

Chapter 1

Background and Objective of the Study

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Chapter 1

Background and Objective of the Study

Demand for passenger and freight transportation in Association of Southeast Asian Nations (ASEAN) members is high and regional automobile use is rapidly spreading. The adverse effects are traffic congestion, traffic accidents, and air pollution, especially in urban areas. At the same time as demand for petroleum has increased, oil self-sufficiency has declined greatly, with CO₂ emissions increasing. Greater automobile penetration is expected as regional economies grow, increasing energy security and environmental concerns.

To tackle these issues, ASEAN countries have promoted electric vehicles (xEVs), including hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and battery electric vehicles (BEVs), and developed associated infrastructure. This will reduce oil consumption and air pollution, but increase demand for electricity. Depending on their power generation sectors (generation mix, input fuels, etc.), countries might not become energy self-sufficient or solve their environmental problems.

This study projects xEV deployment effects to around 2040 on the economy, energy, and environment (3Es) – the basic principle of energy policy. The study analyses qualitative and quantitative information on energy supply and demand structure, impacts on CO₂ emissions, and the macroeconomy to contribute to ASEAN members' automobile and energy policy planning.

1 Objective of the Research

- ✓ Analyse the effect of xEV penetration on ASEAN countries' 3Es.
- ✓ Estimate the benefits and costs of xEVs in ASEAN countries.
- ✓ Determine the implications for energy policy and supply industries in ASEAN countries.

2 Methodologies of the Project

This study uses a model in which the macroeconomy and the energy supply–demand structure are interdependent to consistently evaluate the impacts on the 3Es (including energy structure, macroeconomy, subsidy amount and CO₂ emissions) by the diffusion of xEVs through scenario analysis. In addition, we will use an Input–Output model to confirm the impact of the spread of xEVs on production and employment.

- ✓ Target countries: Indonesia, Malaysia, Thailand, and Viet Nam
- ✓ Scenario plan: 1) xEV penetration pattern (sales share percentage, etc.)
2) Battery cost trend (affecting xEV prices)

- ✓ Analysis scope:
 - 1) Influence on energy demand and CO₂ emissions
 - 2) Influence on subsidy amounts on xEVs
 - 3) Influence on production and employment structure

This study is unique because it is comprehensive, analysing not only the reduction of CO₂ emissions from automobiles, but also the impacts on the macroeconomy. Depending on national circumstances, reducing direct CO₂ emissions from automobiles might not necessarily lead to better energy security or macroeconomy. We therefore depict a different future landscape and perform a multifaceted analysis that is not limited to the automobile sector to identify the advantages and disadvantages of each scenario.

3 Report Structure

Chapter 1 presents the study background, objectives, and methodologies.

Chapter 2 presents the modelling framework and the reference scenario as a baseline for evaluating the effects of alternative scenarios.

Chapter 3 presents the impacts of shifting towards xEVs on CO₂ emissions and subsidy amounts to xEVs, using the economic-energy model.

Chapter 4 presents the impacts of shifting towards xEVs on production and employment, using input–output analysis.

Chapter 5 presents policy implications.