Chapter 1

Introduction

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CHAPTER 1

INTRODUCTION

The demand for energy in East Asia Summit (EAS) countries—led mostly by their power and transport sectors—has been growing substantially. The energy demand in the transport sector is mainly on oil, of which imports have been growing rapidly as the demand surpasses domestic production, causing concerns on energy supply security. Some EAS countries subsidise oil products to ensure affordable price levels for social considerations, but this exacerbates their fiscal balance. In addition, the upsurge in motorised vehicles in their cities has worsened the air quality. As these incidents prove, increases in transport demand—and thus oil demand—have great socio-economic impact, and the improvement in the efficiency in the transport sector's oil demand is an important policy agenda across EAS countries.

The growth in the transport sector's oil demand has been caused by the motorisation in cities where income levels have been rising rapidly. Particularly in urban areas, such rise in passenger vehicle ownership has been causing a number of socio-economic issues, including chronic traffic congestion. In fact, the average travel speed in some urban areas in Asia is low—for example, Jakarta's travel speed is at 15 km per hour, and Bangkok's is at 12 km per hour. This incurs energy waste, lost time in economic activities, and poor air quality.

It is thus necessary for EAS countries to take on a growth pattern different from that of developed countries. For a sustainable socio-economic development, emerging Asian countries are required to meet three objectives: enhance energy security, improve environmental quality and stabilise economic growth, and create 'smart communities'. Unlike conventional economic development paths, these three objectives have to be achieved simultaneously.

Smart communities aim to simultaneously achieve efficiency in the transport sector and lower the environmental burden by optimising transport infrastructure such as roads and railways, introducing next-generation vehicles (hybrid, plug-in hybrid vehicle, and

electronic vehicle), and managing the transport. In other words, a smart community for the transport sector can cope with various transport issues in Asian urban areas.

A number of studies had considered the energy saving potential in Asia's transport sector by shifting towards fuel-efficient vehicle units. However, this particular study is unique in that its approach focuses on the interrelationship between energy demand and traffic flow. It utilises a simulation model that will be able to analyse the impact of infrastructure development on traffic flow and the subsequent impact of the transport sector's energy-efficiency improvements. The outcomes from the study are expected to provide new insights that will contribute to the sustainable development in EAS cities with urban transport improvements.

1. Rationale

The rationale for this study is derived from the 17th Energy Cooperation Task Force[1] meeting held in Phnom Penh, Cambodia on 5 July 2012. In this meeting, the Economic Research Institute for ASEAN and East Asia (ERIA) explained and proposed new ideas and initiatives for EAS energy cooperation, such as strategic usage of coal, optimum electric power infrastructure, nuclear power safety management, and smart urban traffic.

Participants of the Energy Cooperation Task Force meeting exchanged views and agreed to commence the proposed studies. As a result, ERIA formulated the working group for the 'Study on Energy Efficiency Improvement in the Transport Sector through Transport Improvement and Smart Community Development in the Urban Area'. Members from Indonesia, Japan, the Philippines and Viet Nam were represented in the working group with the Institute of Energy Economics, Japan acting as the secretariat.

2. Objective

This study aims to draw out policy recommendations for improving energy efficiency in EAS countries' transport sector. Special focus is given to traffic flow

[1] Under the Energy Minister Meeting of EAS countries.

improvements and the subsequent effects. The study consists of two different approaches, policy study and simulation analysis, to bring out more comprehensive and unique results.

3. Work Stream

First Year:

a) *Selection of model cities.* Several aspects were considered, including size of the city, traffic congestion level and data availability, before deciding to focus on Jakarta, Indonesia.

b) *Policy analysis 1*. Various policies and experiences were examined and summarised into four categories under the Avoid-Shift-Improve-Finance framework.

c) *Simulation analysis 1.* The model that can describe car traffic in a specific area was developed. Some options to improve traffic were considered, and costs (e.g. investment cost for roads) as well as benefits (e.g. reduction of congestion, and thus oil consumption) were estimated.

Second Year:

a) *Policy analysis 2*. Policies that could enhance the modal shift from private car to public transportation were implemented.

b) *Simulation analysis 2.* A survey of the general public's preferences was conducted in Jakarta to explore the factors that can drive a modal shift. Some options for improving public transportation utilities, especially bus rapid transit (BRT), were considered and the subsequent effects (e.g. increase in BRT usage and the subsequent reduction in oil consumption) estimated.

c) *Policy implication.* Based on these analyses, policy implications were derived.

Third Year:

Since FY 2012, there have been some successes in identifying investment options for reducing traffic congestion as well as its effects, including the reduction in oil demand. Meanwhile, it also became clear that the proposed investment and policy measures have limited effects and require a fundamental change to obtain a better landscape in the future for existing megacities such as Jakarta.

For instance, the case study on Jakarta for the past two years showed that traffic congestion has deteriorated considerably. Measures for fundamental improvements have been limited and now require massive short-term investment. Meanwhile, the EAS region has many mid- to small-size cities that are about to launch, or have just launched, their phase of rapid urbanisation and motorisation. From the initial development stage, appropriate measures must be implemented gradually to ensure a sound development for these cities.

Given this background, the case study in FY 2014 targets mid- to small-size cities in the initial development stage, and analyses policy and infrastructure measures that aim to improve traffic and energy efficiency. From this analysis, this study derives forward-looking policy recommendations for similar cities in the EAS region.

a) Selection of model city

In selecting the target city for this phase's case study, two of the considerations were the road traffic and transport infrastructure conditions, and the availability of data for analysis. Of the options, the research team chose Da Nang in Viet Nam.

b) Analysis of policy implementations in accordance with the development stage

While various policies can effectively improve traffic (and reduce energy consumption), the appropriate ones apparently differ based on the development stages of the urban and transport system of the city. Therefore, the analysis here will focus on the potential of policies to address the issues in the development stage of the model city.

c) Model development and initial assessment

This study first developed the model to replicate the traffic flow in Da Nang. Once the simulation model was in place, the effects of the implementation of different routes of feeder bus lines were assessed. The assessment results served as feedback for the improvement of both the simulation model and analysis approach.

d) In-depth simulation analysis for traffic improvement and impact

This step involved a quantitative analysis of any increase in energy efficiency through the improvement in traffic flows as gathered from step (c) above.

e) Draw policy recommendations for traffic and energy efficiency improvement in developing cities

Policy recommendations of this study will pay particular attention to urban and traffic systems' development stages.