Chapter 1

Background and Objective

Many emerging countries in the East Asia Summit (EAS) region are likely to increase dependence on fossil fuel imports in the future. This trend means an increase in countries' energy security vulnerability. It is imperative for such countries to do the following:

(i) understand the influence and impact of unexpected import disruptions,

(ii) understand how a country can react, and

(iii) implement necessary policy actions to enhance energy security.

Each country in the EAS region has a unique energy supply portfolio consisting of a variety of energy sources such as coal, oil, natural gas, and renewables. Some countries have indigenous energy sources and their degree of diversification in energy supply sources varies. What almost all EAS countries have in common, however, is that they are very likely to rely on more fuel imports to grow their economies. Therefore, more attention should be given to resilience against the disruption of fuel imports. Such disruptions are not an uncommon occurrence and happen for a variety of reasons –political, economic, technical, and environmental.

Among various fossil fuels, liquefied natural gas (LNG) has been chosen for this study for a number of reasons, which are mentioned below. Although LNG is expected to play a bigger role in the future energy mix, since it is somewhat new among Member States of the Association of Southeast Asian Nations (ASEAN), there has been little attention on its supply security in terms of study or tangible actions. Oil and coal, on the other hand, given that they are more conventional and popular fuels in the region, enjoy the benefit of a mature global market, a redundant domestic supply system, and stockpile. Assessing resilience against the disruption of LNG imports may provide crucial insights for the energy security of many emerging EAS countries in the coming future.

1.1. Increasing demand and import dependence

LNG is considered an increasingly important energy supply source in the coming decades, both for resource reserve and environmental reasons. However, natural gas production is not keeping pace with the increased demand in many ASEAN Member States, which have just started or will soon start importing LNG. Even Indonesia and Malaysia, major LNG exporting countries in the EAS region, will soon rely on LNG imports to support their own economic growth. This gives rise to new concerns over national energy supply security.

Meanwhile, even though the import dependence of oil is higher than that of natural gas, because of the inherent supply security risk of oil, better countermeasures have been implemented. For coal, in general, import dependence – and thus supply security risk – is well below that of oil and natural gas due to the abundance of the resource in the region.

1.2. Exporting countries

While LNG exporting countries are widely believed to be diversified, Qatar, a country located inside the Strait of Hormuz, dominates global LNG production/export its share nearing one third in recent years. Recent conflicts between Qatar and its neighbours have highlighted the significance of LNG from Qatar – and the resulting need for further diversification.

Even the largest oil producers, Saudi Arabia and the Russian Federation, have a share of only around 13% of the world's production, respectively. Together with the tight oil production and exports from the United States, oil exporting countries are more diversified than LNG exporting countries. Coal exporting countries are rather concentrated, but their significance is that most trading partners are within the same EAS region (Australia, China, Indonesia, and the Russian Federation), whereas supply is free from geopolitical problems in the Middle East and choke-point risks in the Strait of Hormuz.

1.3. Flexibility of supply

Unlike crude oil and coal, which have mature global markets, the LNG market is rather new and still lacks the flexibility of redundant export and import capacity. Most of the transactions are still made under traditional long-term oil-price-linked contracts. Therefore, flexible spot transactions that can fill the supply–demand gap in emergency situations are limited compared to oil and coal.

Similarly, oil and coal are generally traded under short-term (less than 1-year) contracts or on a spot basis. Therefore, they have more supply flexibility. This flexible global market provides short-term supply security for market participants – that is, anyone can procure the necessary amount of the commodity whenever they need it, at transparent market prices.

1.4. Redundancy of domestic supply system

LNG receiving terminals are basically designed and built to withstand large natural disasters. The 3.11 earthquake in Japan in 2011, however, has proved that the unimaginable could happen even to an LNG receiving terminal and domestic gas supply system. If a country is equipped with a redundant supply system (i.e. multiple LNG receiving terminals connected with pipelines), import of LNG and supply of natural gas can be maintained to some extent even when certain parts of the system are damaged. This means that young/emerging LNG importing countries are at higher risk of losing 100% of their gas supply because of less redundant/connected LNG/gas supply systems in their country.

Since more countries have experience with oil as their fuel source, many have more redundant supply systems, both in terms of geography and capacity, multiple refineries, tank terminals, and pump stations connected with diverse shipping routes and road networks.

For coal, in general, the situation is similar to that of LNG. Due to limited demand (i.e. for power generation and some industries), the domestic supply system is simple. In addition, due to the

range in coal quality, provision of coal between different destinations is difficult even in the case of an emergency.

1.5. Stockpile

Stockpiling is a useful tool to enhance supply security. However, the stockpile of LNG is limited compared to oil and coal due to its physical nature (gaseous state in ambient temperature and extremely low temperature required to become liquid). In the case of Japan, LNG importers hold 1–2 weeks' worth of stock in their receiving terminals.

Meanwhile, every International Energy Agency (IEA) member country holds more than 90 days' net import equivalent of oil stock. Many developing countries are trying to hold their own oil stocks as well, along with rising oil imports. For coal, Japanese importers hold about 1 month of stock.

The objective of this study is to develop a generalised procedure to assess the readiness of a country in case of an LNG supply disruption. First, a hypothetical assessment procedure is applied to one country to present how it can be applied and to provide useful policy recommendations. Then, the assessment procedure is further generalised to apply to other countries in the EAS region.