REGIONAL LIGHT ELECTRIC VEHICLES (LEV) GUIDELINE IN SOUTHEAST ASIA

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ABOUT

This paper is an abridged version of a currently work-in-progress guideline for light electric vehicle in Southeast Asia, designed to assist ASEAN governments in promoting the adoption of LEVs by providing a framework for policy development and collaboration. The full paper is available by the end of 2024.

TITLE

Regional Light Electric Vehicles (LEV) Guideline in Southeast Asia

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DISCLAIMER

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LAYOUT

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PICTURES

All the pictures are provided by the ITDP

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1 INTRODUCTION

Motorised two- and three-wheelers are a crucial component of transportation and logistics in ASEAN Member States (AMS). They are affordable, manoeuvrable, and can serve similar purposes as cars, albeit at a slower pace. However, their reliance on petrol and diesel contributes significantly to air pollution, noise pollution, and greenhouse gas emissions.

Light Electric Vehicles (LEVs) offer a solution to these negative impacts. The electrification of the vast light vehicle fleet in AMS can significantly reduce urban pollution and contribute to the decarbonisation of the transport sector. Furthermore, LEVs are adaptable to different charging models and can provide higher benefits per unit of investment compared to cars.

The transition to LEVs requires a comprehensive approach. This includes developing new business models, establishing domestic production chains, and creating a supportive e-mobility ecosystem. To achieve a successful transition to LEVs, key stakeholders must collaborate. This includes manufacturers, service providers, and government bodies. Additionally, the availability of skilled personnel, a reliable infrastructure for charging, and a system to recycle batteries must be ensured.

This guide is designed to assist ASEAN governments in promoting the adoption of LEVs by providing a framework for policy development and collaboration. It acknowledges the diverse starting points of member states and encourages them to tailor their approach based on their specific context. Therefore, the guidelines do not provide a universal one-size-fits-all approach that is applicable in all AMS. Instead, they suggest a process to define country-specific strategies for supporting the uptake of LEVs. The document examines the current state of LEV markets, the current vehicle offer, analyses different use cases and resulting user needs, and provides insights into the business and service-related aspects of LEVs. Furthermore, it also provides an overview of recent policies and standards that are in place in the individual AMS. Finally, the guideline proposes measures to facilitate the uptake of LEVs by national and local authorities. These measures are not only intended to increase the number of LEVs, but also to explore different potential use cases for LEVs.

In deriving strategies to enhance LEV adoption, it is recommended to follow these five different stages:

1. Building a vision: establish a clear and concise vision for LEV adoption.

2. Understanding the LEV ecosystem: conduct a thorough study of the existing LEV market and identify relevant stakeholders within the e-mobility ecosystem.

3. Identifying challenges and opportunities: consider existing and new use cases and business opportunities as well as identify the key issues to LEV adoption (e.g., upfront costs, range anxiety, charging infrastructure).

4. Setting targets and policy measures: assess the current state of policy instruments and defines the goals and targets.

5. Monitoring and evaluation: establish clear key performance indicators and evaluate the effectiveness of implemented measures.

2 BUILDING A VISION

Building a sustainable ecosystem for LEVs requires collaboration and a shared vision among all stakeholders. This includes public authorities, manufacturers, fleet managers, civil society, and even electricity providers. Engaging them in defining a common goal will ensure buy-in and commitment during implementation. This collaborative approach ensures tailored measures and effective implementation. Top-down approaches without broader stakeholder involvement risk inefficiency and lack of long-term support. The vision statement should be comprehensive and incorporate different sustainability components of sustainability: environment, social, and economy.

Many ASEAN countries have already begun laying the groundwork for LEV adoption by establishing national strategies and setting targets. These strategies and targets, while often limited in scope, provide a foundation for further development and collaboration. Most ASEAN countries have set general e-mobility targets, but only a few have specific targets for LEVs. Existing LEV targets mostly focus on light-duty vehicles like passenger cars, with some countries also targeting electric three-wheelers. Targets for slower electric two-wheelers and light elrs are still lacking. Additionally, some countries have set targets for supporting infrastructure like charging stations.

3 UNDERSTANDING LEV ECOSYSTEM

The LEV ecosystem consists of a range of actors and stakeholders that influence the take-up of e-vehicles and the provision of vehicles, components and related services, are critical for the construction of infrastructure, or shape the production and end-of life stage of vehicles.

The list of stakeholders is encompassing and may differ from use-case to use-case. The relevant actors in LEV ecosystem are interconnected, such as raw material producers, vehicle and component manufacturers, BaaS providers, and recycling sector.

4 IDENTIFYING CHALLENGES AND OPPORTUNITIES

A diverse range of motorised light vehicles are available in ASEAN, although a uniform categorisation system has not yet been established. Some countries utilise the UNECE L category with adjustments, while others consider the EU's sub-categorisation. This guideline focuses on UNECE L-category vehicles, including powered bicycles/e-bikes and electric kick-scooters. Notwithstanding the fact that not all LEVs are classified as motor vehicles in every country, low-speed options such as e-bikes and e-scooters are gaining popularity, sometimes operating in unregulated spaces. This lack of clear regulations can create challenges for law enforcement, road safety, and user uncertainty.

Currently, there is a growing interest in cleaner transportation solutions, which could lead to innovative use cases for LEVs that cater to diverse market needs. This guideline explores four different use cases for LEVs in AMS:

• PERSONAL PASSENGER TRANSPORT

Personal passenger transport is one of the most common use cases for motorized light vehicles in AMS. The advantages of LEVs for personal use include convenient home-charging, minimal behavioural changes from ICE vehicles, and relative affordability. Additionally, they contribute to environmental sustainability with zero tailpipe emissions and reduced noise. However, limitations exist, such as higher purchase costs, limited range, and potential strain on local electrical systems. Opportunities lie in improved urban access through low-emission zones, government incentives, and the potential for high impact due to widespread adoption. Conversely, the lack of sufficient power infrastructure, the absence of affordable, high-quality LEVs, and the under-pricing of fossil fuels present significant challenges.

• RIDE-HAILING AND PARATRANSIT SERVICES

LEVs offer potential benefits for ride-hailing and paratransit services, including lower operational costs, improved driver comfort, and environmental advantages. Furthermore, the ability to electrify entire business fleets streamlines the process and capitalizes on the focus on total cost of ownership. However, limitations persist, such as higher purchase costs, limited range, and potential infrastructure challenges. Additionally, limited incentives and potential repair delays pose further obstacles to widespread adoption.

• SHARED VEHICLE SERVICES

The introduction of LEVs into shared vehicle services represents a compelling addition, offering the same flexibility as existing options with enhanced capabilities. Compared to non-motorised shared vehicles, LEVs offer greater power, and compared to internal combustion engine (ICE)-powered vehicles, they are zero-emission. Additionally, shared LEVs can reduce the financial burden of EV ownership for individual users. Nevertheless, several challenges remain, including high initial and operational costs for service providers, limited range, which could cause anxiety for users unfamiliar with LEVs, and the need for additional space for charging infrastructure or parking. Furthermore, misplaced free-floating vehicles could pose environmental risks, and the lack of affordable high-quality LEVs, particularly slow-speed ones, hinders wider adoption. Additionally, limited incentives for commercial purposes and regulatory uncertainty surrounding certain LEV types in some countries add further complexity.

• URBAN LOGISTICS

The utilisation of LEVs in urban logistics environments offers a number of significant advantages, including a reduction in operational costs, an improvement in driver comfort, and the elimination of emissions. There are a number of opportunities for the advancement of LEVs, including the electrification of fleets, access to low-emission zones, and the introduction of new vehicle types. Nevertheless, a number of challenges remain, including limited range, high initial costs, and the necessity for additional infrastructure and collaboration.

The rise of LEV and e-mobility ecosystem triggers the emergence of business and services related to LEV in AMS. Those business and services can be categorised into three groups:

- DOMESTIC MANUFACTURING OF VEHICLES AND COMPONENTS

The existing market for light vehicles in Southeast Asia provides a robust foundation for the domestic manufacturing of electric alternatives. The introduction of new technologies and the emergence of potential niche markets for locally-designed LEVs present further opportunities. However, the lack of clarity surrounding vehicle classifications, the higher initial costs compared to traditional vehicles, and the unfavourable energy pricing structures present obstacles. Additionally, customer reluctance across different segments represents a challenge.

- OPERATION OF CHARGING INFRASTRUCTURE AND BATTERY-AS-A-SERVICE (BAAS)

The emerging LEV market in AMS presents a unique opportunity for companies specialising in charging infrastructure and battery-as-a-service. This sector can cater to specific needs through decentralised solutions, potentially bridging the gap in rural areas. Additionally, the rise of super-apps could streamline payment systems. However, challenges include the need for electricity grid upgrades, an initial unprofitable period until widespread EV adoption, and a lack of standardised batteries that could create compatibility issues. Furthermore, limited access to financing and inadequate grid capacity present significant obstacles. Without the availability of standardized batteries, investments in charging infrastructure risk becoming unusable in the future, further hindering large-scale development.

- VEHICLE AND BATTERY RECYCLING

The surging demand for LEVs in AMS presents a significant opportunity for battery and vehicle recycling. This industry can support the growth of domestic EV manufacturing by recovering valuable materials, while meeting the global demand for recycled content. However, establishing effective collection systems and overcoming initial economic hurdles due to limited battery lifespans are crucial for the success of this industry. Furthermore, the development of rigorous design-for-recycling standards is essential for the long-term sustainability of this industry.

Standards are of paramount importance for the success of emerging technologies, including LEVs, particularly given that the LEV market is still in its initial phase. They ensure that different components produced by various companies can be integrated effectively, thereby reducing the costs and risks associated with development. Furthermore, standards set out safety and quality requirements, thereby instilling confidence in consumers. By eliminating compatibility issues, standards allow new players to enter the market and drive competition. In the case of LEVs, standards are of particular importance in ensuring that charging stations and batteries produced by different manufacturers can be used interchangeably. This would be beneficial to users, offering more charging options and making it more cost-effective to construct a comprehensive charging network. Nevertheless, while some AMS share international standards, there is a necessity for further harmonisation in order to maximise the benefits. Based on a survey of companies involved in LEVs, business stakeholders consider a regional standard within Southeast Asia a critical issue and 76% of respondents consider this issue important.

5 SETTING TARGETS AND POLICY MEASURES

Policies are of crucial significance for the stimulation of the LEV market in AMS by means of rendering it more alluring to consumers and supporting domestic businesses. The prevailing policies are currently oriented towards manufacturers and not sufficiently directed towards other businesses such as ride-hailing or recycling. Surveys indicate that businesses perceive a lack of government support, particularly in the case of fleet operators. Effective policies should comprise financial incentives and address issues such as regulations and local production capacity.

A successful LEV strategy for AMS necessitates the implementation of adaptable policy mixes tailored to the specific needs of each country. These mixes should comprise a combination of incentives, regulations and phase-out plans designed to facilitate the adoption of LEVs throughout the entire innovation cycle. This guideline presents a range of measures within the following categories:

- **Financial incentives,** such as subsidies or tax breaks that address the upfront cost of vehicles, equipment and infrastructure;

- **Taxation and pricing** of fossil fuels and CO2 emissions;

- **Planning** a dense network of charging infrastructure and leveraging public and private investments to support the development publicly accessible charging stations;

- **Regulatory measures** to create a long-term market shift towards electric mobility, such as zero-emission zones or sales bans for ICE vehicles;

- The promotion of **harmonised vehicle and battery standards** to ease market access across AMS, to ensure safety and quality of vehicles, components, and charging equipment, and to enhance user trust;

- The introduction of **extended producer responsibility** schemes to ensure the collection and treatment of end-of-life vehicles; or

- The education of expert staff to support the **local capacity development and awareness raising**

- The **non-economic incentives** to increase users' demand

6 MONITORING AND EVALUATION

In order to ensure the effectiveness of LEV policies, it is essential that they are underpinned by clear goals and that they are subject to constant monitoring. This is of particular importance given the rapid evolution of LEV technology and user preferences. Monitoring facilitates the identification of issues at an early stage, thereby enabling adjustments to be made in response to new innovations, changing user behaviour, and market trends. It is frequently overlooked, but it is of crucial importance for accountability and transparency. In order to effectively monitor progress, it is necessary to have a set of clear and measurable indicators. The aforementioned indicators should be designed to track a variety of aspects, including funding, the deployment of charging stations, and the impact of these initiatives on the adoption of LEVs. This impact can be measured in terms of the percentage of LEVs in a given region.

This guideline provides indicators in these following categories:

- Cost of e-mobility
- Diffusion of electric vehicles
- Infrastructure development and safety
- Product chains and circularity

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