Chapter 1

Introduction

Study on energy efficiency improvement in the transport sector through transport improvement and smart community development in the urban area Working Group

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Energy demand of East Asia Summit (EAS) countries has been growing substantially, led mostly by energy for the power sector and transport sector. Energy for the transport sector in EAS countries is dominated by oil, of which imports have been increasing rapidly as the domestic production slows, rendering energy supply security concerns. Meanwhile, some EAS countries subsidize oil products to ensure affordable price levels for social considerations, and this exacerbates fiscal balances. In addition, motorization in the urban areas of some EAS countries has worsened the air quality because of increased combustion of low quality oil products. As these incidents prove, increases in transport oil demand have great socio-economic impacts, and the improvement in efficiency for the transport sector oil demand would be the important policy agenda across the EAS countries.

The growth in transport sector oil demand has been led by motorization in some EAS countries of which income level is growing rapidly. Particularly, the urban area of rapidly growing Asia represent higher income level than the country average, and their soaring passenger vehicle ownership has been causing a number of socio-economic issues, including chronic traffic congestion. In fact, the average travel speed of some urban areas of Asia represents low level, Jakarta at 15 km/hour, and Bangkok at 12 km/hour; and this in turn means the energy waste, time losses in economic activities, and worsening the air quality.

At the early stage of urbanization, developed countries experienced those issues arising from the rapid motorization, such as oil demand growth, congestion, and health impacts arising from air quality problems. It is deemed necessary for EAS countries to take on a growth pattern different from those of developed countries since the emerging Asian countries increase the presence in the global energy market. For sustainable socio-economic development, the emerging Asian countries are required to meet three objectives: enhancing energy security, improving environmental quality, and stable economic growth; and creation of "smart community" would be able to satisfy these objectives, which at conventional economic development path tend to conflict with each other.

With respect to the transport sector, smart community aims to simultaneously achieve the efficiency improvement in the transport sector and lowering environmental burden through the optimization of transport infrastructure – such as road and rail, introduction of the next generation vehicles (hybrid, PHV, and EV), and transport demand management. In other

words, smart community for the transport sector could cope with various transport issues in the urban areas of Asia.

A number of studies have been implemented to consider the energy saving potential in the transport sector of Asia through the shifts towards fuel efficient vehicle units. Meanwhile, this study will utilize a simulation model which would be able to analyze the impacts of infrastructure development on the traffic flow and subsequent impacts of the overall transport sector energy efficiency improvement within the rapidly developing Asian cities. The outcomes from the study would provide new insights that would contribute to the sustainable development for the cities of EAS countries with the urban transport improvement.

1. Rationale

The rationale of this study is derived from the 17th ECTF[1] meeting held in Phnom Penh of Cambodia on 5 July 2012. In this meeting, the ERIA explained and proposed new ideas and initiatives for EAS energy cooperation, including the following:

- Strategic Usage of Coal
- Optimum Electric Power Infrastructure
- Nuclear Power Safety management, and
- Smart Urban Traffic

The participants of the ECTF Meeting exchanged views on the above proposals and agreed that it was time to consider new areas in addition to the current work streams to reflect the dynamics of energy demand and supply in the East Asian region. As such, the ECTF Meeting endorsed the proposed new areas and initiatives.

As a result, The Economic Research Institute for ASEAN and East Asia (ERIA) has 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, Philippines and Vietnam are represented in the WG with Mr. Ichiro Kutani of the Institute of Energy Economics, Japan (IEEJ) as the leader of the group.

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[1] Energy Cooperation Task Force under the Energy Minister Meeting of EAS countries.

2. Objective

   This study is aims to draw out policy recommendation for improving energy efficiency of transport sector in EAS countries. Firstly, the study will gather and marshal existing policy or initiatives for improving energy efficiency in a transport sector. In addition to this policy survey, the study will quantify the effect of load investment and traffic management on oil demand by using simulation model for specific city area.

3. Work Stream

   The study consisted of three work streams for fiscal year 2012.

(A) Selection of Model Cities

   The study will select one city among those Asian cities with large room for improvement of energy efficiency in transport sector through traffic management. As the below listed factors and availability of data for a simulation analysis being considered, Jakarta is proposed as an initial candidate of a model city for the purpose of this study.

- Population size and population density
- Income level
- The number of passenger vehicle stocks
- Traffic congestion level
- Level of infrastructure development
- Potential for cooperation from the relevant government agencies
- Potential for data collection to conduct the analysis listed in (C)

(B) Data/Information Gathering for Traffic Demand Management

   Data/Information will be gathered to analyze the selected city's potential for traffic demand management. The below includes the example of data list.

- Map of the selected city representing the locations for road, rail, and buildings
- Trends in traffic demand by passenger vehicles, motor cycles, and trucks
- Plans for road and public transport infrastructure (for rails and buses) development
- Policies for traffic demand management/improvement

(C) Analysis of possibility to improve road traffic

A model will be developed to simulate traffic demand at certain area of a model city using the data/information listed in (B). Given the certain budgetary constraints, the model will be able to simulate the impacts of infrastructure development (for road, and public transport) on traffic demand (in terms of improvement in travel time improvement), savings on oil demand, and CO_2 emissions reduction. Building on the simulation results, benefits/costs analysis will be conducted to understand the socio-economic impacts of traffic demand management within the selected model city.

Aside from the simulation analysis of infrastructure development on traffic demand, an analysis will be made to estimate the impacts of passenger vehicle ownership arising from various transport related tax imposition.

The study will focus to the impacts of road infrastructure development on the traffic demand, not including simulation analysis of next generation vehicle and public transport infrastructure.

4. Working Group Activities in 2012

The study has form a working group with the experts from those emerging countries of Asia that have great needs for the transport sector improvement. Experts from Indonesia were given higher contribution in terms of data/information provision, to the working group since Jakarta was selected as the model city for the study.

In 2012, the WG was held for 2 times in October 2012 and February 2013 both in Jakarta, Indonesia. In the first working group meeting, current traffic related problems / difficulties in the region. And also, methodology and conditions for simulation analysis was provided. In the second working group meeting, concentrated discussion was made on policy measure in efficiency improvement of transport sector and result of simulation analysis.