local roads within the jurisdiction of the LGU. According to the 2022-2027 Pasig City Comprehensive Development Plan (CDP), Pasig City has a road density of 0.44 kilometers per 1,000 population – a statistic well below the 2.4-kilometer per 1,000 population standards. The CDP identified the need for 1,927 kilometers more road length to meet the standard.

[1] "2020 Census of Population and Housing (2020 CPH) Population Counts Declared Official by the President", Philippine Statistics Authority, July 2021, https://psa.gov.ph/content/2020-census-population-and-housing-2020-cph-population-counts-declared-official-president

[2] "Highlights of the Population Density of the Philippines 2020 Census of Population and Housing (2020 CPH)", Philippine Statistics Authority, July 2021, https://psa.gov.ph/content/highlights-population-density-philippines-2020-census-population-and-housing-2020-cph

[3] The Philippines classifies its roads based on their coverage and which agency regulates them. National roads connect major cities, urban and rural centers, secondary destinations, and main ports or airports. In Metro Manila, national roads are managed and maintained by the Department of Public Works and Highways (DPWH) while their rules and regulations on their use are created and enforced by the Metro Manila Development Authority (MMDA). On the other hand, local roads (such as municipal, city, and barangay roads) connect to provincial and national roads that to facilitate mobility and access at an intracity level. Rules and regulations on local roads are enacted and enforced by their respective local government units (LGUs). From "Complete Guide to Road Classifications in the Philippines", Land Transportation Office, accessed June 18, 2024, https://ltoportal.ph/road-classifications-philippines/

Figure 1. Map of Metro Manila highlighting Pasig City.[4]

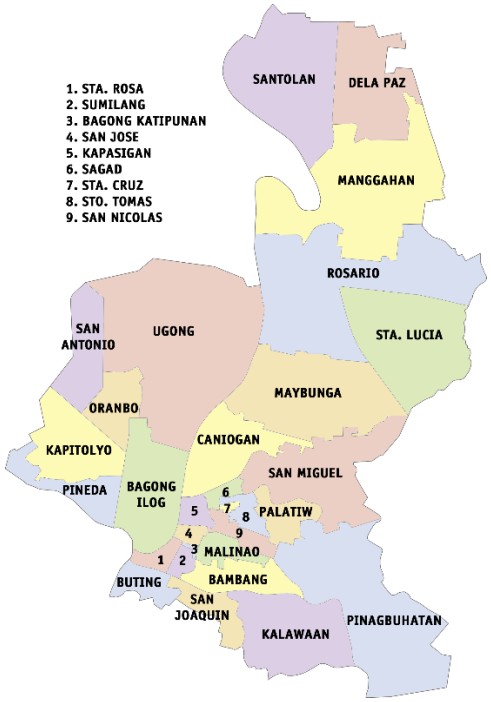

Figure 2. Map of Pasig City barangays.[5]

Public transport in Pasig City

Mass public transport for road in the Metro Manila is comprised of several vehicle types of public utility vehicles (PUVs). These include buses, mini-buses, public utility jeepneys (PUJs), and UV expresses. These modes of transportation are granted franchises to operate by the Land Transportation Franchising and Regulatory Board (LTFRB) under the Department of Transportation (DOTr) while the vehicles are registered to the Land Transportation Office (LTO) also under the DOTr. Moreover, the routes assigned to these modes of transportation can traverse multiple cities within Metro Manila, and sometimes even beyond in adjacent provinces.[6] Since Pasig City is in the center of Metro Manila, it regularly experiences vehicles passing through from one city to another.

Tricycles for public transport[7], on the other hand, are limited to operating only within the boundaries of the LGU where they are registered. While each region in the Philippines can have their own unique design, tricycles are generally comprised of a passenger cab attached to a

[4] Eugene Alvin Villar, *Locator map of Pasig City in Metro Manila, Philippines*, image, Wikipedia, October 26, 2023, https://en.wikipedia.org/wiki/File:Ph_locator_ncr_pasig.png

[5] Roel Balingit, *Political map of Pasig, Philippines*, image, Wikipedia, August 29, 2012, https://commons.wikimedia.org/wiki/File:Ph_fil_pasig_barangays.png

[6] These modes of transportation are considered *mass transport*. Other forms of public transport for road are taxis, cars booked via ride-hailing apps, and motorcycles booked via ride-hailing apps. These modes are also regulated by the LTFRB and registered to the LTO. They can also traverse city borders in Metro Manila.

[7] While tricycles can be both for public and private use, this report will refer to tricycles for public use unless defined otherwise.

motorcycle, making it a three-wheeler vehicle (motorized or non-motorized)[8]. For a small fare (ranging from PHP 13-100, depending on the distance or the exclusivity of the ride), tricycles are officially allowed to take up to four to six passengers, although some tricycles can take beyond the allowed maximum allowable number of passengers. The tricycles are popular forms of last-mile travel, with their small size making them conducive for maneuvering about Metro Manila's narrow streets. Tricycles travel from one terminal to another or can move about their designated tricycle zones.

Figure 3. Examples of tricycles in the Philippines.[9]

Unlike the other forms of public transport for road, tricycles are regulated and registered to the LGU where they operate. The Pasig City **Tricycle Operation and Regulatory Office (TORO)**[10] grants a tricycle unit their franchise to be able to operate exclusively within their registered city (see Table 1). Each tricycle is a member of a **Tricycle Operators and Drivers' Association (TODA)** which is also registered and recognized by the TORO. A TODA is assigned a **zone** in their city where they are designated to serve. Each TODA also has one **terminal** where they can pick up and drop-off passengers. However, regardless of where a national road is situated, tricycles are prohibited from using national roads – even if those national roads are within the jurisdiction of the tricycles' city or tricycle zone.[11]

[8] Non-motorized tricycles are typically referred to as "pedicabs" but follow the same operational and regulatory rules as motorized tricycles.

[9] Second image by Joe Forjette, *Filipino Tricycle*, photograph, Flickr, October 19, 2005, https://www.flickr.com/photos/joeforjette/59179787

[10] The Local Government Code of 1991 (Republic Act No. 7160) tasked LGUs to regulate the use of public and private tricycles and pedicabs within their jurisdiction. Each LGU is responsible for enacting policies and procedures that tricycles in their city are to follow.

[11] Tricycles are not allowed to traverse national roads in Metro Manila because national roads are regulated by the Metro Manila Development Authority (MMDA).

Table 1. Overview of road public transport vehicles in Metro Manila (operation and regulation).

Road public transport vehicle	Area(s) of operation	Regulating body	Remarks
Bus	Interprovincial, intercity	National government – Land Transportation Franchising and Regulatory Board (LTFRB)	• Can be used for long-distance trips.
Public Utility Jeepney (four-wheeler) (PUJ)	Intercity	LTFRB	• Can be a form of middle-mile transportation.
UV Express (four-wheeler)	Intercity	LTFRB	• Can be a form of middle-mile transportation.
Tricycle (three-wheeler)	Intracity	Local government – Local government unit (LGU)	• Can be a form of first/last-mile transportation. • Not allowed on national roads.
Pedicab[12] (three-wheeler)	Intracity	LGU	• Can be a form of first/last-mile transportation. • Not allowed to operate on national roads.

Because of their smaller size, tricycles are able to navigate through narrow roads. They are able to pick-up and drop-off passengers closer to their homes, which is significant for the mobility needs of vulnerable road users such as children, senior citizens, and persons with disabilities (PWDs). They are ideal forms of first and last-mile transportation from local smaller streets to larger mass transport vehicles that can traverse national roads in Metro Manila.

As of May 2024, Pasig City has distributed at least 11,984 tricycle franchises.[13] Pasig City's 2022-2024 Local Development Investment Program (LDIP) stated that in 2020, the ratio of tricycles to the city's population was 1:100, with overlapping areas served by TODAs. This large number of tricycles within the city aggravates Metro Manila's vehicular congestion. According to the TomTom Traffic Index in 2023, Metro Manila was ranked the metropolitan with the slowest travel time at 25 minutes and 30 seconds to travel 10 kilometers.[14] Moreover, the average daily volume of traffic in the same year was 3.63 million.[15]

[12] A type of tricycle that is non-motorized and powered by a person peddling.
[13] In an attempt to curb the number of tricycles in Pasig City, the Pasig LGU paused the distribution of tricycle franchises in 2009. The pause in franchising resulted in 1,800 public transport tricycles operating illegally in the city. In 2021, the Pasig LGU reopened the application for franchises which also allowed the 1,800 illegally-operating tricycles to register to legalize their operations. The move allowed more drivers to participate in public transport in Pasig City while also increasing the tricycle population drastically. Patrick Garcia, "Pasig City opens tricycle franchising system after 12 years", Manila Bulletin, September 9, 2021, https://mb.com.ph/2021/09/08/pasig-city-opens-tricycle-franchising-system-after-12-years/
[14] Lance Spencer Yu, "Metro Manila has world's worst metro area traffic in 2023. What can we learn?", Rappler, January 19, 2024, https://www.rappler.com/business/manila-world-worst-metro-area-traffic-2023/
[15] "Average daily traffic volume in Metro Manila in the Philippines from 2018 to 2023", Statista, March 2024, https://www.statista.com/statistics/1276518/philippines-average-daily-traffic-metro-manila/

While there are widespread calls to reduce the volume of vehicles on Metro Manila roads, this reduction still needs to be balanced with sufficient mobility and continuity of transport. Rigorous city and transport planning and a streamlined institutional set-up are urgently needed to alleviate the condition of travel and public transport in Metro Manila.

Transport emissions in Pasig City

In 2017, Pasig City's greenhouse gas (GHG) emissions inventory attributed 170,948.59 tCO_2e (12%)[16] of the city-level emissions to road transport.[17] Pasig City's most recent CDP and LDIP highlighted that long-term exposure to vehicle emissions contributed to the environmental degradation and respiratory illnesses. Additionally, the Pasig City 2014-2022 Comprehensive Land and Water Use Plan (CLWUP) state the rise in respiratory cases in Barangays Kalawaan, Santolan, and San Joaquin due to air pollution. The CDP also identified cases of pneumonia from heavily polluted air from vehicles as one of the intersectional social sectoral (social-environmental) challenges in Pasig City.

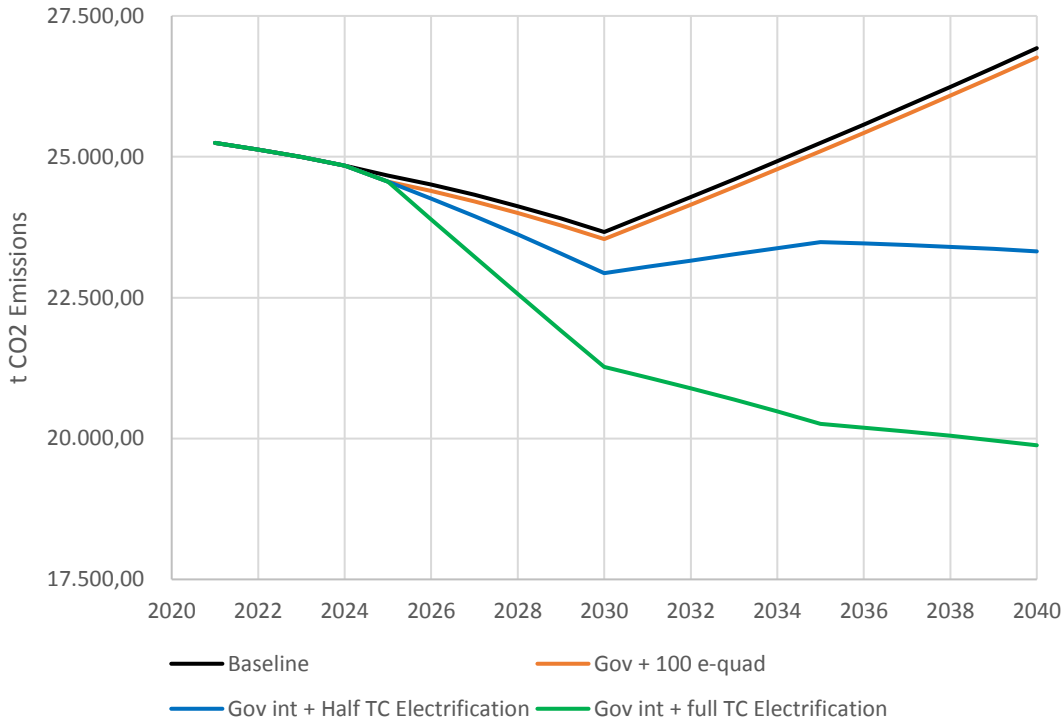

Figure 4. Annual metric tonnes of carbon dioxide emission of Pasig City fleet by scenario.[18]

[16] tCO_2e = tonnes (t) of carbon dioxide (CO_2) equivalent (e)

[17] "Power of Pasig: Low emission development strategies 2020-2030", ICLEI, June 10, 2021, https://acp.iclei.org/wp-content/uploads/2022/05/Promise-of-Pasig-min.pdf

[18] Taken from D1.6 Impact assessment results of Pasig City (April 2024).

In 2021, the Pasig LGU and tricycle fleet emitted an estimated amount of 25,247.20 metric tonnes of CO_2. Should the current transportation scenario of the local government and tricycle fleet continue, a total of 26,927.67 metric tonnes of CO_2 is expected to be released into the city's air by 2040 (see Figure 4). Without drastic measures to curb the city's transport emissions of the government and tricycle fleet, Pasig City will continue to experience the negative impacts of increased GHG emissions, aggravating both the city's environment and its residents' health conditions.

E-mobility overview in the Philippines

LTO registration data shows that the on-road **electric vehicle (EV)** fleet in the country is primarily dominated by electric tricycles and electric motorcycles. Historical documentation of the growth in registered EVs is not yet available as the rules regarding the registration of EVs have varied over the years. LTO is yet to announce stipulations such as the adopted rules for registering electric motorcycles. These issues are related to the fact that the underlying national laws still pertain to vehicles as those having internal combustion engines (ICEs).

In general, e-mobility has been slow in picking up in the country. In 2014, the Electric Vehicle Association of the Philippines (EVAP) forecasted that the Philippine EV fleet would be at approximately 54,000 units. As seen in the registration figures, the actual registrations have been far off these projections. Multiple significant barriers (i.e., high acquisition costs, limited charging infrastructure, lack of social and technical familiarity, registration issues, and lack of financial incentives) have contributed to such a slow uptake. There have been electric jeepney pilot projects in the past in several major cities (e.g., Makati City and Pasig City), as well as other pilot projects involving electric tricycles.[19] However, no significant levels of roll-out have been achieved to date.

Recently, there have been two major national documents established on EVs. The **Electric Vehicle Industry Development Act (EVIDA)** (Republic Act No. 11697) lapsed into law in 2022. The Philippine Department of Energy (DOE) is the main proponent of the EVIDA. The purpose of the EVIDA is to reduce the country's dependency on imported fuel for transportation and create an enabling environment for EVs and thereby enhancing the country's energy security. With the EVIDA, the DOE was able to introduce the **Comprehensive Roadmap for the Electric Vehicle Industry (CREVI)** in 2022. The CREVI outlines the country's national development plan and timeline for EVs to be able to reach identified targets, particularly on EV adoption in several industries. Since their publication, both the EVIDA and the CREVI have prompted multiple local

[19] Refer to Section 1.2 for details on the ADB-DOE project on the "Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project".

and national policies to promote EV adoption, such as local policies that exempt EVs from daily number coding[20] and allowing zero tariffs from imported hybrid EVs.[21]

As of May 2024, the Pasig LGU has a total of 847 vehicles[22] in its fleet which includes 29 EVs.[23]

1.2. Current policy framework and market readiness for deployment of e-mobility

To understand the context of e-mobility in Pasig City, it is important to know the city's existing policies, market readiness, as well as the barriers to deploying electric tricycles for public transport. These will give an overview of the support environment for e-mobility, understand the present situation of tricycles in the city, and what would be impediments for the adoption of electric tricycles for public transport.

Current policy framework

While the EVIDA and CREVI are the key national policies for the promotion of e-mobility, mandates on the roles of LGUs and the propagation of EVS at the city level have yet to be firmly institutionalized. Moreover, unlike other forms of public transportation, tricycles are regulated at the local level by their respective LGU. As such, existing policies and programs on local public transport, tricycles, and e-mobility vary for each city.

For this report, policies and programs of the City Government of Pasig are outlined then their contents analyzed to identify the e-mobility focus areas that they address. There are five e-mobility focus areas:

1. **Urban planning** – refers to land use, local infrastructure, zoning, and building and parking codes. Implementing actions include low emission zones (LEZs), exclusive parking spaces for EVs, electric vehicle charging station (EVCS) requirements for new structures, etc.
2. **Regulatory measures** – refers to regulations for EVs. Implementing actions include setting access restrictions to areas based on vehicle emissions, establishing zones and lanes exclusively for EVs, mandating that all new public transport vehicles are to be EVs, reducing or waiving permit fees for EVs, etc.

[20] Refer to Table 3 for "An ordinance exempting electric vehicle users from the mandatory unified vehicular reduction scheme of the City of Pasig" (Ordinance No. 50, Series of 2022).
[21] Ian Nicolas P. Cigaral, "Marcos okays zero tariff for hybrid e-vehicles", Inquirer, May 17, 2024, https://newsinfo.inquirer.net/1941537/marcos-okays-zero-tariff-for-hybrid-e-vehicles
[22] 818 vehicles are comprised of buses, motorcycles, cars, trucks, vans, school vehicles, and barangay vehicles. Not included in this count are the 58 specialized vehicles such as ambulances, amphibious, backhoes, firetrucks, flatbed self-loaders, forklifts, garbage compactors, garbage dump vessels, marine hulls, owner jeeps, pick ups, and seamasters.
[23] The 29 EVs are comprised of electric quadricycles, BEMAC electric tricycles, PHLPost three-wheelers, and the Flexible Electric Vehicle (FLEV).

3. **Economic and financial measures** – refers to monetary support or incentives for EVs. Implementing actions include establishing EV purchase subsidies, exempting from taxes, offering tax and other monetary incentives for establishments with EVCSs, providing incentives for EV providers, etc.
4. **Operations ecosystem** – refers to the provision of support infrastructure for the entire lifecycle of EVs, from purchase, operations, maintenance, and eventual end-of-life. Implementing actions include streamlining permitting processes for EVs and EVCSs, installing EVCSs powered by renewable energy sources, establishing EV supply and repair businesses, etc.
5. **Public engagement** – refers to communication strategies for and partnerships with key stakeholders. Implementing operations include conducting pilot demonstrations, conducting consultations and capacity-building activities on EVs, establishing partnerships with financing institutions and non-government organizations (NGOs), sharing social media announcements on EVs, etc.

Table 2 outlines the Pasig LGU's existing policies on tricycles, their salient points, and which e-mobility focus areas they address.

Table 2. Inventory of existing policies of the City Government of Pasig on tricycles.

Policy	Description	Focus area
Ordinance No. 24, Series of 2016: **Pasig City Revised Tricycle and Pedicab Code of 2016**	• Ordinance to execute the Local Government Code of 1991 (Republic Act No. 7160) in Pasig City. • The Pasig LGU shall govern and regulate the operation (including the application and revocation of franchises and permits) of tricycles and pedicabs within the city. • The Pasig Tricycle/Pedicab Operation and Regulatory Office (PC/TORO) is the office in charge of regulating the city's tricycles and Tricycle Operators and Drivers' Associations (TODAs).	Regulatory measures
Ordinance No. 23, Series of 2016: **Revised 2016 Traffic and Parking Management Code of Pasig City**	• Outlines the traffic and parking rules (including penalty fees, rules of roadworthiness, driving customs, etc.) for all vehicles in Pasig City.	Regulatory measures
Executive Order No. PCG-59, Series of 2022: An Executive Order **creating the Technical Working Group to facilitate the Pasig TODA Transport Cooperative Program for the City of Pasig**	• Policy to create a technical working group (TWG) to support the formation of TODAs into transport cooperatives. • Lead by the Cooperative Development Office (CDO) and composed of the Tricycle Operation and Regulatory Office (TORO), City Transportation Development and Management Office (CTDMO), Traffic and Parking Management Office (TPMO), Sangguniang Panlungsod[24], City Council Office for Committee on Environment, City Council Office for	Regulatory measures, public engagement

[24] The *Sangguniang Panlungsod* is the City Council.

Policy	Description	Focus area
	the Committee on Cooperatives, and City Council Office for Committee on Transportation. • Through the creation of transport cooperatives, the TWG hopes that it can support the tricycle transport cooperatives into improving local public transport services, integrate business s models to improve livelihoods, and encourage the procurement of environment-friendly transportation vehicles.	
Executive Order No. 70, Series of 2021	• Allowed 1,800 illegally operating tricycles ("colorum") became eligible to apply for legitimate franchises	Regulatory measures

Policies for tricycles in Pasig City have been mainly for regulatory purposes. The establishment of the TORO is instrumental to the institutional and operational framework for tricycles in the city. In addition, the Traffic and Parking Management Code outlines rules for tricycles (and all other vehicles) to follow. While these two mandates set up the base for the operations of tricycles in the city, the **TODA Transport Cooperative Program for the City of Pasig** technical working group (TWG) is tasked to provide support for TODAs who wish to become **transport cooperatives**. The TWG sees transport cooperatives as a means for individual tricycle drivers and operators to pool their resources and therefore have more access to financial and technical support for the operations of their tricycle services. With pooled financial resources and optimizing of services, the TWG hopes that transport cooperatives for tricycles will have greater capacities in eventually procuring modernized vehicles.

In addition to policies for tricycles, the Pasig LGU also has policies specifically on e-mobility. Table 3 lists the existing city policies on electric tricycles, particularly on transitioning from ICE tricycles to electric tricycles.

Table 3. Inventory of existing policies of the City Government of Pasig on e-mobility.

Policy	Description	Focus area
Ordinance No. 16, Series of 2016: **Tricycle Upgrading and Replacement Program** and Resolution No. 242, Series of 2017: **Authorizing City Mayor to allocate PHP 5 million to qualified and eligible tricycle operators and drivers who will replace their tricycles with an e-trike**	• Ordinance to comply with the Department of Natural Resources (DENR) air quality standards. • Outlined the Two-Stroke Phaseout Plan for the upgrading of tricycles to three-stroke units.[25] • Stipulated an incentive program that includes a 50% off financial assistance on regulatory fees for three years. • The accompanying resolution authorizes the City Mayor to allocate PHP 5 million (EUR 81,000) to	Regulatory measures, economic & financial measures

[25] Tricycles with two-stroke engines consumes more fuel, produces more noise and vibration while operating, has an engine with shorter service life, and overall produces higher emissions than tricycles three- or four-stroke engines. From CarParts.com Research Team, "2-Stroke Engine vs. 4-Stroke Engine: Differences, Advantages, and Disadvantages", Carparts.com, March 7, 2024, https://www.carparts.com/blog/2-stroke-engine-vs-4-stroke-engine-differences-advantages-and-disadvantages/

Policy	Description	Focus area
	eligible tricycle operators and drivers for the upgrading of their tricycles to e-trikes, with a beneficiary receiving up to PHP 79,000.	
Ordinance No. 5, Series of 2004, amended by Ordinance No. 21, Series of 2017: **Easy Pondong Pasigueño (Revised EPP) Program**	• Pasig residents, cooperatives, and associations were given access to interest-free loans to fund current and proposed businesses in Pasig. • Tricycle operators and drivers could use this program to avail of electric tricycles. • The City Transportation Development and Management Office (CTDMO) and the Office of the City Mayor (OCM) are working on a loan forgiveness program for tricycle operators and drivers with delinquent electric tricycles.	Economic & financial measures
Executive Ordinance No. PCG-63, Series of 2021: **The Pasig E-Mobility Steering Committee**	• Mobilized by Clean Air Asia for city-level e-mobility initiatives. • Composed of the CTDMO, City Environment and Natural Resources Office (CENRO), City Health Department (CHD), City Engineering Office (CEO), Office of General Services (OGS), Tricycle Operation and Regulatory Office (TORO), City Council Secretariat, Office of Barangay Affairs (OBA), and the OCM.	Regulatory measures
Ordinance No. 50, Series of 2022: **An ordinance exempting electric vehicle users from the mandatory unified vehicular reduction scheme of the City of Pasig** amending Article XXII, Section 133-A of Ordinance No. 23, Series of 2016, and for other purposes	• Following the Electric Vehicle Industry Development Act (EVIDA), electric vehicles are exempted from the mandatory unified vehicular reduction scheme[26] stipulated in Ordinance No. 23, Series of 26 or the Revised 2016 Traffic and Management Code of Pasig City when in Pasig City.	Regulatory measures

The Pasig LGU has established policies to promote the use of EVs in the city, particularly for tricycles for public transport. Financial assistance from the **Tricycle Upgrading and Replacement Program** incentivized eligible tricycle operators and drivers to shift from using two-stroke tricycle units to three-stroke tricycle units, and even to electric tricycles. The **Easy Pondong Pasigueño (EPP) Program** gave Pasig City residents and groups access to interest-free loans that could be used to acquire electric tricycles. However, the City Transportation Development and Management Office (CTDMO) reported that some tricycle drivers and operators are opting to shift back from electric tricycles to four-stroke (ICE) tricycles due to the difficulty of maintaining EVs.

[26] The unified vehicular reduction scheme is a traffic management strategy in Metro Manila that restricts vehicles from travelling certain roads from 7 to 10am and 5 to 8pm. Vehicle restriction is based on the day of the week and the last number of the vehicle's license plate (e.g., license plates ending in 1 or 2 are restricted from Metro Manila roads from 7 to 10am and 5 to 8pm on Mondays).

Additionally, the CTDMO is in the process of creating a loan forgiveness program for some tricycle drivers and operators who have not been able to pay off their loans from the EPP Program.

One of the regulatory changes that the Pasig LGU made in recent years was the creation of the **Pasig E-Mobility Steering Committee**. The steering committee was tasked to lead city-level projects on e-mobility. In 2022, the steering committee oversaw the installation of four-coin operated EV charging pods in the city. With the growth of EVs, the steering committee will be expected to take on more roles in the planning and monitoring of e-mobility initiatives.

Moreover, e-mobility initiatives of the Pasig LGU have often been implemented with support from partners from the private sector and non-government agencies (NGOs). Table 4 lists the city's past and on-going programs on e-mobility.

Table 4. Inventory of past programs of the City Government of Pasig and partner organizations on e-mobility.

Program	Description	Focus area
CitieSWITCH to E-Mobility with UPS	• Three-year project with UPS towards Clean Air Action through e-mobility solutions. • Goal is to mainstream e-mobility to limit the negative impacts of the transportation sector on air quality.	-
Market Transformation Through the Introduction of Energy-Efficient Electric Vehicles (E-Trike) Project with the Department of Energy (DOE) (2019)	• 200 electric tricycles were donated by the DOE to the Pasig LGU. • The electric tricycles were distributed among tricycle operators and drivers' associations (TODAs), homeowners' associations (HOAs), public schools, and local government offices.	Economic & financial measures
SOLUTIONSplus on Integrating electric 2- and 3-wheelers into existing urban transport modes with the United Nations Environment Programme (UNEP) and the International Climate Initiative (IKI)	• Electric two-wheelers of PHLPost Pasig were deployed to delivery mail and parcels in the city. • Used to deliver basic services during the COVID-19 lockdowns in 2020. • Four solar-powered charging pods were installed at the Mega Parking II Building at Pasig City Hall dedicated to electric two- and three-wheelers in the city. • Conducted workshops on e-mobility. • Includes partnership with Tojo Motors to develop an e-quadricycle that will be integrated into the official fleet of the Pasig LGU.	Operations ecosystem, public engagement
GrabWheels	• Several electric scooters were donated to the Pasig City Transportation Development and Management Office (CTDMO).	-
Promotion of Low Carbon Urban Transport in the Philippines with the United Nations Development Programme (UNDP) funded by the Global Environment Fund (GEF) (2017-2022)	• Project with UNDP and the Department of Transportation (DOTr) to create an enabling environment for low carbon transport, including electric vehicles for public transportation. • Supported the formation of the TODA Transport Cooperative Program technical working group (TWG) to help Pasig TODAs form cooperatives and	Regulatory measures, operations ecosystem, public engagement

Program	Description	Focus area
	build capacity to purchase electric tricycles, among other benefits of forming a cooperative. • Built and installed a free-standing solar-powered electric vehicle charging station (EVCS) in Barangay Sta. Lucia. • Conducted workshops on EV adoption for public utility vehicle (PUV) transport cooperatives. • Prepared a Low Carbon Transport (LCT) Re-entry Action Plan (REAP) with the National Center for Transportation Studies (NCTS) for Pasig City.	

The Pasig LGU has benefitted from EV donations from partner organizations. The city government itself has received electric scooters and **e-quadricycles** that are added to the city's existing fleet. The Pasig LGU has also been the recipient of 200 electric tricycles that they in turn distributed among TODAs, homeowner associations (HOAs), and public schools in the city. Projects like these promoted the use of electric tricycles as they become more exposed to the public when regularly in use. The donations also relieved recipients of the initial costs of ownership for EVs.

Aside from EV units, the Pasig LGU has also benefitted from technical and financial support in the installation of EVCSs. The SOLUTIONSplus project and the Promotion of Low Carbon Urban Transport Systems in the Philippines Project have both partnered with the Pasig LGU to study and establish **solar-powered charging stations** in the city. These projects have since increased the number of privately-owned light electric vehicles (LEVs) in the city. These solar-powered charging stations have also become local examples of the process and feasibility of government-owned and operated charging facilities in the city.

Market readiness

Large population of ICE and electric tricycles in the city. Pasig City is known to have one of the densest population-to-tricycle ratios in Metro Manila. There are 11,984 active tricycle franchises in Pasig City[27] and a 100:1 population-to-tricycle ratio. These tricycle franchises belong to the 88 TODAs registered to the city TORO. In addition, previous programs such as the Asian Development Bank (ADB) "Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project" and the EPP Program have increased the share of electric tricycles plying city roads. There are around 96 electric tricycles (Allirey and BEMAC[28]) in Pasig City belonging to public schools, TODAs, and homeowners' associations (HOAs). The city government also has a fleet of 8 e-quadricycles, 10 BEMAC three-wheelers, and 10 PHLPost three-wheelers.

[27] This is the latest tricycle population, not included late franchise renewals.
[28] Allirey and BEMAC are locally-manufactured electric tricycles.

Figure 5. BEMAC electric tricycles.[29]

Figure 6. Awarding of EPP Program to Allirey electric tricycles.[30]

Figure 7. EVCS at Pasig City Hall Complex.[31]

Figure 8. EVCS at Barangay Sta. Lucia.[32]

Availability of electric vehicle charging stations. The City Government of Pasig owns two solar-powered EVCS both done in collaboration with non-government organizations (NGOs). With Clean Air Asia, the United Nations Environment Programme (UNEP), and the SOLUTIONSplus Project, the Pasig LGU installed four charging pods with two 220V outlets each at the Pasig City Hall Complex in 2022.[33] The following year, with the United Nations Development Programme (UNDP) and the Promotion of Low Carbon Urban Transport Systems in the Philippines Project, the city installed three charging pods at Barangay Sta. Lucia. As city-owned EVCS, they are free of charge and aims to serve the many electric tricycles and LEVs in the city and are publicly accessible. The Metropolitan Manila Development Authority (MMDA) also launched free charging stations

[29] Pasig City E-trike transport, *Pasig BEMAC e-trikes*, photograph, Facebook, March 31, 2020, https://www.facebook.com/etrikepas/photos/pb.100063954491043.-2207520000/110954473888659/?type=3&locale=cx_PH

[30] *Pasig EPP Awarding*, photograph, Metro News Central, 2018, https://metronewscentral.net/pasig/city-news/pasig-city-awarding-of-loan-for-epp-program-beneficiaries

[31] *Pasig City EVCS at Mega Parking II*, photograph, TopGear Philippines, July 4, 2022, https://www.topgear.com.ph/news/motoring-news/pasig-city-hall-chargers-a962-20220704

[32] https://pia.gov.ph/news/2024/03/13/pasig-city-unveils-solar-powered-electric-vehicle-charging-station

[33] Jimmyley Guzman, "Pasig City opens free EV charging station", Mirror, July 9, 2022, https://mirror.pia.gov.ph/news/2022/07/09/pasig-city-opens-free-ev-charging-station

for electric bikes and electric scooters in its main office in Pasig City in 2022. Private businesses such as the Estancia Mall and the SM Podium Mall offer free charging in their parking areas. Other institutions such as the Medical City hospital, Legado Motors, Inc., Joy~Nostalg Hotel & Suites, EDSA Shangri-la Manila, and Arcovia City have charging stations to cater to patrons.

Barriers to electric tricycle adoption in Pasig City

Limited financial capacities of tricycle operators and drivers. While the cost paid per trip may vary depending on the length of the trip, a tricycle driver still has other fees that they would incur. A tricycle driver's take-home pay is about PHP 240 per day for drivers that rent a unit while a tricycle driver that owns their own unit can get at least PHP 370 per day, totalling to about PHP 7,200-11,00 per month – not including the operation costs that they could incur (such as repairs and paying for gas).[34] Moreover, TODAs may need to rent spaces for their required terminals, incurring an additional operating cost. Operational expenses and the net profit from their services put tricycle operators and drivers into the "low-income but not poor" social class defined by the Philippine Institute for Development Studies in 2018[35] and may need to depend more on external financing options to afford the initial costs of ownership of electric tricycles.

Limited financing options. The cost of electric tricycles is one of the biggest hurdles to acquiring EVs in the public transport sector. Although previous programs from the Asian Development Bank (ADB) and the Pasig City Government offered financing programs for tricycle upgrading to electric tricycles, other options for e-mobility funding, such as from government financial institutions (GFIs), are not available for tricycles. The Land Bank of the Philippines' (LBP) Special Package for Environment-Friendly and Efficiently-Driven Public Utility Vehicles (SPEED PUV) Loan Program[36] and the Development Bank of the Philippines' (DBP) Program Assistance to Support Alternative Driving Approaches (PASADA) Program[37] target vehicle modernization for the public transport sector. However, these are only available for recognized public transport cooperatives or corporations with approved routes under the LTFRB Omnibus Franchising Guidelines. Nation-wide financing for electric tricycles is yet to be deployed.

[34] Many tricycle drivers work 12 hours a day, 7 days a week. From "Summary Poverty Reduction and Social Strategy", Asian Development Bank, accessed May 25, 2024, https://www.adb.org/sites/default/files/linked-documents/43207-013-phi-sprss.pdf

[35] Katrina Domingo, "Who are identified rich, poor? Gov't shows income class brackets in PH", Philippine Institute for Development Studies, September 17, 2020, https://www.pids.gov.ph/details/who-are-identified-rich-poor-gov-t-shows-income-class-brackets-in-ph

[36] "Speed PUV Loan Program", Landbank of the Philippines, accessed May 25, 2024, https://www.landbank.com/loans/business-loans/generalsmall-medium-enterprises/speed-puv-loan-program

[37] "DBP PASADA Financing Program (Program Assistance to Support Alternative Driving Approaches", Development Bank of the Philippines, accessed May 25, 2024, https://www.dbp.ph/developmental-banking/infrastructure-and-logistics/pasada/

Overlapping public transport routes. The population-to-tricycle ratio in Pasig City is 100:1 and the CTDMO reported that there are overlapping areas served by TODAs, especially around the city hall area, creating competition among the tricycles and therefore economic losses. Overlaps also generate competition among the other modes of public transportation such as jeepneys and PUVs in the same areas.

The Pasig LGU lacks its own Local Public Transport Route Plan (LPTRP) and Route Rationalization (RRP) that would streamline and manage transportation in the city and ultimately determine how many tricycles are needed in the city and which routes they should ply. While the LPTRP is created by city governments, Pasig City's route rationalization depends on the studies of the LTFRB and the Metro Manila Urban Transportation Integration Study (MMUTIS) Update and Enhancement Project (MUCEP)[38], which has yet to be updated and released by the national government.

Unpaid loans and returned electric tricycle units from previous e-mobility projects. In 2012, the Asian Development Bank (ADB) launched its "Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project". The project worked closely with City Government of Pasig, to distribute 200 units, on loans, to TODAs, HOAs, and public schools. In 2019, the Pasig LGU distributed the BEMAC units at loan at different prices, to be paid off gradually and at zero interest.[39] Public schools were given loans at PHP 24,000 per unit, HOAs at PHP 48,000 per unit, and TODAs at PHP 104,300 per unit.[40] Table 5 breaks down the remaining payments that need to be made to the Pasig LGU.

Table 5. Accounting of number of loans and electric tricycle units still active in Pasig City.

Loans for electric tricycles	TODAs	HOAs	Public schools	Total
No. of electric tricycles distributed	20	101	44	165
No. of fully paid loans	1	5	0	6
No. of on-going loans	15	63	35	113
No. of delinquent payments[41]	4	33	9	46

Since 2019, the rate of repayment for the units has been slow. Only 3% of all electric tricycles have been fully paid. Of the 20 electric tricycles of the TODAs, only one loan has been fully paid, with 15 remaining unpaid and four electric tricycles that have had zero contributions. Of the four unpaid electric tricycles, only one unit has been returned to the Pasig LGU. There has also been

[38] The MUCEP aims to prepare the DOTr to create a public transportation plan for Metro Manila through database management, planning of the Metro Manila public transportation network, and development of policies on public transportation network development in Metro Manila. A Metro Manila city's LPTRP is dependent on the MUCEP.
[39] The Pasig LGU decided to give no final repayment deadline, acknowledging the difficulties incurred by all sectors due to the pandemic. TODAs, HOAs, and schools were free to pay any amount at any convenient time.
[40] The rationale for TODAs paying higher loan prices was due to tricycles being profit-based businesses, unlike HOAs and schools.
[41] Delinquent payers have not contributed any payments since receiving the vehicle.

one reported flooded electric tricycle unit. Table 6 shows the total contributions made per year by the TODAs.

Table 6. Repayment contributions by TODAs per year.

TODA contributions	Year						Total paid
	2019	2020	2021	2022	2023	2024	
Contributions per year (PHP)	80,128	78,518	45,272	86,696	49,334	25,000	364,948

The total balance for all TODA electric tricycles is still PHP 1,721,052, which means that 82% of the loans have still not been repaid. Although the COVID-19 lockdowns contributed to the reduced payments in 2021, the ADB identified the insufficient scale-up of adjacent industries, such as charging, as one of the barriers to full EV deployment. [42]

The lack of support for the adjacent industries of electric mobility from the failed roll-out of the ADB project resulted in negative experiences for electric tricycle operators and drivers. The CTDMO shared that drivers were more hesitant to continue using electric tricycles because of the lack of battery swapping facilities, resulting in some electric tricycle drivers and operators to revert to using ICE tricycles. The CTDMO and the Office of the City Mayor (OCM) are working on a loan forgiveness policy to completely remove all debts from the remaining repayments.

Negative public perception of modernization for public transport vehicles. The electrification or modernization of public transportation is not a new topic in Metro Manila. The Public Utility Vehicle Modernization Program (PUVMP) is the flagship program from the Department of Transportation (DOTr) seeking to modernize public transport services and operations and replace PUVs over 15 years and older. Although the LTFRB reported that 81% of PUV operators and drivers have managed to consolidate their vehicles, with some managing to acquire Euro-4 PUVs, there are constant calls to stall or even nullify the project by striking transport groups.[43]

The negative reception of the PUVMP has permeated through other sectors causing more caution to policies on modernization. The existing Pasig LGU policies on modernizing public transport are geared towards a just transition, ensuring that there is proper sequencing before the concept of modernization can be fully introduced. For electric tricycle drivers, seeing the negative impact of PUVMP on other PUV drivers can cause much hesitation.

Restrictions on using light electric vehicles in Metro Manila national roads. In April 2024, the MMDA started the implementation of MMDA Regulation No. 24-022, Series of 2024, which

[42] "Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project Completion Report", Asian Development Bank, October 2021. https://www.adb.org/projects/documents/phi-43207-013-pcr

[43] Ian Laqui, "TRO vs PUVMP urged anew as 'grace period' for unconsolidated PUVs nears end", PhilStar, May 14, 2024, https://www.philstar.com/headlines/2024/05/14/2355048/tro-vs-puvmp-urged-anew-grace-period-unconsolidated-puvs-nears-end

prohibits electric bicycles and electric tricycles (as well as pedicabs and pushcarts) from traversing national roads. Rules such as these were released in 2020 and 2023 by the Department of Interior and Local Government (DILG).[44] This latest circulation by MMDA specified the inclusion of electric bicycles and electric tricycles in the prohibition because of what the MMDA reported as an increasing number of accidents involving LEVs[45], attributing 907 road-related crashes can be attributed to these vehicles.[46] Despite banning LEVs on national roads, President Ferdinand "Bongbong" Marcos Jr. urged a transition period for this regulation wherein penalties for violators will be given to allow time to educate the public on the ban.[47]

Any restriction on EV use can lead to a negative impact on the EV demand in a city and affect the market for ancillary EV industries (i.e., EVCS, EV repairs, EV suppliers, etc.). On the other hand, some countries or cities have established LEZs[48] that exclusively allows EVs or low-emission vehicles on its roads. The Transport for London office imposes a small fee on drivers of vehicles that do not comply with low-emission vehicle standards.[49]

1.3. SOLUTIONSplus Project and pilot demonstration

The SOLUTIONSplus demonstration in Pasig focuses on integrated and shared urban logistics solutions, as well as investigate the potential for public charging solutions. The activities on the ground also include improved the enabling conditions for e-mobility and enhance local capacities related to e-mobility. Currently, the demonstration will feature the manufacturing of eight e-cargo quadricycles and two flexible electric vans.

Shared use cargo e-quadricycles

Locally appropriate solutions addressing urban logistics are deemed quite important, as conventional vehicles currently being used are not particularly effective in conducting efficient movements considering the local conditions in the urban areas. The SOLUTIONSplus

[44] DILG Memorandum Circular Nos. 2020-036 and 2023-195 or the Prohibition on Tricycles, Pedicabs, and Motorized Pedicabs on National Highways.
[45] Light electric vehicles (LEVs) are classified by LTO Administrative Order No. 2021-039 or the Consolidated Guidelines in the classification, registration and operation of all types of electric motor vehicles.
[46] "MMDA to Start Implementing E-bikes, E-trikes Regulation on April 15", Metro Manila Development Authority, March 11, 2024, https://mmda.gov.ph/100-news/news-2024/7295-march-11-2024-mmda-to-start-implementing-e-bikes-e-trikes-regulation-on-april-15.html
[47] De Leon, "Marcos says e-trike, e-bike ban stays, but no penalty on violators for now."
[48] Low Emission Zones (LEZs) are a moving traffic convention that restricts transport emissions from raods in an area in the hopes of improving air quality and protect public health. "How Low Emission Zones work", Low Emission Zones Scotland, accessed May 25, 2024, https://lowemissionzones.scot/about/how-lezs-work
[49] "Low Emission Zone", Transport for London, accessed May 25, 2024, https://tfl.gov.uk/modes/driving/low-emission-zone

demonstration will aim to produce and test urban cargo quadricycles that are suited to local conditions and can potentially transform how urban deliveries are made in the country. These quadricycles combine the nimbleness of smaller vehicles and the carrying capacity of larger vehicles currently used in urban deliveries in Pasig City (e.g., motorcycles, cargo tricycles, and minivans).

Figure 9. E-quadricycle manufactured by ToJo Motors.[50]

The e-quadricycle vehicles to be developed will primarily be used to deliver parcels and letters within Pasig City. Other use cases will be explored as well, such as shared use with the nearby public market and waste collection. A **shared-use vehicle** concept will be investigated for feasibility in the Pasig pilot demonstration. This concept will center on the shared use system that would feature the use of the vehicles by PHLPost during the normal delivery hours of the day and the conduct of last-mile deliveries for the Pasig City public market during the early hours of the morning (e.g., 3 am to 5 am). This concept is being explored as such shared usage would lead towards optimised total ownership costs. This concept is also seen as a solution that can significantly alleviate urban congestion around public markets.

E-quadricycle booking app

As a shared-use vehicle, the demonstration of the e-quadricycle will be accompanied by a pilot run of a ride-booking app. City government employees looking to use the e-quadricycle are to book or reserve an e-quadricycle using an app. As the managers of the e-quadricycle service, the CTDMO will be able to use the app as a fleet management tool. The booking app allows the Pasig LGU to maximize the use of the vehicles as well as gather key ridership data to improve the vehicle and the service.

[50] ToJo Motors, *E-quadricycle*, photograph, Facebook, December 7, 2022, https://www.facebook.com/photo/?fbid=516669283831640&set=pcb.516675760497659

Flexible Electric Van (FLEV)

SOLUTIONSplus will also be supporting a proposal led by the De Lasalle University to a funding mechanism of the Department of Science and Technology (DOST) to develop a flexible electric van (FLEV) which features a chassis that can be used for multiple purposes (e.g., passenger or cargo). Essentially, the vision is to make the FLEV also compatible for handling the cargo boxes to be used in the SOLUTIONSplus quadricycles. SOLUTIONSplus can provide a couple of units of the Valeo motors to the FLEV proposal. SOLUTIONSplus (through the city equipment budget) can also purchase a unit of the FLEV to use PHLPost, which can replace one of their dilapidated minivans.

Figure 10. Flexible Electric Van (FLEV) produced by De La Salle University.

1.4. Relevant key stakeholders

As the main proponent of the electrification of three-wheelers for public transport, the City Government of Pasig's principal offices, working groups, and processes will be outlined to understand the underlying framework that will support and institutionalize the city's e-mobility initiatives. This section will also assess the impact, power, and interest of key stakeholder groups outside the LGU to anticipate their responses to the Roadmap and to help prepare for crucial engagement strategies.

Institutional e-mobility framework for Pasig City

Key players in national government agencies (NGAs) on e-mobility include the Department of Energy (DOE) Department of Transportation (DOTr). However, local government units (LGUs) are the primary stakeholders in the electrification of three-wheelers for public transport.

In Pasig City, the **City Transportation Development and Management Office (CTDMO)** is the primary local government office charged with planning and managing public transport and mobility in the city. Along with the CTDMO, the Pasig E-Mobility Steering Committee was created to plan, guide, and monitor city-level initiatives on e-mobility. The CTDMO and the steering committee will be the principal actors in executing the Roadmap.

The Pasig E-Mobility Steering Committee is composed of members from the following local government offices:

- City Transportation Development and Management Office (CTDMO)
- City Environment and Natural Resources Office (CENRO)
- City Health Department (CHD)
- City Planning and Development Office (CPDO)
- City Engineering Office (CEO)
- Office of the General Services (OGS)
- Tricycle Operations and Regulatory Office (TORO)
- Sangguniang Panlungsod (City Council) Secretariat
- Barangay Affairs Office (BAO)
- Office of the City Mayor (OCM)

Aside from the mandates of each office, each steering committee member has specific tasks in the development of e-mobility in the city. Table 7 lists the members of the e-mobility steering committee and other Pasig LGU offices and their roles in the implementation of the Roadmap. Each of the LGU offices will then be categorized into primary, secondary, or tertiary stakeholders. Primary stakeholders have a direct influence over the Roadmap, secondary stakeholders have some but lesser influence on the roadmap, and tertiary stakeholders have indirect or temporary influence on the Roadmap. Each local government office is also evaluated on which focus areas they can contribute to.

Table 7. E-mobility steering committee members and LGU offices and their roles in the implementation of the Roadmap.

LGU office	Role in Roadmap implementation	Influence on roadmap	Focus area
City Transportation Development and Management Office (CTDMO)	• Develop policies and programs for to promote public transport and e-mobility. • Provide technical advice and support on public transport and e-mobility. • Lead coordination of e-mobility and public transport initiatives. • Conduct capacity building activities for e-mobility and public transport.	Primary	Urban planning, regulatory measures, economic & financial measures, operations ecosystem, public engagement
City Environment and Natural Resources Office (CENRO)	• Develop policies and programs for to promote clean air. • Provide technical advice and support on air quality improvement and transport emissions. • Lead coordination of air quality improvement initiatives.	Primary	Regulatory measures, operations ecosystem, public engagement

LGU office	Role in Roadmap implementation	Influence on roadmap	Focus area
	• Conduct capacity building activities for clean air and air quality improvement. • Disposal and circular economy.		
City Health Department (CHD)	• Develop policies and programs for to promote respiratory health and the importance of staying active. • Provide technical advice and support on respiratory health and the importance of staying active. • Lead coordination of respiratory health and the importance of staying active. • Conduct capacity building activities for respiratory health and the importance of staying active.	Tertiary	Regulatory measures, public engagement
City Planning and Development Office (CPDO)	• Develop policies and programs on land use and transport allocation. • Provide technical advice and support on land and public transportation	Primary	Urban planning, regulatory measures, operations ecosystem
City Engineering Office (CEO)	• Develop policies and programs for charging infrastructure. • Provide technical advice and support on charging infrastructure.	Secondary	Operations ecosystem
Office of General Services (OGS)	• Provide technical support on LGU-owned and operated logistics, equipment, and supplies.	Secondary	Operations ecosystem
Tricycle Operation and Regulatory Office (TORO)	• Develop policies and programs to promote e-mobility. • Provide technical advice and support on e-mobility. • Lead coordination of e-mobility initiatives. • Conduct capacity building activities for e-mobility.	Primary	Regulatory measures, public engagement
Sangguniang Panlungsod (City Council)	• Recommend policies and programs for public transport, land-use, financing, and e-mobility. • Develop policies for public transport, land-use, financing, and e-mobility. • Review and approve policies and programs for public transport, land use, financing, and e-mobility.	Primary	Regulatory measures, economic & financial measures
Barangay Affairs Office (BAO)	• Manages, supports, and monitors barangay offices	Tertiary	-
Office of the City Mayor (OCM)	• Approves policies on local public transport, land use, financing, and e-mobility	Primary	Urban planning, regulatory measures, economic & financial measures
Public Information Office (PIO)	• Primary communication channel of all policies and programs of the Pasig LGU	Secondary	Public engagement
Community Relation and Information Office (CRIO)	• Primary communication channel of all policies and programs of the Pasig LGU	Secondary	Public engagement

LGU office	Role in Roadmap implementation	Influence on roadmap	Focus area
Management Information Systems Office (MISO)	• Manages data relevant to Pasig LGU	Tertiary	-

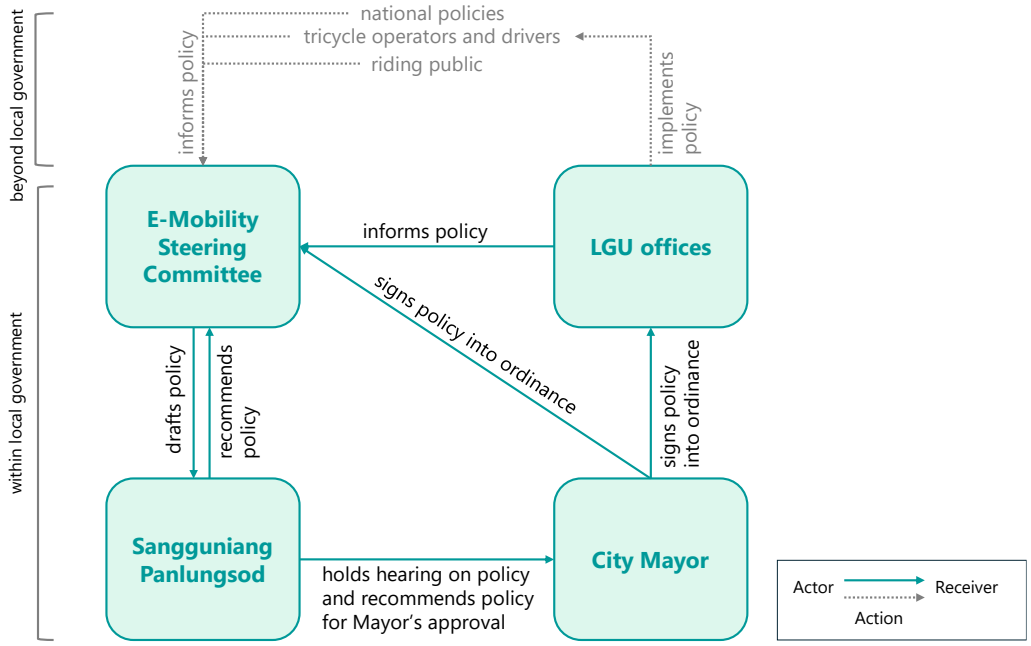

Figure 11. Lifecycle of a policy drafted by the Pasig E-Mobility Steering Committee.

With the e-mobility steering committee, the Pasig LGU can streamline the process of consolidating plans and perspectives from various city government offices. As illustrated in Figure 11, policies and plans drafted by the e-mobility steering committee should be informed by national policies, consultations with tricycle operators and drivers, and engagements with the riding public.[51] The steering committee can then submit policies to the Sangguniang Panlungsod (City Council) for their review through a hearing. Once reviewed, the Sangguniang Panlungsod recommends the policy to the Office of the City Mayor for the mayor's approval. The mayor signs the draft policy into an ordinance which LGU offices are tasked to enforce to tricycle operators and drivers, thus creating an iterative process of policy identification, drafting, recommendation, approval, and implementation.

Stakeholder mapping and analysis

[51] The Sangguniang Panlungsod can also recommend policies to be drafted.

While the Pasig LGU offices have the greatest impact on the implementation of the Roadmap, there are some key stakeholders beyond local government offices that affect or will be greatly affected by the electrification of public transport for three-wheelers in Pasig City.

Table 8 lists stakeholder groups that will be impacted by the implementation of the Roadmap. After describing the impact on the electrification of public transport tricycles, the position of each stakeholder is assessed whether they will be receptive or hesitant on the initiatives of the Roadmap. Each stakeholder group is then classified by the degree of impact of the Roadmap on the group: primary stakeholder (stands to gain or lose from the electrification of tricycles), secondary stakeholder (indirectly affected by the electrification of tricycles), or tertiary stakeholders (less indirectly affected by the electrification of tricycles).

Table 8. Key stakeholders impacted by the electrification of tricycles and the Roadmap.

Stakeholder group	Impact of electrification of three-wheelers for public transport on group	Estimated position on electrification of three-wheelers for public transport	Stakeholder classification
Local government unit (LGU) offices	• Continuously develop, respond, and monitor roadmap initiatives.	Pro	Primary
Tricycle operators and drivers	• Compliance to policies and programs. • Affected operations and management of vehicles. • Beneficiaries of financing initiatives.	Pro/Con	Primary
Public (riding and non-riding)	• Exposed to improved air quality. • Beneficiaries of improved services	Pro	Tertiary
Electric vehicle (EV) supply and repair shops	• Compliance to policies and programs. • Increase demand on supply and repair services.	Pro	Secondary
Charging station operators	• Compliance to policies and programs • Increased market for charging services.	Pro	Primary
Public utility vehicle (PUV) groups	• Face competition from electric tricycles. • Support scaling down of number of electric tricycles.	Pro/Con	Secondary
Land Transportation Franchising and Regulatory Board (LTFRB)	• Implement the Pasig LGU's crafted Local Public Transport Route Plan (LPTRP) and Route Rationalization Program.	Pro	Tertiary
Adjacent cities	• Continuity of shared PUV routes and operators.	Pro/Con	Tertiary
Financing institutions	• Consulted by the LGU to finance e-mobility initiatives.	-	Tertiary
Non-government organizations (NGOs)	• Partner with the LGU to finance or support implementation (provide resources and technical know-how) on e-mobility	Pro	Tertiary

The primary stakeholders of the Roadmap are the tricycle operators and drivers as well as charging station operators. Electric vehicle (EV) repair and supply shops and public utility vehicle (PUV) groups are expected to be indirectly impacted by the electrification. For instance, PUV groups may respond favorably to the scaling down of Pasig City's tricycles since it would mean a greater demand for PUV services.

Most of the stakeholder groups are expected to respond positively to the electrification of tricycles for public transport. However, public transport groups, such as public utility vehicle (PUV) and tricycle drivers and operators, may have hesitations on the Roadmap. PUV groups may fear that the support that public transport electric tricycles receive from the Pasig LGU may create more competition for the PUV groups. On the other hand, tricycle drivers and operators may be reluctant to support the electrification of their vehicles because of fears of being forced to phase-out or comply with electric tricycle adoption policies they may not feel comfortable with.

While these stakeholder groups can be impacted by the Roadmap, it is also important to engage them because they, in turn, can affect the efficiency and success of e-mobility initiatives. Figure 12 maps the stakeholders based on their power and interest on the electrification of three-wheelers for public transport in Pasig City.

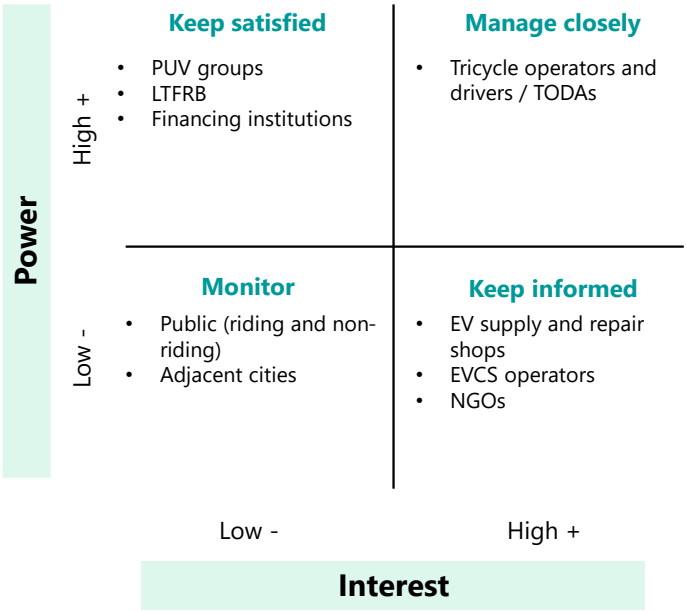

Figure 12. Stakeholder mapping based on stakeholder power and interest in Roadmap initiatives and outcomes.

Tricycle operators and drivers as well as their associations (TODAs) are the principal affected stakeholder group and have the most impact on the success of Roadmap initiatives because of their sheer number and the influence they have on public opinion. In a similar vain, PUV groups

need to be kept satisfied. While financing institutions such as government banks may not be directly interested in the Roadmap, they have influence on funding for key initiatives on e-mobility. Non-government institutions (NGOs) also need to be kept informed because of the potential they have in forming partnerships with the Pasig LGU on e-mobility projects.

2. Approach – Methodology

The City Government of Pasig is no stranger to the electrification of three-wheelers for public transport. The formation of this roadmap needs to integrate key points from existing city plans on public transport and e-mobility, while considering the lessons learned from previous plans and programs (see Section 1.2). This section will conduct a thorough desk research on existing sources that can contribute the formation of the roadmap. Gaps in the plans, policies, and programs are identified to understand critical focus areas that the Roadmap will need to address. Lastly, the formulation of the Roadmap will be outlined based on the findings.

2.1 Inventory of existing sources

There are already multiple plans and roadmaps that address e-mobility and electric tricycles in Pasig City. This section enumerates the existing plans and roadmaps to consolidate an overall vision for electric tricycles in the city. Past workshops where the Pasig local government unit (LGU) expressed their experiences and challenges with e-mobility are also outlined. This Roadmap will be able to integrate past plans and lessons learned to ensure a sustainable future for electric tricycles in the city.

Pasig City existing plans and roadmaps

The City of Government of Pasig has been consistent in incorporating plans and policies on addressing problems on transportation, mobility, and the environment. The **Comprehensive Land and Water Use Plan (CLWUP)** and **Comprehensive Development Plan (CDP)** are the key documents in assessing the city's developmental needs and determining the city's direction on key issues within an administrative period.

Table 9 details the CLWUP, CDP, and other existing plans and roadmaps of Pasig City. Along with the Comprehensive Roadmap for the Electric Vehicle Industry (CREVI), these plans contain Pasig City's intentions and desired results when it comes to its development. The vision of each roadmap or plan is highlighted with salient points on transportation, mobility, and the environment noted. Each roadmap and plan are assessed on which focus area[52] they address.

Table 9. Inventory of previous plans of the City Government of Pasig on transportation, air quality, and e-mobility.

Salient points	Focus area
Comprehensive Land and Water Use Plan (CLWUP) 2014-2022[53] City Government of Pasig	
Vision: "…a vibrant and competitive economy with world-class infrastructure systems, a liveable and sustainable ecopolis and ultimately a model of urban development."	

[52] Refer to Section 1.2 for the description of focus areas.

[53] The latest Pasig City CLWUP covers 2023 to 2031. Since it has not yet been officially published, this report will discuss the previous CLWUP covering 2014 to 2022.

Salient points	Focus area
• The Zoning Ordinance defines Planned Unit Development (PUD) Zones as land development scheme for a new project site with its own Comprehensive Development Master Plan (CDMP) including transit-oriented developments (TODs).	Urban Planning
• A CLWUP workshop identified the Green Environment Program, GHG Inventory and Accounting, and Environmental Code of Pasig City as one of the city's Environmental Management Policies, Programs, Projects, and Services for the long-term. • Prioritizing Environmentally Sustainable Transport (EST) has been identified as an intervention to deal with this, but mostly focus on walking and cycling along with strict adherence to the Clean Air Act.	Urban planning, regulatory measures
• The need to enhance the city's green initiatives on power was identified as one of the physical infrastructure development key issues and concerns. The hope is for the Pasig City local government unit (LGU) to take the lead as a "green" advocate by incorporating green practices such as solar power as well as promoting green practices through massive information campaigns.	Regulatory measures, public engagement
• Another physical infrastructure development concern for public transportation and the large number of tricycles. For a small city, Pasig City has one of the highest number of three-wheelers in Metro Manila, which causes issues on traffic flow efficiency, road safety, and environmental quality. There is an need for the LGU to manage the number of tricycles and consider more efficient and environment-friendly public transport modes. • The suggested intervention is the pause of granting of additional tricycle franchises and to promote other EST such as walking and cycling.	Regulatory measures, public engagement
• One of the identified projected development needs for public transport is the study of the interface between metropolitan-level transportation and city-wide transportation provided by a transport master plan. • Priority programs and projects include a Pasig City mass transit system feasibility study, master plan and feasibility study for a TOD in Barangay Rosario, electric buses or vehicles in the Ortigas Central Business District (CBD) and provision or supply of electric vehicles to support the program, and the creation of an EST project for the short term and long term.	Urban planning, regulatory measures, economic & financial measures
Low Emission Development Strategies 2020-2030[54] ICLEI – Local Governments for Sustainability	
Vision: "The Promise of Pasig is grounded by Pasig City's vision of a 'Model community of empowered citizens with high quality of life.' The City Government's mission is sought to empower its constituents and make Pasig a livable community through: • People-centered development that nurtures caring, innovative, healthy and locally-rooted but globally competitive Pasigueños; • Business-friendly policies that foster competitiveness and inclusive economic growth; • Resilient, safe and sustainable riverine place-making; • Good governance marked by inclusivity, participation, transparency, competence and sound fiscal management."	
• The goal for Pasig City's transport sector is to reduce road transport GHG emissions by 20% from the 2017 GHG emissions (170,948.69 tCO_2e) by 2030 by setting up base year emissions goal and multi-year goals. • The allowable emissions target for the transport sector (in-jurisdiction) per year amounts to 3,418.97 tCO_2e per year.	-
• PHP 26,364,880 of public funds are appropriated towards fighting climate change, with around 87% of the public funds are allotted to transport and air quality.	Economic & financial measures

[54] "Promise of Pasig: Low Emission Development Strategies 2020-2023."

Salient points	Focus area
• Transport and air quality funds amount to PHP 23,089.65, the highest priority sector to combat climate change.	
• The first climate change mitigation action for transport and air quality is to continue the implementation of the Bayanihan sa Daan[55] program to by improving mobility and public transportation. • Operations and services are the primary target: allocating 20 kilometers of priority lanes for high occupancy public transport vehicles, establishing five common public transport terminals, decreasing public transport total travel time by 25%, and assuring PWD and senior citizen-accessible public transport in the city. • To reach these goals, there is a need for a transport master plan and Local Public Transport Route Plan (LPTRP) to integrate all modes of transportation. • Coordination and engagement with transport sector groups and the public are emphasized. The creation of a transport desk was identified to represent the interests of the transport sector. • The Pasig LGU plans to allocate common facilities for the maintenance for public utility vehicles (PUVs). • An identified strategy is to prioritize suppliers that advocate for a sustainable supply chain.	Urban planning, regulatory measures, operations ecosystem, public engagement
• The Pasig LGU aims to have 2,000 tricycle drivers transition to electric tricycles by 2025, register 5,000 electric tricycle businesses or logistics by 2025, and establish five common battery charging or swapping stations. • The Pasig LGU is tasked with identifying tricycle drivers to be re-fleeted to electric tricycles as well as businesses that shall receive electric tricycles. • Tricycle drivers to be re-fleeted are to be offered subsidies for the conversion or improvement of charging by providing an alternator provision using ordinary vehicle batteries. Banks and other financial lending institutions are earmarked to provide this support. • Electric tricycles are planned to have distributed deployment among Pasig City sectors. • A Memorandum of Agreement (MOA) to secure efficient use and maintenance of electric tricycles. • The Manila Electric Company (MERALCO) is tagged to provide technical and/or financial support for the feasibility study to identify locations, capacities, and maintenance requirements for charging and swapping stations. Recommendations on land donation or leasing at lower prices are needed for identified land to install common terminals. • The Pasig LGU hopes for the public to patronize and prioritize electric tricycles as a means of mobility within the city.	Urban planning, regulatory measures, economic & financial measures, operations ecosystem, public engagement
• The number of areas within the ambient air quality guideline values (e.g., PM10, PM2.5, SOx, and NOx)[56] are to be identified. • The Pasig LGU plans to have strict enforcement of anti-smoke belching regulations and to regularly monitor and disseminate information on air quality. • Regular smoke emission tests and vehicle maintenance are targeted for businesses and the public and encourage an environment-friendly driving culture (e.g., reduce excessive cooling in the car, etc.).	Regulatory measures, public engagement
Comprehensive Development Plan (CDP) 2022-2027 City Government of Pasig	

[55] Bayanihan sa Daan program is one of the City Government of Pasig's initiatives towards becoming a green city. Free community shuttle bus services and upgrading of two-stroke (ICE) tricycles to electric tricycles are some of the EST initiatives.

[56] PM = particulate matter, SOx = oxides of Sulphur, NOx = oxides of Nitrogen

Salient points	Focus area
Vision: "Pasig City envisions itself to be the exemplar or participatory and good governance where communities enjoy a high quality of life in a competitive and inclusive economy, ecologically-balanced environment, innovative and resilient infrastructure guided by a response, transparent, and accountable government."	
• For the infrastructure sector, establishing systems and facilities for low carbon transport has been identified as success indicator. Considered to be an innovative vision, the Pasig LGU judges there has been something done to achieve the goal, but the level of attainment is still on the low side. The Pasig LGU aims however to reach a level that is at least half-fulfilled through awareness and education campaigns on low carbon transport and to develop pilot implementations of business charging stations. • While having all modernized public transport system vehicles be compliant with the LTFRB Circular Memorandum, there has been no stated desire to improve the half-accomplished current state. To add, the Pasig LGU has noted that some transport groups have formed cooperatives to procure modern vehicles but also do not wish to improve on the current situation.	Public engagement
• Another success indicator is having TODs with 15-minute accessibility. With limited initiatives towards traffic management and study of mass transit, the goal is to reach 100% success in this indicator through a traffic management study and intra-city mass transit study.	Urban planning
• Another success indicator is the city's electric tricycle program for qualified beneficiaries. The indicator is judged to be currently on the low side, but the LGU wishes to improve this initiative into short of full attainment.	-
• The Pasig LGU has identified providing subsidies for transport groups to support the shift to using modernized vehicles. The City Transportation Development and Management Office (CTDMO), Tricycle Regulation and Regulatory Office (TORO), and the Cooperative Development Authority (CDA) plan to incentivize and subsidize environmentally-friendly sustainable vehicles such as electric tricycles and electric jeepneys.	Economic & financial measures
• In 2020, the population to tricycle ratio was 100:1, raising issues on traffic flow efficiency, road safety, and environmental quality. • Most of the Tricycle Operators and Drivers' Association (TODA) terminals are located around the city hall and public market area, resulting in overlapping and competing services causing economic losses and transport inefficiencies. • Pasig LGU wishes to increase the public transport services and facilities by 90% and modernize public transport modes by 2026. Part of this is establishing transport terminals and PUV stops within 500 meters of residential areas through capital investment (to modernize public transport units), livelihood programs (for displace drivers), study of loading areas and transport terminals, and identification of overlapping routes.	Urban planning, economic & financial measures
• Pasig LGU aims to increase the share of public transport and active transport users by 75% in 2026 with the target of having modernized transport services accessible every 500 meters through an awareness campaign and establishment of TODs.	Public engagement
• For PUV modernization, one of the key components is the implementation of the LPTRP including a tricycle and PUV study, co-financing program for transport cooperatives in the city (allotting a loan package for modernization), a light electric vehicle financing program (incentivizing electric vehicle facilities and installation of charging facilities), a tricycle upgrading program (handholding after sales, charging facilities and promotion of e-bikes through incentivization and subsidies). • A priority legislation is an ordinance on Route Rationalization and Modernization Program for 2022-2026, an ordinance for co-financing support for transport cooperatives, and an ordinance on light electric vehicles financing program.	Regulatory measures, economic & financial measures, operations ecosystem, public engagement
• TORO Administrative Services Program includes the Decarbonization Program that supports the decarbonization of all tricycle units in Pasig City.	-
Local Development Investment Program (LDIP) 2022-2024	

Salient points	Focus area
City Government of Pasig	
Vision: "Pasig City envisions itself to be the exemplar or participatory and good governance where communities enjoy a high quality of life in a competitive and inclusive economy, ecologically-balanced environment, innovative and resilient infrastructure guided by a response, transparent, and accountable government."	
• There needs to be an additional 1,927 kilometers of road to comply with road network standards but there also needs to be action to address increasing traffic congestion, particularly on tricycles. • There is a call for the rationalization of public transportation to address overlapping of routes and underservicing of areas as well as advocating for public transportation to reduce the traffic congestion. There is also a call to invest in more environmentally sustainable modes of transportation.	Urban planning, regulatory measures
• The transportation sector (vehicle emissions) is linked to air pollution, environmental degradation, and respiratory illness risks due to long-term exposure. • The Pasig LGU Environmental Sector also hopes to improve the air quality up to established standards set by the national government.	-
• One of the objectives is to modernize public transport modes by 2026. • Programs identified for PUV Modernization and Route Rationalization Program include the LPTRP implementation, co-financing program for transport cooperatives in Pasig City to be coordinated with the Cooperative Development Office (CDO) and allot loan packages for the modernization program plus subsidy (co-finance), and Tricycle Upgrading Program (handholding after sales, charging facilities and promotion of electric bicycles). • Of the Pasig LGU's ranking of all its public investment programs, the PUV Modernization and Route Rationalization Program ranked 21st of 101. On the other hand, other programs for tricycles are relatively low on the prioritization list such as the TORO Administrative Services Program (Decarbonization Program) at 73. • Local Investment Program allotted a total of PHP 53,900,000 for 2022 to 2024 towards the PUV Modernization and Route Rationalization Program, with 2024 receiving PHP 29 million of the total amount.	Urban planning, regulatory measures, economic & financial measures, operations ecosystem, public engagement
Comprehensive Roadmap for the Electric Vehicle Industry (CREVI) 2030-2040 [57] April 2022 Department of Energy (DOE)	
Vision: "To electrify a diverse range of vehicles and establish a domestic EV industry with strong export potential, with the aim of building a sustainable future, where new EVs and the required infrastructure are locally robust with reduced environmental impact."	
• Tricycles for public transport are to achieve at least 5% EV share by 2034, and 10% by 2040.	-
• LGUs are tasked to lead pilot programs on EV and Electric Vehicle Charging Stations (EVCSs) in the short term (2023-2028).	Operations ecosystem
• LGUs are to promote business models for local businesses in support of the EV supply chain. • From 2023 to 2040, LGUs are tasked to conduct trainings on shared service facilities for groups such as businesses operators and cooperatives to ensure the success of EV supply chains. • LGUs are also tasked to conduct capacity-building activities on EV and EVCS deployment from 2023 to 2040.	Economic & financial measures, operations ecosystem, public sector engagement

[57] The analysis of the CREVI in this report only tackles salient points that address tricycles and the role of LGUs in the EV industry. "2030-2040 Philippine Comprehensive Roadmap for the Electric Vehicle Industry (CREVI)", Department of Energy, April 2023, https://doe.gov.ph/sites/default/files/pdf/energy_efficiency/CREVI-2023_Updated.pdf

Salient points	Focus area
• For policy and credit, LGUs have a task for each timeframe to ensure sustainable operation and energy-efficient environment for EVs and EVCSs. • For the short term of 2023 to 2028, LGUs are to encourage renewable energy sources for EVCS. For the medium term of 2029-2034, LGUs are to mandate the use of renewable energy resources for 50% of EVCSs. For the long term of 2035-2040, LGUs are to mandate the use of renewable energy resources for 100% of EVCSs.	Operations ecosystem
Poblacion Urban Renewal Area (PURA) Comprehensive Land and Water Use Plan (CLWUP) 2023-2031	
Vision: A cultural heritage district with community-based tourism targeted to be a low emissions zone (LEZ) by creating "superblocks" to encourage foot traffic and active transport.	
• The PURA area is targeted to have several development controls to preserve the unique heritage and culture of the buildings and natural spaces in the area. It has four sub-zones covering 11 barangays – encompassing around 240 hectares.	Urban planning
• The PURA development will include transit stations for buses, jeepneys, and tricycles within walking distances of residential areas. • Interconnectivity of transportation is prioritized.	Urban planning, regulatory measures

The roadmaps and plans of Pasig City have varying levels of commitments and direction when it comes to e-mobility. Of the plans produced by the Pasig LGU, the CDP offers the most direction. While the CDP emphasizes the need to transition into e-mobility for public transport tricycles, it also recognizes the urgency of carefully planning transport routes to ensure efficient and sufficient mobility in the city. Targeted subsidies for public transport operators and drivers to transition to e-mobility are mentioned – especially for tricycles. Subsidies and support for e-mobility transition are paired with addressing the large population of tricycles and route rationalization to streamline intra-city transport and promote public transportation. By 2026, the Pasig LGU aims to increase the share of public transport and active transport users by 75%, increase public transport services and facilities by 90%, and modernize public transport. The CDP identified **Route Rationalization Program** and **Public Utility Vehicle (PUV) Modernization Program** for Pasig City as priority ordinances for 2022 to 2026, including co-financing programs for transport cooperatives and financing for light electric vehicles (LEVs).

The **Local Development Investment Program (LDIP)** complements and prioritizes the initiatives set by the CDP. Besides emphasizing the 2026 target for the modernization of public transport modes as stated in the CDP, the LDIP also stressed the need for allotting loan packages and co-finance schemes for those intending to modernize. For the intended Tricycle Upgrading Program, the LDIP identified the need for intensive support such as handholding after sales and the provision of charging facilities. A total of PHP 53.9 million is allocated to the PUV Modernization Program and Route Rationalization Program – indicated the city's dedication to solve the issues of public transport. With this comes a need to consider expanding Pasig City's road network by

1,927 kilometers to reach acceptable road network standards. This presents an opportunity to establish **developmental routes**.[58]

A specific area that presents opportunities for developmental routes is the **Poblacion Urban Renewal Area (PURA)** (refer to Figure 13). Because the PURA area prioritizes active or non-motorized transport and interconnectivity, it can be defined as a **Low Emissions Zone (LEZ)**. The master plan for this area is yet to be crafted. As a potential LEZ, e-mobility, particularly the last-mile services and transport connectivity that electric tricycles can offer, can suit this development.

The **Low Emission Development Strategies 2020-2030** is a publication produced by the ICLEI Southeast Asia Secretariat that consolidates the findings from a series of public consultations with the Pasig LGU and other groups that outline the low emission development strategies of the city. The document set a goal of reducing the city's GHG emissions by 20% by 2030 (from 170,948.69 tCO_2e in 2017). By 2025, the Pasig LGU aims to transition 2,000 tricycle drivers to electric tricycles and register 5,000 electric tricycle businesses or logistics. The Pasig LGU plans to support this transition by establishing five battery charging or swapping stations in the city and encourage the public to patronize these electric tricycles.

Because tricycles are regulated by LGUs, existing plans are mainly developed in the context of cities. However, the CREVI offers direction and targets for LGUs in achieving e-mobility. By 2034, tricycles for public transport are to achieve a 5% EV share, and 10% by 2040. However, because tricycles are given franchises individually, there is no clarity on what is considered a "fleet" in the context of three-wheelers. The CREVI also tasks LGUs to lead the promotion of EVs through the LGU execution of capacity-building initiatives on e-mobility and establishing EVCSs powered by renewable energy sources.

Past workshops and consultations on e-mobility

Because of the City Government of Pasig's history of integrating into their plans and cooperating with various organizations on e-mobility, the Pasig LGU has also been able to participate in several meetings and workshops on e-mobility. Table 10 records some important discussion points from events participated by the Pasig LGU. The salient points of each event give an insight on what the Pasig LGU's views are on e-mobility policies and programs and their successes or lessons learned for future initiatives. The discussion points are then assessed to determine which focus area(s) they pertain to.

[58] Developmental routes, as defined by the Omnibus Guidelines on the Planning and Identification of Public Road Transportation Services and Franchise Issuances (DOTr Department Order No. 2017-011), are routes that are designed to serve new land use development areas.

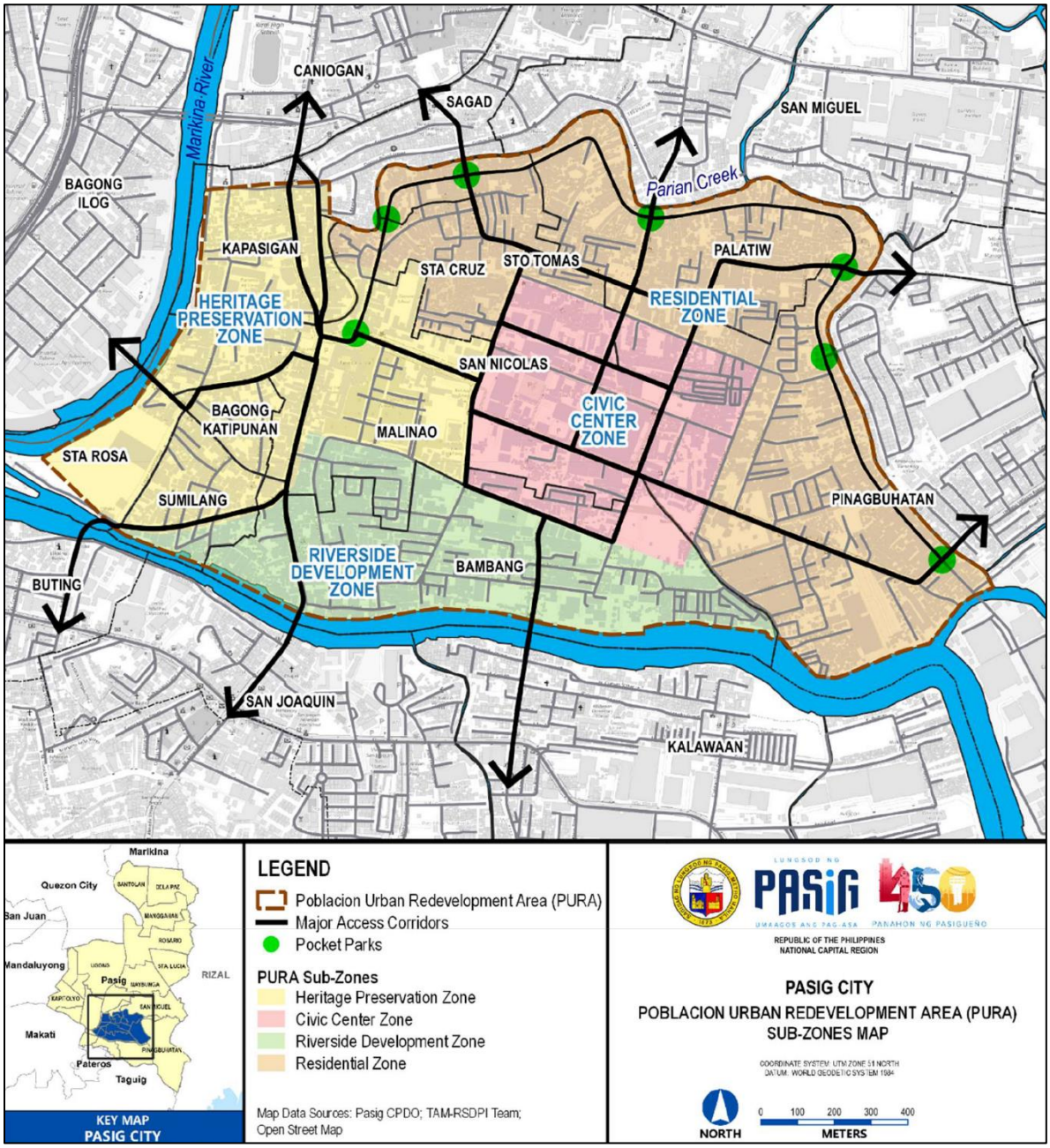

Figure 13. The Poblacion Urban Renewal Area (PURA) and its sub-zones.[59]

[59] Source: CLWUP 2023-2031.

Table 10. Inventory of meetings, events, and workshops attended by the City Government of Pasig on e-mobility.

Salient points	Focus area
Consultation Meeting with Pasig City LGU City Transportation Development and Management Office (CTDMO) and the City Planning Development Office (CPDO)	
• The Pasig LGU shared that despite the donated electric tricycles from the Department of Energy (DOE) in 2014 and 2019, tricycle drivers were still hesitant to shift from internal combustion engine (ICE) tricycles to EVs due to battery concerns, durability concerns, and battery swapping costs. There was an overall perception that EVs were difficult to maintain. • The Pasig LGU noted that although there was a movement to upgrade two-stroke tricycles to e-trikes, the uptake has been slow.	Economic & financial measures, operations ecosystem
• The Pasig LGU shared that the initial concern for EV adoption is the limited availability of funding and the high initial costs for establishing battery swapping stations. • The Pasig LGU attributes project partners for support in piloting charging stations as proofs of concept. • The Pasig LGU is open to requiring the installation of electric vehicle charging stations (EVCS) in certain establishments to promote EV use.	Economic & financial measures, operations ecosystem, public engagement
• Congestion caused by the lack of city road networks as well as the overlapping routes are concerns. • The Pasig LGU shared that there were conversations on green routes but no concrete action or criteria for selection. • The Pasig LGU stressed that the Land Transport Franchising and Regulatory Board (LTFRB) should be involved in identifying green routes since Pasig City is part of Metro Manila. The Pasig LGU felt that green routes or even lanes dedicated to light electric vehicles (LEVs) could be best considered after optimizing all public transport routes in the city with a mandate. • Segregated lanes for LEVs would depend on the size and speed of the LEV. • The Pasig LGU expressed that it would be nice if Tricycle Operators and Drivers' Associations (TODAs) had exclusive lanes for EVs.	Urban planning, regulatory measures
• The Pasig LGU found that focusing on transport cooperatives would be critical in integrating and implementing green routes since EVs are expensive and transport cooperatives need funding support.	Economic & financial measures, public engagement
• The Pasig LGU shared that tricycles should be involved and integrated into the updated zoning ordinance and Comprehensive Land and Water Use Plan (CLWUP). • The Pasig LGU shared the need for "colorum" tricycles[60] to be given franchises so that they could be regulated and integrated into any transport planning. • The CPDO expressed the need for further discussions on how to optimally locate tricycle services.	Urban planning, regulatory measures, operations ecosystem
• The Pasig LGU shared plans by the Office of the City Mayor (OCM) to execute a condonation program for those who accrued unpaid balances for the acquisition of the Allirey electric tricycle through the Easy Pondong Pasigueño (EPP) Program.[61] The Pasig LGU also reported that there were some BEMAC recipients who want to shift to four-stroke tricycles.[62]	Economic & financial measures, public engagement

[60] "Colorum" refers to any unregistered, and therefore illegal and unregulated, public transport modes.
[61] Refer to Table 3 for details on the EPP Program.
[62] The request for the BEMAC users to transition to four-stroke tricycles has not yet been approved. Refer to Section 1.2 for details on the ADB-DOE "Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project".

Salient points	Focus area
• The Pasig LGU shared that tricycle drivers and operators who shifted to electric tricycles were given PHP 74,000 worth of financial assistance, and then a PHP 65,000 loan to relieve some of the costs of an electric tricycle unit.	
• The Pasig LGU felt that financing for EVs was the most urgent barrier to EV adoption. • After financing, the Pasig LGU identified charging and battery swapping, technical support, market development, and battery disposal are next priority areas.	Economic & financial measures, operations ecosystem
Knowledge Sharing Event on Electric Mobility for Local Governments City Transportation Development and Management Office (CTDMO), City Environment and Natural Resources Office (CENRO), and City Health Department (CHD)	
• The Pasig City LGU shared that they purchased 200 lead acid battery electric tricycles to be operational for three to four years. The Pasig LGU identified battery swapping as the main challenge because of the limited budget and the eventual unserviceable electric tricycle units. In the end, only 30% were still operational.	Economic & financial measures, operations ecosystem
• The Pasig City LGU felt that their ICE tricycle phase-out program was unsuccessful due to the high cost of lead acid batteries and prevalent concerns on charging.	Economic & financial measures, operations ecosystem
• The Pasig City LGU shared their future plans on establishing more solar-powered charging stations in the city.	Operations ecosystem
Roundtable Workshop on Battery Electric Vehicle Adoption in the Philippines April 2024	
• The Pasig LGU shared that there were 300 public and private EVs in Pasig City.	-
• The Pasig LGU identified the provision of EVCS (particularly for fast-charging stations) and expanding the range of EV fleets as the priority areas for EV adoption in the city. • The Pasig LGU credited the free charging facilities in the city for the uptake of two- and three-wheelers.	Operations ecosystem
• The Pasig LGU shared that they have an unserviceable fleet of LEVs that run on lead acid batteries. They are attempting to reserve these units by engaging with a start-up with an expertise in charging for lithium-ion battery packs.	Operations ecosystem, public engagement
• The Pasig LGU urged the DOE to require gasoline stations to have at least one EV charging facility.	Regulatory measures, operations ecosystem

Financing and lack of access to vehicle maintenance and charging were regularly identified as barriers in the adoption of EVs in the city. The Pasig LGU identified several occasions where the lack of an allocated budget for battery swapping facilities would inhibit electric tricycle owners from using their units. Despite pervious programs on electric tricycle, including donations by the DOE of electric tricycle units, some electric tricycle owners have opted to use four-stroke (ICE) tricycles instead, because of charging anxiety and costs of battery swapping for lead acid units.

Fortunately, lithium-ion batteries for EVs are made more available and affordable. Moreover, the Pasig LGU is regularly made a partner of beneficiary of programs on e-mobility, particularly for

tricycles.[63] Pilot programs that offer an introduction and proof of concept are welcomed by the city.

However, the Pasig LGU also emphasized that to promulgate electric tricycles, they would first need to optimize the entirety of public transport. The Pasig LGU follows the Avoid-Shift-Improve (ASI) framework. As such, the Pasig LGU feels that tricycles need to be considered in relation to the entire road transport network. Any plans, whether for electric or ICE tricycles, need to be integrated seamlessly into all public transport.

2.2 E-mobility gaps in Pasig City

To better comprehend the needs of the City Roadmap, the gaps in city policies, challenges in the adoption of EV ecosystem components, and the benefits, risks, opportunities, and barriers of the transition to e-mobility need to be analyzed.

Gaps in policies and initiatives on e-mobility in Pasig City

With the existing plans, policies, programs, and perspectives on the modernization of tricycles and adopt of e-mobility in Pasig City, it is necessary to evaluate if there are any gaps in the city's e-mobility environment. Table 11 lists all the policies, programs, plans, and perspectives from Section 1.2 and Section 2.1 and evaluates which focus areas they address. The identification of gaps, along with responding to barriers, are critical actions in the preparation of a holistic and successful roadmap.

Table 11. Summary of City Government of Pasig policies, programs, plans, and perspectives on public transport, tricycles, and e-mobility.

Policy/program/plan	Focus area				
	Urban planning	Regulatory measures	Economic and financial measures	Operations ecosystem	Public engagement
City policies					
Pasig City Revised Tricycle and Pedicab Code of 2016		✓			
Revised 2016 Traffic and Parking Management Code of Pasig City		✓			
An Exectuvie Order creating the Technical Working Group to facilitate the Pasig TODA Transport Cooperative Program for the City of Pasig		✓			✓
Executive Order No. 70, Series of 2021		✓			

[63] Refer to Table 4 for the list of programs and partnerships of the Pasig LGU on e-mobility.

Policy/program/plan	Focus area				
	Urban planning	Regulatory measures	Economic and financial measures	Operations ecosystem	Public engagement
Tricycle Upgrading and Replacement Program and Authorizing City Mayor to allocate PHP 5 million to qualified and eligible tricycle operators and drivers who will replace their tricycles with an e-trike		✓	✓		
Easy Pondong Pasigueño (Revised EPP) Program			✓		
The Pasig E-Mobility Steering Committee		✓			
An ordinance exempting electric vehicle users from the mandatory unified vehicular reduction scheme of the City of Pasig		✓			
City programs					
CitieSWITCH to E-Mobility					
Market Transformation Through the Introduction of Energy-Efficient Electric Vehicles (E-Trike) Project			✓		
SOLUTIONSplus on Integrating electric 2- and 3-wheelers into existing urban transport modes				✓	✓
GrabWheels					
Promotion of Low Carbon Urban Transport in the Philippines		✓		✓	✓
Existing city plans					
Comprehensive Land and Water Use Plan (CLWUP) 2014-2022	✓	✓	✓		✓
Low Emission Development Strategies 2020-2030	✓	✓	✓	✓	✓
Comprehensive Development Plan (CDP) 2022-2027	✓	✓	✓	✓	✓
Local Development Investment Program (LDIP) 2022-2024	✓	✓	✓	✓	✓
Comprehensive Roadmap for the Electric Vehicle Industry (CREVI) 2030-2040[64]			✓	✓	✓
Poblacion Urban Renewal Area (PURA)	✓	✓			
Past workshops and consultations					
Consultation Meeting with Pasig City LGU	✓	✓	✓	✓	✓
Knowledge Sharing Event on Electric Mobility for Local Governments			✓	✓	
Roundtable Workshop on Battery Electric Vehicle Adoption in the Philippines		✓		✓	✓

[64] Only refers to sections pertaining to electric tricycles and the role of LGUs in EV adoption.

Pasig City policies have mainly focused on regulatory measures and providing financial assistance for electric tricycles while partner organizations implemented projects that target the city's e-mobility operations ecosystem (i.e., installation of charging stations) and public engagement (i.e., workshops on e-mobility). There is a lack of city policies on support for charging stations and EV maintenance and there are currently no plans or programs targeting the urban planning aspect of e-mobility in the city.

On the other hand, city plans have discussed all focus areas. Existing plans can form the basis of future proposals on e-mobility policies and programs – making it easier to invest in and institutionalize operations ecosystem, urban planning, and even financial assistance. As expressed in consultations with the Pasig LGU, financial measures and the operations ecosystem are critical to the adoption of electric tricycles in the city.

Challenges of adopting e-mobility in Pasig City

The institutional and policy framework of the Pasig LGU inevitably affects the entire EV ecosystem in the city. From the EVs themselves, EV charging stations (EVCS), technical capacity and human resources – the availability of the different policies and programs each have specific impacts to each component which results in potential challenges in the adoption of EVs in the city, especially for public transportation. These challenges primarily stem from the existing barriers and policy and program gaps on electric vehicles.

Challenges in the adoption of electric vehicles. Existing and previous policies and programs for e-mobility in Pasig City highlighted some of the challenges in the adoption of EVs for the city as well as for the Pasig LGU. Public transport operators and drivers that participated in the city's tricycle upgrading and replacement program and the Easy Pondong Pasigueño (EPP) program[65] have had difficulties in paying off their electric tricycle loans, with some experiencing difficulties in finding electric tricycle replacement components and having flooded vehicles.[66] The high upfront costs of electric vehicles as well as limited and challenging financing mechanisms are barriers to the adoption of electric tricycles for public transport. Problems of funding can also be experienced by the Pasig LGU in integrating EVs in their government fleet. Moreover, external factors such as the restrictions of Light Electric Vehicle (LEV) use on national roads from national government agencies may dissuade the scaling-up on EVs and the EV operations ecosystem.

Challenges in the planning and installation of charging stations. The primary barrier in the promulgation of EVCSs in Pasig City is the lack of publicly available land – particularly land that is not prone to flooding. The Pasig LGU has yet to introduce incentives for the integration of

[65] Refer to Table 3 for Pasig City policies and programs on e-mobility.
[66] Refer to Section 1.1 for barriers to e-mobility.

charging stations in private properties or institutionalize programs enabling partnerships with private entities for publicly accessible charging stations.

Challenges in technical capacity and human resources. When compared to internal combustion engine (ICE) vehicles, EVs may be perceived as unfamiliar and complex technology. A current lack of technical capacity and human resources for EVs and EV-related programs poses a challenge to EV adoption for the Pasig LGU and for the Pasig local public transport sector. More training on EV and EVCS technologies for Pasig LGU staff and other mechanical or automobile experts should be made available to close the knowledge gap of EVs. Regular data-gathering processes for EVs and GHG emissions and administrative changes can challenge EV adoption. Moreover, the lack of sufficient communications on the benefits of EVs also contribute to the limited baseline knowledge on e-mobility.

Analysis of the transition to e-mobility in Pasig City

Pasig City's EV market readiness, EV adoption barriers, existing and previous programs and policies on EVs, as well as gaps in these programs in policies result in both negative and positive impacts for the city with the e-mobility transition influenced by external factors. It is therefore valuable to identify the strengths and weaknesses of a transition and to flag opportunities and threats.

Table 12 presents the SWOT analysis of the adoption of e-mobility in the city. An e-mobility transition will bring about benefits (strengths) and risks (weaknesses) in the city, particularly for the Pasig LGU, and will be affected by opportunities and threats to adoption.

Table 12. SWOT analysis of the transition to e-mobility in Pasig City.

	Positive	Negative
Internal	**Strengths**	**Weaknesses**
	• Ability to achieve national targets of 75% reduced emissions by 2030 and local targets of reduced GHG emissions from Pasig City road transport sector to 136,000tCO_2e by 2034 • Cost effectiveness of EVs for LGU use when compared to conventional ICE vehicles[67] • Introduction of energy-efficient transport solutions and energy resource systems	• Rearrangement of public transport routes that may lead to resistance from public transport groups • Potential negative reception of public transport sector due to current views on modernization and electrification in Metro Manila • Loans for the acquisition of EVs may cause financial hardships for borrowers
External	**Opportunities**	**Threats**
	• City government momentum towards EV adoption from previous and existing Pasig LGU e-mobility programs and partnerships	• Limited regularly updated baseline data on GHG emissions

[67] According to the D1.6 Impact assessment results (April 2024), the Pasig LGU's e-quadricycles were more cost-effective with a CER-VKT value of PHP 55.76 per vehicle kilometres travelled when compared to the use of the city's Suzuki APV (with a value of PHP 75.07 pesos per vehicle kilometres travelled).

	Positive	Negative
	• Large existing number of internal combustion engine (ICE) tricycles, with some already electrified • Formalization of transport cooperatives, especially Tricycle Operators and Drivers Associations (TODAs) • Integration of green routes and Low Emission Zones (LEZs) in Local Public Transport Route Plan (LPTRP) and Sustainable Transport Master Plan • Successful implementation of EVCS projects with partner organizations resulting in two publicly accessible EVCSs with free charging • Renewable energy utilization • Availability of local EV and EVCS solutions	• Personnel and administrative changes in the implementation of projects from partnerships • Lack of skilled workforce on EVs at the city and local government levels • Access and availability of EV components • Road use restrictions set by national government (i.e., electric and ICE tricycles not allowed on national roads) • Current views on modernization and electrification of the public transport sector drivers and operators • Limited available government-owned land for EVCS installation • Limited publicly available EV charging stations (EVCS) • High upfront costs of EVs • Limited financial capacities of public transport operators and drivers (including tricycle operators and drivers) in procuring EVs • Limited financing options for procuring EVs

The benefits of transitioning to e-mobility in Pasig City are well-known. By adopting EVs in public transport and its government fleet, the Pasig LGU will be able to reach both national and local road transport emission targets (75% reduced emissions by 2030 and reduced GHG emissions from Pasig City road transport sector to 136,000tCO_2e by 2034) which will improve the city's overall environmental quality and health conditions. The cost-effectiveness of EVs in the long-term when compared to their ICE counterparts make them a more financially sustainable option. Moreover, the introduction of EVs in the city's public transport sector will also lead to more integration of renewable energy sources such as solar power.

Fortunately, there is momentum in Pasig LGU for the implementation of EV policies and programs due to previous and existing initiatives on e-mobility. Moreover, because principal policies in transport such as the Local Public Transport Route Plan (LPTRP) and a Sustainable Transport master Plan have not yet been formulized, there are still opportunities to introduce green routes and Low Emission Zones (LEZs) in these plans. With the city's large population of ICE tricycles, there is an opportunity to formalize transport cooperatives with the integration of sustainable transport solutions and business models.

On the other hand, there are still some barriers to the adoption of e-mobility in the Pasig City. Factors such as limited charging infrastructure or even available public land for the installation of charging stations pose a risk to the EV operations ecosystem. The high upfront costs of EVs with the limited financial capacities and financing options of the public transport sector also stand in the way of a full EV transition. Administrative changes, limited technical knowledge on EVs also

impede EV adoption, and the negative public perception of modernization. Public views on electrification and modernization may dissuade political support for e-mobility in the public transport sector. Changes in public transport planning may result in some resistance.

2.3 Roadmap formulation

The roadmap for the electrification of public transport tricycles for Pasig City will be based on the city's consolidated vision from existing plans and roadmaps, policy and program gaps, and timelines already set by the city, albeit some adjustments due to updated timeframes and the current condition of public transport in the city (see Figure 14). Inputs from discussions with the Pasig LGU will also be incorporated into the roadmap.

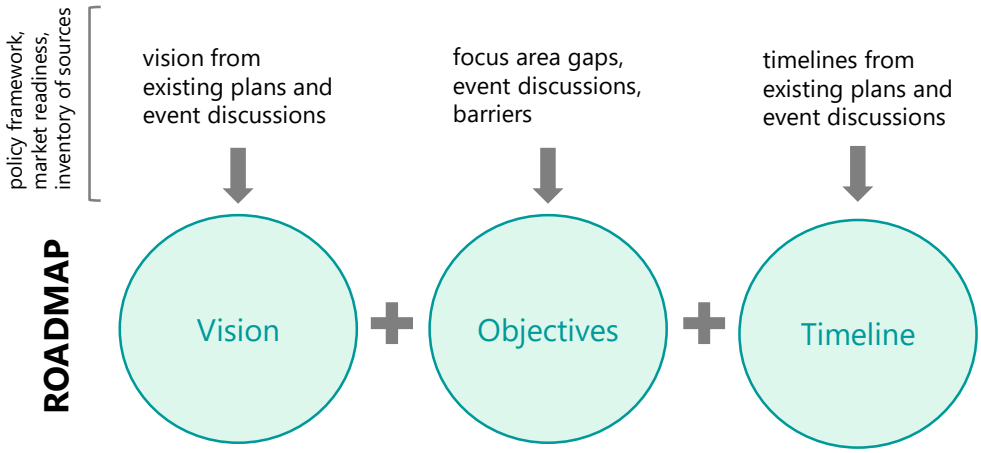

Figure 14. Diagram of the formulation of the Pasig City roadmap for the electrification of public transport three-wheelers.

Overall, the City Government of Pasig prioritizes good governance, inclusivity, and a high quality of life for its residents. People's participation. Secondary to these priorities is the vision for Pasig City to be resilient, sustainable, and environment-friendly. As such, the Pasig LGU envisions tricycles as key features of mobility in the city. The Pasig LGU sees the opportunity to modernize internal combustion engine (ICE) tricycles to electric three-wheelers in the planning and optimization of all public transport modes in the city. The Pasig LGU also believes that patronizing all forms of public transport, including electric tricycles, is a way to increase revenues of electric tricycle operators and drivers and thereby justifying initial costs.

There are policy and program gaps in the city on urban planning, operations ecosystem, and public engagement. Although there are policies for financial assistance for the adoption of electric tricycles for public transport, current roll-out programs have failed to reach full-scale adoption, with program participants not being able to pay off loans and opting to return to using ICE tricycles because of the lacking support infrastructure. For the electrification of three-wheelers for

public transport, objections will need to address these gaps and barriers to improve the public perception on programs on electric tricycles and support everyday operations.

Existing roadmaps and plans of the Pasig LGU have set targets for the development of the e-mobility in the city. Roadmap timelines will be based on the CREVI and the administrative term to ensure continuity and proper phasing. These targets can serve as the basis for this roadmap timeline:

- 2025: transition 2,000 tricycle drivers to electric tricycles and transition 5,000 electric tricycle businesses or logistics (LEDS)
- 2026: increase public transport services and facilities by 90% (CDP)
- 2026: modernize public transport modes (CDP)
- 2026: create an ordinance on Route Rationalization and Modernization Program (CDP)
- 2028 (from 2023): lead pilot programs on EV and EVCSs (CREVI)
- 2028 (from 2023): encourage renewable energy sources (CREVI)
- 2034 (from 2030): reduce road transport GHG emissions by 20% from 170,948.69 tCO_2e in 2017 (LEDS)
- 2034 (from 2023): achieve at least 5% EV share for electric tricycles for public transport (CREVI)
- 2034 (from 2023): conduct capacity-building activities on EV and EVCS deployment (CREVI)
- 2034 (from 2029): mandate the use of renewable energy sources for 50% of EVCSs (CREVI)
- 2040 (from 2028): increase the share of public transport and active transport users by 75%, have modernized transport services accessible every 500 meters (CDP)
- 2040 (from 2035): mandate the use of renewable energy sources for 100% of EVCSs (CREVI)
- 2040: achieve at least 50% EV share for electric tricycles for public transport in the Clean Energy Scenario (CREVI)

3. The Roadmap – Where are we going?

The City Government of Pasig will create plans, policies, and programs for the adoption of electric three-wheelers for public transport. This City Roadmap will be based on the findings from the previous sections on market readiness, adoption barriers, and policy and program gaps to create the vision, objectives, and timeline for the transition of tricycles to e-mobility.

3.1 Vision

The City Roadmap for E-Mobility for the electrification of three-wheelers for public transport in Pasig City aims to provide a clear plan for the city's transition to e-mobility, with a vision that is aligned with national policies and addresses the three pillars of the Pasig local government unit's (LGU) work: **People, Planet, Profit** (see Figure 15).

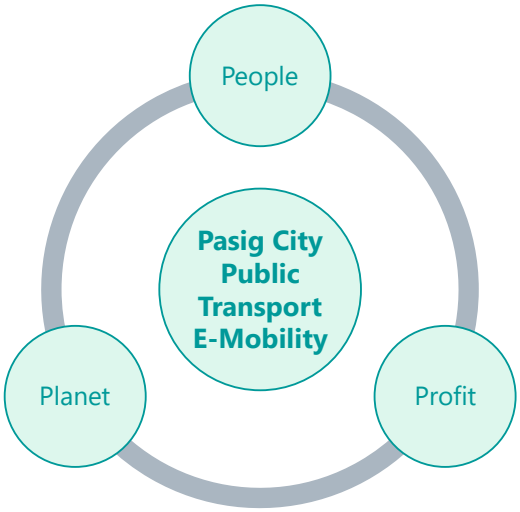

Figure 15. Three Ps of the City Government of Pasig.

People. The Pasig LGU envisions a highly mobile community with a vibrant atmosphere at the street level served by interconnected, accessible, and comfortable options of road transportation. The Pasig LGU aspires for continuous road networks, uninterrupted and soundly designed sidewalk infrastructure, and open spaces with clean air to encourage Pasigueños to walk, wheel, or cycle around the city.

Planet. The Pasig LGU recognizes its responsibility as a steward of its natural resources. The Pasig LGU envisions an ecologically-balanced and sustainable transportation system to combat climate change and ensure that roads, rivers, and open spaces can be enjoyed by future generations of Pasigueños.

Profit. The Pasig LGU envisions a locally-rooted and resilient business environment where local public transportation are optimized so that local public transport becomes the preferred mode of transportation for all Pasigueños. For a thriving public transport system, financial, economic, administrative, and operational support is offered by the city government to local transport drivers and operators to improve and streamline their services.

Value of the transition to electric tricycles in Pasig City

For the City Government of Pasig to achieve its vision, it needs to fully integrate tricycles in its public transportation system. Tricycles are forms of travel that can maneuver Pasig City's narrow streets and can therefore complete the city's transportation routes. Tricycles can also serve as last-mile transportation especially for small children, pregnant women, senior citizens, and persons with disabilities (PWDs).

Tricycles can address the Pasig LGU's vision for its people, planet, and profit. Tricycles can complement a traveller's entire journey chain if properly integrated in the city's Local Public Transport Route Plan (LPTRP). As a mode of public transport, tricycles can also lessen the demand for private modes of transportation and ease traffic congestion in the city.

As a form of e-mobility, electric tricycles can significantly reduce the city's GHG emissions for transportation. If frequently patronized as public transport, electric tricycles can achieve its return on investment (ROI) and contribute back to the local economy. A thriving public transport system and low carbon transport options creates a cleaner and healthier environment that can further promote walking and cyclin in Pasig City.

To complement the transition of the local public transport sector to e-mobility, the Pasig LGU can take their own actions in adopting e-mobility for official government use, thus leading the transition to the electrification of transportation in the city. While the Pasig LGU already has more than 25 electric vehicles in its fleet[68], there is an opportunity to standardize the adoption of electric quadricycles[69], and even electric mini-buses, to expand the city's electric vehicle fleet. The Pasig LGU's vehicle fleet's can be further maximized using an EV sharing system to ensure the usage and efficiency of the electric vehicle fleet. Local government action and local public transportation transition to e-mobility has the ability to enhance the meeting of people's mobility needs, curtailing fuelling costs, and reducing the transport industry's environmental damage to meet the city's vision for its people, planet, and profit.

[68] The Pasig City Government has 8 electric quadricycles, 10 BEMAC electric tricycles, and 10 PHLPost electric tricycles.

[69] Based on D1.6 Impact assessment results for Pasig City (April 2024), electric quadricycles were found to have less noise impact and are more effective for first- and last-mile freight and passenger transport when compared to the city's Suzuki APV units.

Roadmap scope

The scope of this Roadmap will only refer to the actions and decisions of the City Government of Pasig on all the public transport tricycles and the local public transport system within the Pasig City. This Roadmap will not include actions pr decisions needed to be taken by national government agencies (NGAs) or other modes of public transportation (e.g., buses, jeepneys, cycling etc.).

3.2 Objectives

Previous city roadmaps have identified several objectives to achieve their vision of a clean and green Pasig City. The objectives[70] are narrowed to three principal and priority objectives to be achieved by the Pasig LGU, with an updated timeline to match the current context:

1. To increase the share of public transport and active transport users by 75% by 2040;
2. To reduce the GHG emissions from the city's road transport sector to 136,000 tCO_2e by 2034[71];
3. To achieve at least 50% EV share of all public transport electric tricycles by 2040; and
4. To attain 50% Pasig City fleet EV share by 2040.

The progress of the Pasig LGU in relation to these objectives should be measured at least at every start and end of a term. Transport sector GHG emissions, public transport and active transport ride-sharing population, and number of public transport electric tricycles should be regularly measured.

3.3 Timeline

The timeline of this Roadmap is based on the length of the term of a city mayor in the Philippines. The short-term (2025-2028, one city mayor term) will **prepare** Pasig City for adoption, the medium-term (2028-2034, two city mayor terms) will **scale-up** preparations from the short-term, and the long-term (2034 onwards) will **mainstream** the activities in each focus area. Table 13 outlines the timeline for the electrification of public transport electric tricycles per term and the overall target for that term. By the end of each phase, there are target objective indicators that align with the Roadmap objectives. These target objective indicators are incremental goals that should be met at each phase to meet the overall Roadmap objectives. The activities in order to achieve the target and objective indicators are itemized. Finance identifies potential resources to

[70] The objectives are based on the targets set by previous plans and roadmaps on e-mobility in Pasig City but adjusted and updated to reflect necessary preparatory steps (e.g., inclusion of data-gathering, baseline studies, partnership formations, etc.).

[71] 20% reduction based on 2017 values of 170,948.69 tCO_2e.

support the activities of each phase while the most prominent stakeholders responsible at each phase are listed.

Table 13. Timeline of the electrification of three-wheelers for public transport in Pasig City.

Phase	**Preparation** Short-term 2025-2028	**Scale-up** Medium-term 2028-2034	**Mainstream** Long-term 2034-onwards
Target	Preparation of studies, plans, policies, and programs for the scale-up of public transportation, EV support facilities, and financing mechanisms.	Construction of additional infrastructure and roll-out of incentivization programs based on studies, plans, and policies from previous term.	Adopt policies to mandate construction of charging stations and implement EV share mandates.
Target objective indicators achieved by end of phase	• Baseline data gathered on percentage share of public transport and active transport users. • 2% of EV share of public electric tricycles. • 10% EV share of Pasig LGU fleet.	• 50% share of public transport and active transport users. • 10% of EV share of public electric tricycles. • 30% EV share of Pasig LGU fleet. • Reduced GHG emissions from the city's road transport sector to 136,000tCO_2e.	• 75% share of public transport and active transport users by 2040. • 50% EV share of public electric tricycles by 2040. • 50% EV share of Pasig LGU fleet by 2040.
Finance	City funds, grants	City funds, grants, carbon markets	Commercial banks, government financial institutions (GFIs)
Responsible	City government	City government, private sector, TODAs	City government, commercial banks, private sector, TODAs
Actions	• Conduct Route Rationalization study. • Complete the Local Public Transport Route Plan (LPTRP). • Create City Sustainable Transport Master Plan to identify additional road networks and identify green routes. • Prepare the Poblacion Urban Renewal Area (PURA) transportation plan and vehicle emission standards. • Study and create programs to support the transition of Tricycle Operators and Drivers' Associations (TODAs) to transport cooperatives.	• Implement LPTRP. • Construct additional road networks and green routes based on the Sustainable Transport Master Plan. • Implement the PURA transportation plan and vehicle emission standards. • Establish TODAs as transport cooperatives and study the potential partnership with forwarding companies for higher LEV utilization. • Implement incentivization program for charging stations at gasoline stations. • Implement incentivization program for public transport electric tricycles. • Implement incentivization program for EV support	• Continue the enforcement of incentivization programs and construction of infrastructure plans from medium-term. • Mandate and enforce green route vehicle emission standards. • Mandate the PURA as a Low Emissions Zone (LEZ). • Mandate the installation of EVCS at gasoline stations based on studies and plans from short-term. • Utilize GHG mitigation from LEVs as a source of financing support for new LEVs. • Procure additional EVs for Pasig LGU (targeting buses and mini-buses) to increase government EV share.

Phase	Preparation Short-term 2025-2028	Scale-up Medium-term 2028-2034	Mainstream Long-term 2034-onwards
	• Study and create program for the incentivization or mandate for electric vehicle charging stations (EVCS) installed at gasoline stations for public use and update city building code. • Study and create policy or program for the incentivization of EV support businesses such as battery swapping stations and supply stores. • Construct additional city-owned EVCS and battery swapping stations for public use. • Complete loan forgiveness program for unpaid electric tricycles. • Study previous electric tricycle programs and prepare incentivization for public transport electric tricycles. • Study installation of charging stations in Pasig City Government properties • Prioritize deployment of government-owned electric three-wheelers and e-quadricycles around the city. • Study the operationalization of the Measurement, Reporting, Verification (MRV) Process for GHG mitigation and scope potential interest from carbon markets through the Pasig City Climate Change and Greenhouse Gas Management Council. • Conduct study on share of Pasig City residents taking public and active transport. • Procure 45 electric tricycles and quadricycles for the Pasig LGU fleet through	businesses such as supply stores and battery swapping stations. • Train technicians and mechanics for the repair and maintenance of EVs. • Procure additional EVs for Pasig LGU (targeting light vehicles) to increase government EV share.	

Phase	Preparation Short-term 2025-2028	Scale-up Medium-term 2028-2034	Mainstream Long-term 2034-onwards
	securing partners for financing.[72]		

The priority of the first term is to study and prepare plans, policies, and programs to support the adoption of electric tricycles and to encourage EV support businesses such as **electric vehicle charging stations (EVCS)**, **EV supply and repair stores**, and **battery swapping facilities**. Another key action for the short-term is the preparation of the **Local Public Transport Route Plan (LPTRP)** to determine how many tricycles (and other public transport modes) are needed in each area in the city. A complimentary action is the study of the transition of tricycle operators and drivers' associations (TODAs) to become **transport cooperatives** to optimize transportation and provide the TODAs more financing options from government financing institutions (GFIs). Moreover, the first term can include valuable baseline studies on public and active transport usage of Pasig City residents.

A crucial action for the short term is to resolve the issues from previous electric tricycle roll-out programs such as the Asian Development Bank's (ADB) "Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project" and the Easy Pondong Pasigueño (EPP) Program. A **loan forgiveness program** can be an opportunity to re-engage with the public transport sector and prepare tricycle operators and drivers for new upcoming programs for electric tricycle deployments.

During the short-term phase (2025-2028), the deployment of the Pasig LGU's fleet of electric tricycles and e-quadricycles should be prioritized to demonstrate the various uses and designs of light e-mobility units and hopefully encourage the public transport sector to invest in EVs. Likewise, construction support infrastructure such as EVCS for public and government use can prepare prospective electric tricycle operators and drivers to adopt EVs. The SOLUTIONSplus consortium developed a pre-feasibility study for charging stations in Pasig City Government properties. It is suggested that the short-term phase initiates the **measurement, reporting, and verification (MRV) of GHG mitigation for LEVs** and scope for the possibility of trading in voluntary carbon markets through the Pasig City Climate Change and Greenhouse Gas Management Council.

For the medium-term phase (2028-2034), the focus is on the implementation of the plans, policies, and programs from the short-term. Key actions include the construction of additional road networks based on a Pasig City **Sustainable Transport Master Plan** and the installation of EVCSs at gasoline stations due to the proposed incentivization program. Milestones for this term also

[72] Refer to D5.1 Scale-up concept note for the Pasig City Government's plans on future EV procurement.

include creating more EV support businesses such as EVCS, EV supply and repair stores, and battery swapping stations. At this time, there should be more TODAs that have consolidated to become transport cooperatives and study the potential scale-up in adoption of **LEVs for logistics services**. As Pasig City regulates tricycle franchises in its jurisdiction, it can explore expanding tricycle franchises to include parcel and package deliveries during passenger off-peak hours, in partnership with companies such as PHLPost. Due to the actions from the short- and medium-terms in EV adoption and public transport improvements, GHG emissions from the city's road transport sector are expected to be reduced.

For the long-term phase (2034 onwards), continuous enforcement of plans, policies, and programs is to take place. Adoption mandates for electric tricycles in the public transport sector and installation mandates for EVCS in building code can be implemented. For this stage, the Poblacion Urban Renewal Area (PURA) is to be formally recognized as a **Low Emissions Zone (LEZ)** accompanied by mandates to limit GHG emissions in the area. TODA transport cooperatives can start applying for and paying for loans from GFIs for electric tricycles, with the government supporting purchases through climate financing from climate funds and carbon markets.

A baseline assessment can be conducted at the beginning and end of each phase. Similarly, a thorough review of the timeline, objectives, and implementation plan should be done at the start of each phase to adjust to any changes in the local context.

4. Implementation plan – How do we get there?

The adoption of electric three-wheelers for public transport for Pasig City will inevitably require the contributions of various Pasig local government unit (LGU) offices, the involvement of the public and private sectors, and potential partner non-government organizations (NGOs). The transition process for a fully electric public transport electric tricycle fleet is also expected to span several terms. The implementation plan will break down the activities identified in Section 3.3 based on the focus areas they address.[73]

4.1 Focus area 1: Urban planning

Urban planning refers to land use, local infrastructure, zoning, and building and parking codes. It has been overlooked in previous programs and policies in e-mobility and public transport which entails more emphasis for next steps. Table 14 elaborates on Pasig City's current state, desired state, and the actions necessary to achieve the desired state for the electrification of public transport three-wheelers on urban planning.

Table 14. Implementation plan for urban planning focus area.

Current state	Desired state	Action item	Stakeholders to engage	Timeline
Large number of public transport internal combustion engine (ICE) tricycles and insufficient road networks.	Efficient and environment-friendly public transport options for Pasig City residents and workers.	Study and implement Route Rationalization Program, Local Public Transport Route Plan, and Sustainable Transport Master Plan, and green routes.	Tricycle operators and drivers and their associations (TODAs), public transport groups, Land Transportation Franchising and Regulatory Board (LTFRB)	Short-term, medium-term, long-term
Private and motorized transport is preferred to public transport.	75% share of public transport and active transport users by 2040.	Study and implement Route Rationalization Program, Local Public Transport Route Plan, and Sustainable Transport Master Plan. Gather data on the percentage share of public and active transport users in the city. Construct additional road networks and	Tricycle operators and drivers and their associations (TODAs), public transport groups, residents of Pasig City.	Short-term, medium-term, long-term

[73] Some action items are repeated because they address more than one focus area.

Current state	Desired state	Action item	Stakeholders to engage	Timeline
		sidewalks based on plans.		
Limited low carbon transport infrastructure in the Poblacion Urban Renewal Area (PURA).	Sufficient walking and cycling infrastructure and public low carbon transport modes serving the PURA and maintaining air quality standards.	Study and implement the PURA transportation plan and vehicle emission standards, mandate PURA as a Low Emissions Zone (LEZ).	Tricycle operators and drivers and their associations (TODAs), public transport groups, residents of the PURA	Short-term, medium-term, long-term
Limited electric vehicle charging stations (EVCS) available to the public.	Frequent availability of EVCS accessible to the public.	Mandate the installation of EVCS at gasoline stations in the city building code.	EVCS operators, private sector (gasoline station owners and operators)	Long-term

Urban planning actions for electric tricycles have three key issues: (1) the large number of internal combustion engine (ICE) tricycles and insufficient road networks, (2) limited low carbon transport options int eh Poblacion Urban Renewal Area (PURA), and (3) limited charging stations available to the public.

The first key issue to address is the state of public transportation in the city. A **Route Rationalization** study and the creation of the **Local Public Transport Route Plan (LPTRP)** should be prioritized to determine, first and foremost, how many of each mode of public transport is needed in each area. This can be complimented by a **Sustainable Transport Master Plan** to determine additional road and sidewalk networks to optimize mobility around the city. The transport master plan can also be used to identify the city's **green routes**. With the improved state of public transport and road networks, the objective is to gradually increase the share of public and active transport shares in the city.

The **Poblacion Urban Renewal Area (PURA)** is a priority development area in Pasig City. Located near the busy city hall complex, the PURA aims to highlight historical tourist spots in the city with a vision of encouraging walking, wheeling, and cycling as the primary modes of transportation. Other forms of low carbon transport (i.e., electric tricycles) are seen as complimentary transportation services for the PURA, especially for children, pregnant women, senior citizens, and persons with disabilities (PWDs). Because of the target of making the PURA walkable, the PURA can be mandated as a **Low Emissions Zone (LEZ)** in the long-term with restrictions or fees imposed on vehicle emissions in the area.

Another key issue in urban planning is the lack of easily accessible public electric vehicle charging stations (EVCS). In the short- to medium-term, the Pasig LGU can incentivize strategically located businesses to install EVCS on their facilities. Additionally, the Pasig LGU can consider improving its EVCS network using the **pre-feasibility study** developed by the SOLUTIONSplus consortium.

In the long-term, the Pasig LGU can mandate the installation of EVCS in the **city building code** to require all gasoline stations to comply – since gasoline stations are as readily available and normally frequently and strategically located.

4.2 Focus area 2: Regulatory measures

Regulatory measures refer to rules promoting EVs or restricting ICE vehicles. Previous policies on regulatory measures have mainly focused on creating regulatory bodies such as the Tricycle Operation and Regulatory Office (TORO) or the Pasig E-Mobility Steering Committee. Table 15 outlines the regulatory actions to promote public transport electric three-wheelers in the city.

Table 15. Implementation plan for the regulatory measures focus area.

Current state	Desired state	Action item	Stakeholders to engage	Timeline
Large number of public transport internal combustion engine (ICE) tricycles and insufficient road networks.	Efficient and environment-friendly public transport options for Pasig City residents and workers.	Study and implement Sustainable Transport Master Plan and green routes.	Tricycle operators and drivers and their associations (TODAs), public transport groups, public	Short-term, medium-term, long-term
Limited low carbon transport infrastructure in the Poblacion Urban Renewal Area (PURA).	Sufficient walking and cycling infrastructure and public low carbon transport modes serving the PURA and maintaining air quality standards.	Study and implement the PURA transportation plan and vehicle emission standards, mandate PURA as a Low Emissions Zone (LEZ). Gather data regularly on the percentage share of public and active transport users in the city.	Tricycle operators and drivers and their associations (TODAs), public transport groups, residents of the PURA	Short-term, medium-term, long-term
Limited electric vehicle charging stations (EVCS) available to the public.	Frequent availability of EVCS accessible to the public.	Mandate the installation of EVCS at gasoline stations in the city building code.	EVCS operators, private sector (gasoline station owners and operators)	Long-term

While the regulatory measure can start taking effect in the short-term, full implementation will likely be observed in the long-term. Restrictions from using ICE vehicles can be done through **green route** and **PURA** vehicle emission regulations. For these areas, vehicle emission thresholds can be set to ensure that only low carbon transport vehicles ply these areas. Mandates for the installation of **EVCS** at gasoline stations can be established in the **city building code** in the long-

term. In the meantime, studies on these regulations should be conducted for the short term, and then incentivization for these regulations should be done in the medium-term.

4.3 Focus area 3: Economic and financial measures

Economic and financial measures refer to monetary support or incentives for EVs. Past policies and programs have tackled the costs of acquiring electric tricycles for public transportation. Table 16 discusses actions that resolve issues from previous policies and programs and sets steps for improved city e-mobility financing initiatives.

Table 16. Implementation plan for the economic and financial measures focus area.

Current state	Desired state	Action item	Stakeholders to engage	Timeline
Remaining unpaid loans from the Asian Development Bank (ADB) electric tricycle project and the Easy Pondong Pasigueño (EPP) program.	Debt-free tricycle operators and drivers and reserviced delinquent electric tricycle units,	Study lessons learned from previous electric tricycle programs; study and implement loan forgiveness program for unpaid electric tricycles.	Tricycle operators and drivers and their associations (TODAs)	Short-term
Limited electric vehicle charging stations (EVCS) and battery swapping stations available to the public.	Frequent availability of EVCS and battery swapping stations accessible to the public.	Study and create program to incentivize the installation of EVCS and battery swapping stations for public use.	EVCS operators, private sector	Short-term, medium-term
Limited government resources to procure EVs for the Pasig LGU fleet.	At least 50% EV share of Pasig LGU fleet.	Procure electric vehicles (i.e., 45 electric tricycles for the short-term and eventually buses and mini-buses for the long-term) for the Pasig LGU fleet. Secure financing through partnerships with NGOs and potential partners.	Private sector, NGOs	Short-term, medium-term, long-term
Almost all public transport tricycles are internal combustion engine (ICE) vehicles.	At least 50% of public transport tricycles are EVs.	Study lessons learned from previous electric tricycle programs, provide incentives for public transport electric tricycles to acquire EVs, relaunch and market EPP	Tricycle operators and drivers and their associations (TODAs)	Medium-term, long-term

Current state	Desired state	Action item	Stakeholders to engage	Timeline
		program for electric tricycles.		

Firstly, the Pasig LGU needs to resolve the unpaid loans from the Asian Development Bank (ADB) electric tricycle program and Easy Pondong Pasigueño (EPP) Program by executing a **loan forgiveness program** for unpaid loans. After establishing a fresh start for all public transport tricycle drivers and operators, a study can be conducted to evaluate the previous loan programs' issues and apply lessons to future incentivization initiatives for the short-term and the long-term. In a similar manner, a study for the **incentivization program** for the installation of EVCS and battery swapping stations for new buildings for public use.

In addition to the financing of public transport electric tricycles, the Pasig LGU needs to form partnerships with financing institutions or NGOs to fund procurement of EVs for their government fleet and EVCSs for city use. The SOLUTIONSplus scale-up concept can provide steps for the initial large-scale adoption of EVs at a government level.

After evaluating the state of adoption of public transport electric tricycles and available EVCS and battery swapping stations in the city, the continuation of incentivization should be studied for the long-term. Otherwise, continuous implementation of incentivization programs should be carried out until adoption targets are met.

4.4 Focus area 4: Operations ecosystem

Operations ecosystem refers to the provision of support infrastructure for the entire lifecycle of EVs, from purchase, operations, maintenance, and eventual end-of-life. Issues from previous electric tricycle roll-out programs have identified the lack of operational support for EVs in the city. Table 17 lists the current state, desired state, and actions that need to be taken for the adoption of public transport electric three-wheelers in the city.

Table 17. Implementation plan for the operations ecosystem focus area.

Current state	Desired state	Action item	Stakeholders to engage	Timeline
Limited electric vehicle charging stations (EVCS) and battery swapping stations available to the public	Frequent availability of EVCS and battery swapping stations accessible to the public.	Construct city-owned EVCS and battery swapping stations.	Tricycle operators and drivers and their associations (TODAs)	Short term
Limited battery swapping stations	Sufficiently-equipped battery swapping	Study and implement program to incentivize the	EV supply and repair shop owners and operators, Technical	Short-term, medium-term, long-term

Current state	Desired state	Action item	Stakeholders to engage	Timeline
and EV supply and repair shops.	stations and well-trained EV mechanics.	establishment of battery swapping stations, and EV supply and repair shops in the city; conduct training opportunities for EV mechanics.	Education and Skills Development Authority (TESDA), non-government organizations (NGOs)	
Limited electric vehicle charging stations (EVCS) and battery swapping stations for public use	Frequent availability of EVCS and battery swapping stations accessible to the public.	Study and create program to incentivize the installation of EVCS and battery swapping stations for public use; eventually mandate the installation of EVCS at gasoline stations in the city building code.	EVCS operators, private sector	Short-term, medium-term, long-term

For the short-term, initiatives on improving the operations ecosystem for all EVs in the city will prioritize constructing city-owned EVCS and battery swapping stations on studied locations based on pre-feasibility studies. The Pasig LGU can also study and implement an **incentivization program** to encourage the installation of publicly available EVCS and battery swapping businesses around the city, with eventual mandates of requiring EVCS installation at gasoline stations in the city's **building code**.

Along the proposed EVCS and battery swapping stations is the need to engage technical experts for the repair and maintenance of electric tricycles. The Pasig LGU can partner with non-government organizations and the Technical Education and Skills Development Authority (TESDA) for the **training** of technicians and mechanics on EVs.

4.5 Focus area 5: Public engagement

Public engagement refers to communication strategies for and partnerships with key stakeholders. While previous city policies and programs engaged private sector partners and NGOs for the implementation, these policies and programs on e-mobility rarely involved the public on key decisions. Table 18 lists the actions needed for public engagement on the electrification of public transport three-wheelers in Pasig City.

Table 18. Implementation plan for the public engagement focus area.

Current state	Desired state	Action item	Stakeholders to engage	Timeline
Public transport tricycle operators and drivers are hesitant to acquire electric tricycles due to perceptions of difficulty of maintaining and operating EVs and technology inertia.	Electric tricycles are preferred to internal combustion engine (ICE) tricycles.	Prioritize deployment of government-owned electric three-wheeler and e-quadricycles.	Tricycle operators and drivers and their associations (TODAs)	Short-term
Almost all public transport tricycles are internal combustion engine (ICE) vehicles.	Almost all public transport tricycles are EVs.	Relaunch and market EPP program for electric tricycles, share electric tricycle success stories	Tricycle operators and drivers and their associations (TODAs)	Short-term, medium-term
Tricycle operators and drivers have limited financing opportunities and face competition with other tricycle operators and drivers' associations (TODAs) of overlapping routes.	Consolidated TODA transport cooperatives with the capacity to participate in loan programs of government financing institutions (GFIs) or climate funds for EVs. An alternative source of financing would be to sell carbon credits from GHG abatement to voluntary carbon markets. Consolidated TODA transport cooperatives provide logistics services during off-peak hours to increase EV utilization and income streams, allowing for multiple shifts.	Study and implement programs to support the transition of TODAs to transport cooperatives, provide capacity-building activities on cooperatives and electric tricycles. Study and explore partnerships with logistics and forwarding companies to provide additional income streams for cooperatives using LEVs.	Tricycle operators and drivers and their associations (TODAs), GFIs, climate funds, voluntary carbon markets	Short-term, medium term
Limited battery swapping stations and EV supply and repair shops.	Sufficiently-equipped battery swapping stations and well-trained EV mechanics.	Conduct training for repair and maintenance of EVs.	Technical Education and Skills Development Authority (TESDA), non-government organizations (NGOs)	Short-term, medium-term, long-term

The first action that the Pasig LGU can do to engage the public is to prioritize the deployment of its existing EV fleet to increase the **exposure** of EVs on Pasig City roads. The Pasig LGU can improve on previous loan programs such as the EPP and relaunch the program with regular communications sharing electrical tricycle **success stories**. The Pasig LGU, through its Cooperative Development Office (CDO) can also support TODAs in their transition to become **transport cooperatives that provide logistics services**. With sufficient training on transport business models, TODAs as cooperatives will become eligible for GFI electric vehicle financing programs. Lastly, the Pasig LGU can start partnering with NGOs and TESDA for **training programs** on EVs that they can make available to tricycle operators and drivers in the city.

5. Conclusion and next steps – What do we need?

The City Roadmap for the electrification of three-wheelers for public transport in Pasig City outlines the vision, objectives, and timeline to achieve a sustainable and efficient transport system in the city. Through the assessment of previous and on-going policies and programs on public transport tricycles and e-mobility of the Pasig local government unit (LGU), lessons learned, and policy gaps contribute to the improvement of initiatives to encourage electric tricycles for public transport.

The vision of public transport electric tricycles for Pasig City is to use it as an avenue to address the needs of people, planet, and profit in the city. The Pasig LGU envisions a mobile and healthy community, sustainable and protected natural resources and air quality, and a thriving local public transportation system. Specific objectives to achieve this vision involves increasing the share of public and active transport, significantly reducing road transport sector GHG emissions, and increasing the public transport electric tricycle EV share in the city.

Gap analysis has identified a lack of policies and programs for operations systems, urban planning, and public engagement. While financial assistance has been offered through the Easy Pondong Pasigueño (EPP) Program and the Asian Development Bank (ADB) electric tricycle program, full roll-out has not been successful because of a lack of charging and batter swapping facilities. Moreover, there is still a need to streamline and optimize public transport services through rigorous planning and the involvement of the public.

Recommended immediate next steps involves the careful planning of the city's Local Public Transport Route Plan (LPTRP), Sustainable Transport Master Plan, and the conduction of the Route Rationalization Study to verify the actual needed population of electric tricycles and where their services would benefit the city best. The construction of electric vehicle charging stations (EVCS) can also be executed based on findings from the pre-feasibility study. As integral city plans, these actions can be funded primarily by city funds.

Lastly, the Pasig LGU prides itself for its good governance and working to benefit its residents. The consultation and involvement of the public, and especially public transport groups, should be included in all stages of any planning and implementation process. The Pasig LGU can consult the United Pasig Coalition of TODA Officers (UPCTODA) for initial insights on the electrification of public transport three-wheelers. Public reception and public support are key components for the successful transition to e-mobility and the creation of a sustainable and ecologically-balanced Pasig City.

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