

Transforming the existing transport infrastructure in Metro Manila (Philippines) by creating an EV Ecosystem - special reference to buses, jeepneys and two-wheeler

Frost & Sullivan, in a research commissioned by Nissan stated that Philippines is one of the three countries willing to adapt electric vehicles along with Thailand & Indonesia. While the focus of the research of Frost & Sullivan was on Philippines and other countries on a whole, the focus of this report would be on Metro Manila, a region with a population of 14.4 million and an area of 619.57 sq km, making it the most densely populated area in Philippines. The region has a significant impact on commerce, finance, media, art, fashion, research, technology, education, and entertainment, both locally and internationally.

Transport in Metro Manila:

The people of Metro Manila rely on 3 major vehicular transport systems to commute on a daily basis: Jeepney, Buses and motorcycles while commute through cars come at a close 4th (Source: [pg5](#)). According to various reports there are over 55,000 jeepneys and 12,500 buses in Metro Manila, a majority of these diesel and energy consuming vehicles.

Route	Number of operators	Number of buses	Average no. of bus/operator
Manila EDSA Route	266	3,711	14
Manila Non-EDSA Route	128	1,632	13
Manila-Provincial North Bound	371	3,684	10
Manila-Provincial South-Bound	357	3,568	10
TOTAL	1,122	12,595	11

Fig.1.1 No. of buses in Metro Manila (source: [pg 11](#))

The public transport system in Manila operates only 4 railway lines and hence relies heavily on the road transport system. The large number of inefficient jeepneys and buses combined with the densely populated region leads to heavy traffic congestion on an almost daily basis. This translates to societal costs of roughly 20 billion USD annually (around 7.4% of the country's GDP) or 51 million USD per day due to lost working-hours, additional fuel consumption, health costs caused by air pollution, and loss of investment opportunities.

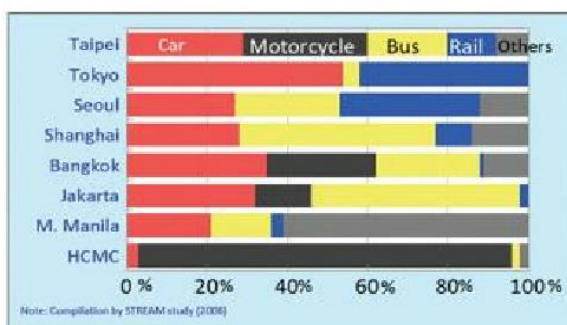


Fig 1.2 Trends in public transport share in Asian megacities (Source: [Research Gate](#))

While the opportunity to transform diesel powered jeepneys and buses into an electric model is tremendous, an equal opportunity presents itself in the commercial two-wheeler segment. The heavy

congestion of the train systems has also led to an increase in demand for motorcycle's and bike taxis' ([source](#)). The government of Philippines in 2020 initiated a pilot program that allowed bike taxi companies to run 10,000 bikes on the road per company which was later expanded to 15,000 ([source](#)). Assuming that the leading bike taxi companies such as GrabBike, Joyride, Angkas, Toktokgo, Moovr are allowed to run 15,000 bikes each; a total of 60,000 bike taxi's run in the Metro Manila region; which is not far fetched as there were over 47,000 registrations in 2020 when this pilot project was announce in Metro Manila.

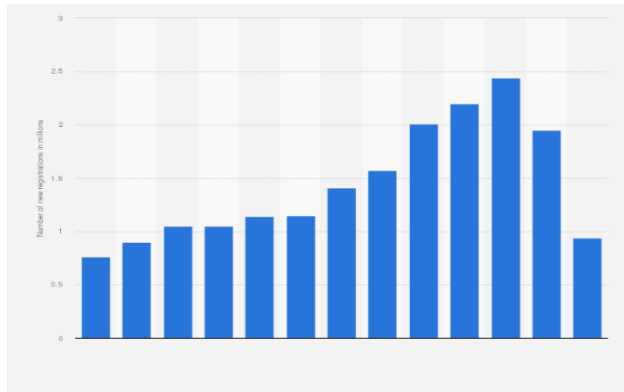


Fig 1.3 New motorcycle registrations 2012-2021 ([source](#))

There were over [14 million registered vehicles from 2011-19](#). Assuming that 5% of this figure are delivery agents and food aggregators, 700000 two wheelers belong to the commercial category of delivery aggregators.

The Approach:

Changing from diesel powered vehicles to electric powered vehicles require three types of resources: 1) Financing sources to purchase the e-vehicles 2) Setting up the charging infrastructure across Metro Manila 3) Changes or upskilling of staff in the transport operation department (Public transport). The Government of Manila must incentivise purchase of electric vehicles and initiate effective scrappage policies.

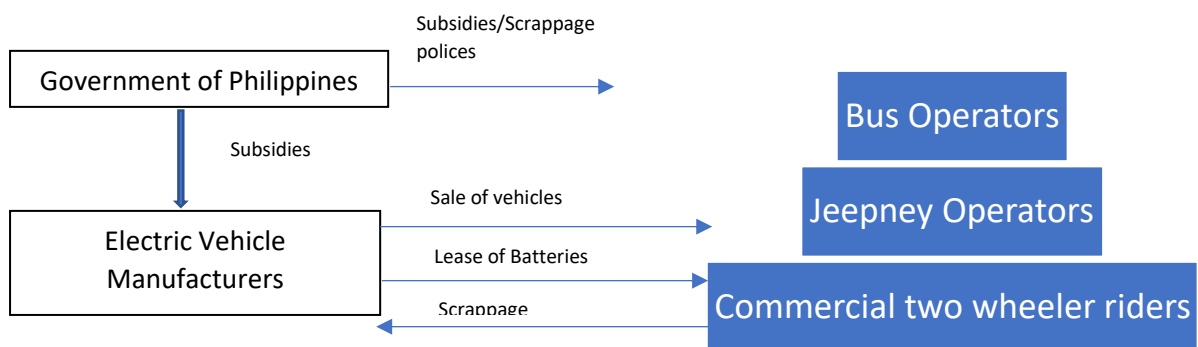


Fig 1.4 Battery Leasing Model

The battery leasing model enable operators to purchase vehicles upfront and leasing the batteries, particularly since battery technology is changing rapidly and batteries are likely to need to be replaced before the end of the bus's useful life. This model reduces upfront capital expenses and has the lessee maintain responsibility for battery performance.

While the vehicles and the charging infrastructure are owned by the operators, the batteries are owned and serviced by the manufacturers. Other models such as bus/vehicle leasing model or outright purchase model can be explored too.

Capital Requirement:

Technology	Cost per Unit	Number of rationalised fleet in Metro Manila	Initial Investment costs in Metro Manila (in Million)
Electric Jeepneys	PHP 950,000 (USD 19,088)	2,239	PHP 2,127.05 (USD 42.74)
Euro 4 Diesel Jeepneys	PHP 1,100,000 (USD 22,102)	33,131	PHP 36,444,100 (USD 732.25)
Euro 4 Diesel Minibus	PHP 1,800,000 (USD 36,166)	7,966	PHP 14,338,800 (USD 288.10)
Euro 4 Buses	4,500,000 (USD 90,416)	885	PHP 3,982,500 (USD 80.02)
Total initial investment costs		43,336	PHP 56,892,450 (USD 1.14)
Total financing requirements (90%)			PHP 51,203,205 (USD 1,028.80)

Fig 1.5 : [Fleet investment requirements for Metro Manila \(22% reduction of fleet\)](#)

A report published by the Government of Philippines indicates that to replace 1 jeepney with an electric vehicle, the cost would be PHP 950,000 (USD 19,088). Assuming that this is the selling price of 1 electric Jeepney, the market size for Jeepneys in Metro Manila alone would be USD 1.05 Billion (USD 19,088*55,000). Setting up a manufacturing infrastructure with a capacity to produce electric buses, bikes and jeepneys with an ability to export to other Asian countries would be extremely profitable.

South Korean firm ENPlus Co. Ltd. Recently announced that it would investing PHP5 billion (USD 94 million) in the Philippines to put up its electric vehicle manufacturing facility. The manufacturing unit would produce electric cars and jeepneys. Setting up a manufacturing hub for EV buses, jeepneys and bikes would therefore be around USD 100 to USD 150 million.

Another important element of setting up an EV ecosystem are the charging points. As per data, it costs PHP 2.5 million to 3 million (USD 47,000 to USD 56,000) to set up a charging point ([source](#)). Assuming that every 1000 Jeepneys need one fast charging station and every 100 buses need 1 charging station there must be a total of 180 charging stations set up in Metro Manila for buses and Jeepneys at an investment of USD 10.8 million (180*USD 56,000). While charging infrastructure for buses and jeepneys can be set up by private players, charging infrastructure for two wheelers can be set up in partnership with aggregators or private households.

The Government of Philippines has taken significant measures to fulfil its vision of establishing a EV ecosystem in the country. As part of its vision, numerous subsidies such as land and tax breaks are provided to EV companies establishing it's units in the country. While there are many areas of concern such as road infrastructure, inefficient public transport planning and implementation, fragmentation of public transport market and other issues; steps have been taken to pave a road towards development of the transport and automobile sector. The future of EV does look strong in Philippines, and it is the right time for private players to invest.