

# Chapter 1

## Introduction

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## CHAPTER 1

### INTRODUCTION

In the EAS (East Asia Summit) countries, power demand is steadily expanding due to population increase and economic growth. As improving the electrification rate is an important policy task in some countries, power demand appears most certain to increase in the future in line with rising living standards. Meanwhile, as GDP is relatively low in this region, it is necessary to supply electricity at the minimum possible cost. Therefore, for the EAS countries, steadily implementing large-scale power source development in an economically efficient way is an urgent task.

Basically, a country implements power source development on the premise of self-sufficiency. That is natural from the perspective of energy security of a country, and it is a rational approach when demand growth is moderate or the country can implement economically efficient power source development on its own so as to meet the demand. However, when demand growth outstrips the capacity to supply necessary domestic resources (manufacturing, human and financial resources) or when economically efficient power source development is difficult due to some constraints, importing electricity from neighbouring countries should be considered as an option. In light of the above, it may be possible to optimise or to improve the efficiency of power infrastructure development in terms of supply stability, economic efficiency and reduction of the environmental burden if ways of developing power infrastructures (power sources and grids) on a pan-regional basis are considered.

This idea may be supported by creating an ASEAN Economic Community (AEC) by 2015. The initiative is aimed at strengthening regional ties by enhancing inter-regional trade, including energy commodity.

Meanwhile in the ASEAN region, HAPUA (The Heads of ASEAN Power Utilities/Authorities ) and the Asian Development Bank (ADB) are implementing initiatives related to intra-regional power grid interconnections and, at the same time, bilateral power imports/exports are ongoing. However,

some countries are still placing priority on the optimisation of investments at the domestic level. Besides, power imports and exports are not brisk enough to contribute to “power grid interconnection,” and progress towards pan-regional optimisation has been slow.

## **1.1. Rationale**

The rationale of this study is derived from the 17th ECTF<sup>1</sup> (Energy Cooperation Task Force) meeting held in Phnom Penh, Cambodia on 5 July 2012. During this meeting, the Economic Research Institute for ASEAN and East Asia (ERIA) explained and proposed new ideas and initiatives for 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 to endorse the proposed new areas and initiatives.

As a result, ERIA has formulated the Working Group for the “Study on Effective Investment of Power Infrastructure in East Asia through Power Grid Interconnection”. Members from EAS countries are represented in the WG with Mr. Ichiro Kutani of the Institute of Energy Economics, Japan (IEEJ) as the leader of the group.

## **1.2. Objective**

The Working Group’s study, which is packaged in this volume titled *Investing in Power Grid Interconnection in East Asia*, quantifies the benefits of the pan-regional optimisation of power infrastructure development in the EAS region. By doing so, the study provides clues for improving efficiency of investment for power station and cross-border grid interconnection. It should be noted that the background of this study has been developed by making reference to the Greater Mekong Sub-region (GMS) program of ADB

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<sup>1</sup> Energy Cooperation Task Force under the Energy Ministers Meeting of EAS countries.

and ASEAN Power Grid (APG) program of HAPUA, thus making the study consistent with these existing initiatives.

### **1.3. Work stream and working group activity**

#### **1.3.1. Fiscal year 2012**

In the first year of the study, the following describes the work streams that were conducted.

- (A) Collecting power infrastructure data and information
- (B) Identifying challenges and discussion points
- (C) Developing a simplified power infrastructure simulation model
- (D) Drawing out policy recommendations (preliminary analysis)

In 2012, the WG held two meetings; one in November 2012 in Jakarta, Indonesia and another in April 2013 in Tokyo, Japan.

In the first meeting, information sharing and discussion regarding each country's power source development plan took place. Additionally, issues related to existing initiatives such as the ASEAN Power Grid and GMS were discussed.

During the second meeting, the validity of data input for simulations of optimal energy mixes was examined, and calculation results were evaluated and discussed.

#### **1.3.2. Fiscal year 2013**

In the second year of the study, the following work streams were conducted.

- (E) Detailed analysis of optimal power infrastructures

Here, a more detailed simulation model, and exercise analysis to figure out optimal mix (cost minimum) of power generation and beneficial interconnection lines were developed. This part of the study provides possible benefit for each candidate through interconnection.

- Annual / daily load curb of demand
- Cost of power generation (construction, O&M, fuel)
- Interconnection line (connecting point, length, capacity, loss rate)
- Cost of interconnection line (construction, O&M)

(F) Preliminary assessment of possible new interconnection

In this part, the cost of possible interconnection lines was estimated. This cost was then fed back to the simulation analysis in the previous part (E). By having an attainable utility of each interconnection line from previous step (E), preliminary cost-benefit assessment was executed. Based on this assessment, some candidates that will be prioritised were then selected.

(G) Draw out policy recommendation

Based on the study outcome from the abovementioned (E) and (F), policy recommendations were drawn out to enhance the effective investment of power infrastructure in the EAS region.

**Figure 1.1: Study flow**

