

Introduction

In East Asia Summit (EAS) countries, progress has been made in recent years towards electrifying the transport sector. Electric vehicles (EVs) are considered as important technological options for those EAS countries towards improving air quality in urban areas, enhancing energy security for shifting away from oil dependence, and mitigating climate change – if these are coupled with low-carbon power generation sources.

Amongst the Association of Southeast Asian Nations (ASEAN) countries, Indonesia, Malaysia, and Thailand have formulated EV production plans, and their plans include battery production. Indonesia has issued a Presidential Decree for the diffusion of EVs, and the country has also formulated EV production plans that include battery production. Indonesia aims to establish integrated production systems from the extraction of cobalt (required for cathodes) to battery production. Vehicle manufacturers in Thailand have formulated a plan to assemble batteries produced in other countries.

In view of EV penetration's great impact on energy security enhancement, air quality improvement, and climate change mitigation, and for the successful implementation of those plans, concerted efforts will be essential to involve all stakeholders, including policymakers, electric utility companies, and representatives from private company members (such as manufacturing companies of automobiles, batteries, and electrical engineering).

Study Method

The study conducted both quantitative and qualitative analyses as follows.

First, the study analysed policies and regulations as well as economic incentives for the wider diffusion of EVs in the five ASEAN countries analysed.

Second, the study considered enablers (such as policies, regulations, production basis, financing, and human resources) for the diffusion of EVs in relation to ownership, manufacturing, and development of charging infrastructure. With the SWOT analysis framework, the study identified strengths, weaknesses, opportunities, and threats for the electrification of the transport system in the analysed countries.

Third, the study estimated the impact of EV deployment on energy savings and CO₂ emissions reduction by 2040. Different mix of electricity generation will differently affect the CO₂ emissions from EV. Therefore, ERIA's Energy Outlook's electricity generation mix by 2040 was utilised as the basis for estimating the impacts derived from EVs on CO₂ emissions reduction (ERIA, 2021). As the countries analysed in this study either consider or establish plans for carbon neutrality beyond 2050, the assessment on the impact of EVs on CO₂ emissions reduction and its coordination with the supply-side decarbonisation is critically important. 2040 marks the transition timing in this process, and various supply-side transition options (biomass blending, ammonia blending, and carbon capture, utilisation, and storage) will be considered as well.

Fourth, the study analysed the total cost of ownership for passenger vehicles, from the use of EVs, and compared it with that of ICE vehicles, hybrid electric vehicles (HEVs), and plug-in hybrid electric vehicles (PHEVs). The analysis was conducted in consideration of the respective countries' differences on tax incentives, electricity prices, and other relevant costs. The study also presented the tipping point when EVs would become more cost competitive compared with ICE vehicles.

Fifth, the study formulated recommendations for ASEAN countries to formulate necessary policies for wider diffusion of EVs, and to develop infrastructure.

Report Structure

This report is structured to analyse the potential and economic benefits and/or costs of a shift towards EVs in Indonesia as follows.

Chapter 1 presents the EV policies in ASEAN countries, including policies, targets, the current status of the introduction of EVs, and economic incentives for the diffusion of EVs.

Chapter 2 presents the well-to-wheel (WTW) analysis that considers greenhouse gas emissions (and energy consumption) in automotive fuels throughout the process from fuel mining to transformation, transport, and final consumption.

Chapter 3 presents the analysis of total cost of ownership of EVs and compares it with ICE vehicles, HEVs, and PHEVs for the five countries in ASEAN: Brunei Darussalam, Indonesia, Malaysia, Thailand, and Viet Nam. The chapter presents the analysis results of the tipping point of EVs – when the benefits of owning electrified vehicles (xEVs) would surpass that of ICE vehicles and HEVs.

Chapter 4 presents the SWOT analysis regarding EV deployment strategies for the five ASEAN countries.

Finally, Chapter 5 draws policy implications from the above analysis.

References

Economic Research Institute for ASEAN and East Asia (ERIA_ (2021), *Energy Outlook and Energy Saving Potential 2020*. Jakarta: ERIA. <https://www.eria.org/publications/energy-outlook-and-energy-saving-potential-in-east-asia-2020/>