Chapter 1

Introduction

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CHAPTER 1
Introduction

Background of the Study

In many East Asian countries, energy demand is expected to grow continuously in the long run, with high economic growth and social development driving this trend. It is also expected that energy production, particularly fossil fuel production, in the East Asian region will not be able to keep up with the speed of energy demand growth, and that the region will have to face rising energy import dependence. At the same time, it is important to note that there are emerging challenges on the energy supply side in the world energy market that include geopolitical risks, market power risks, natural disaster/accidental risks, underinvestment, resource nationalism, and so on. Given these background factors, the enhancement of energy security is becoming one of the top priorities for each East Asian country, as all of them have a common need to achieve sustainable economic growth and development.

It is also essential to recognise that East Asian countries have a wide range of diversity in such areas as energy resource endowment, economic development, industrial structure, technology development, and others. Under these circumstances, it is necessary to analyse the energy security situation and policy implications in each East Asian country, with due consideration to the diversity mentioned above.

Since East Asian countries have already deepened their economic and energy relationships in a bid to explore regional integration, it is very important to promote the enhancement of security, not only in each country but also in the East Asian region as a whole, through regional cooperation.
In recognition of the above, this study focused on the development of an energy security index (ESI) and the assessment of energy security policies for East Asian countries.

Objective

The first objective of the study is to develop an index that quantitatively indicates the country-by-country energy security situation, which could help policymakers to accurately gauge the energy security situation in their specific countries.

The second objective is to analyse the linkages between policies and the historical trends shown in the index, and thereby assess the impact of policies on the energy security situation.

The last objective is to offer policy recommendations to policymakers in East Asian countries on improving energy security based on an analysis that answer the following:

-What methods and approaches are effective for improving energy security?

-What kinds of regional cooperation are useful for improving energy security?

Summary of Research

Research was conducted in three stages over a three-year period. Table 1-1 presents a description of the research at each stage. Stage three, or the third year of the research was conducted in 2013.

Table 1-1: Time Line of the Study

1st year: Develop and calculate indicators
(A) Development of energy security index (ESI)
- Assume ESI to comprise several major indicators that reflect the principal components of energy security.
(B) Data collection and calculation of ESI for each country
- Necessary historical data to be collected for each indicator, and for each country.
Publicly available statistics; IEA, IMF, BP, etc.
National statistics; expect to be provided by each member of the working group

Timeframe; 1970 — latest available Transparency of the data - Calculating the ESI
2nd year: Analyse relationship between ESI and policy (C) Analysis of past energy security policy taken in each country - Past energy security policy examined (D) Assessing the effectiveness of past policy on the status of energy security - Quantitative assessment of past policy - Relationship between historical change of the index and past policy (E) Drawing useful lessons from past experiences - What can be the better approach/practice to be adopted - What will be required to actually implement the identified approach/practice, etc.
3rd year: Foresee the future **(**F) Estimate ESI for the future - Apply energy supply-demand outlook - Calculate future status of ESI (G) Recommendation for regional energy cooperation - How regional cooperation will best address the energy security

Note : BP = BP Statistical Review of World Energy, ESI = energy security index, IEA = International Energy Agency, IMF = International Monetary Fund.

Working Group Activities in 2011

In 2011, the working group (WG) meeting was held twice—in October 2011 and April 2012— both in Jakarta, Indonesia.

During the first meeting, the 2010 study plan was developed and each member provided information on their country's energy security. As an overview of the study, the significance and objectives were shared, and an overall plan of the multi-year project was presented. In this context, members confirmed the positioning of the work streams for the fiscal year. In the reports made by the WG members, changes in the energy supply and demand balance in their countries were described, along with changes in policy, the

issues currently confronting their countries, and others. A preliminary estimation of ESI was also presented and this served as a basis for discussion. A wide range of views were exchanged during that discussion, on a variety of topics, including the selection of indicators and the data collection methods. Lastly, a request was made to WG members to provide the necessary information from their respective countries.

During the second meeting, the WG discussed the calculation results for the ESI. A variety of views were discussed and exchanged on the ESI, such as the relevance of the data utilised for calculating the indices and the indicators, which ought to be selected. Missing data were supplemented and data reliability was improved through the contribution of WG members. A very important achievement was the wider discussion on the approach for assessing the calculated indices. Accordingly, it was decided that the knowledge of the WG members and the discussion outcomes would be reflected in the study report.

Working Group Activities in 2012

In 2012, the WG meeting was held twice—November 2012 in Jakarta and April 2013 in Tokyo.

During the first meeting, the WG discussed the calculated index. Discussions revolved around the use of econometric modeling as one method for assessing the impact that policies in each country have had on changes in the index. A number of elements have caused the index to change, including macroeconomic conditions, industrial structure, and fluctuations in energy prices, but it was pointed out that analysis using econometric modeling would make it possible to break down the impact from each. There are limitations, however, posed by an econometric modeling analysis. In addition, at least 20 years worth of accurate data would be required for such an analysis, which would be extremely difficult to collect since the number of countries that could provide such data is very limited. It was also pointed out that government policies did have an effect on changes in the index and that some sort of correlation do exist.

WG members also talked about the energy policy of their countries, followed by a question-and-answer session. The difficulty of looking into past government policies, particularly among developing countries, was pointed out. In addition, WG members also noted the importance of policies on renewable energy and electricity, thus, confirming that the effects of these policies should be analysed appropriately.

Based from the discussions during the first meeting, an analysis was performed on the correlation between policy and ESI, and results were discussed at the second meeting. It was noted that there are a variety of elements affecting changes in the ESI and no single element could be used to explain all of the changes in ESI. Based on this, it was decided that consideration will be given to a variety of related elements during future analysis of the correlation between policy and ESI.

The impact of past government energy policies on the energy security situation was next discussed. Once again, the difficult nature of assessing past government policies was confirmed. In most countries, policies on the reduction of carbon dioxide (CO_2) emissions have only been enacted recently, hence, it is too early to measure their effects.

Working Group Activities in 2013

In 2013, the WG meeting was held twice—December 2013 in Jakarta and April 2013 in Kuala Lumpur.

The objective of the 2013 study was to calculate future ESIs. The main data source used for this study was the ERIA Energy Outlook released by the ERIA Working Group for the Analysis of Energy Saving Potential in East Asia (ERIA ESP WG).

At the first meeting, the WG discussed the (i) main data sources to calculate future ESIs, (ii) selection of ESIs, (iii) tentative results of selected ESIs, (iv) limitation of future ESI calculation, and (v) future energy plan of member countries. The following are the major opinions generated:

- As many of the ERIA member countries become net energy importers, diversification will be the key to future energy security of the region.

- As Middle East dependence increases, the security of transportation routes will need to be considered.

- It is implied that electricity transmission grid interconnection contributes to the promotion of electrification, the diversification of power supply, and reinforcing of energy security.

- There will not be enough power generated from renewables to replace conventional energy and the options grow even thinner when affordability is considered. Coal is the most economical, but it also carries with it major environmental problems.

At the second meeting, the WG discussed the methodology of calculating future self-sufficiency, and the baseline for scoring of ESIs. An expert presented his concept of energy security and the case study of energy security in China. The following are the major opinions generated;

- Considering the ASEAN Integration in 2015, it would be preferable to add the evaluation of the ASEAN average.

- It would be preferable to add the gross domestic product (GDP) per capita and total primary energy supply (TPES) per capita as economic indicators to make CO_2 relevant and ESIs easier to understand.

- Countries where an energy mix of coal and renewable energy/nuclear energy could be applicable are limited. This situation varies depending on the country. Coal, in particular, is low-priced, but the initial investment cost of power generation from coal is high. Thus, it is necessary to consider financing.

- For renewable energy, their levels of CO_2 emissions may be high over their life cycles. Thus, nuclear power is likely more suitable for CO_2 emission reduction.