EXECUTIVE SUMMARY

It is widely believed that EMI in East Asia is beneficial for both developed and developing countries. However, such benefits are more often stated in qualitative ways than in quantitative ways. Since the benefits of EMI are not without questions, it is useful to do further quantitative studies to deepen our understanding on the impact of EMI. Moreover, even though EMI in the EAS region seems beneficial and promising, the way toward EMI will not be smooth and therefore the implementation of EMI should be carefully studied.

To address these needs, ERIA continued an EMI study project for the second year. Part of this year's studies will further deepen our understanding about the impacts of EMI; while the other part explore ways to move the EMI forward, which echoes the instructions from the leaders and the energy ministers. Considering the debates of shifting away from nuclear energy as a consequent of the triple disasters in Japan, two studies are dedicated to estimate the impact of reducing nuclear energy in national energy mix with Japan as a case study.

1. Key findings

In Chapter 2, Andrews-Speed finds that many services needed in order to develop and sustain a regional integrated energy market have the characteristics of a regional public good, though some may also be trans-regional or global in nature as well.

In Chapter 3, Yu's estimation shows that countries like Japan and New Zealand have the highest extents to EMI. By contrast, China has the lowest score of EMI, followed by Malaysia, India and Indonesia.

Step further, in Chapter 4, Sheng and Shi find that an integrated energy market may significantly help poor countries to catch up with rich countries in economic growth.

Moreover, the EAS region is more likely to achieve economic convergence than the rest of the world.

In Chapter 5, Zhang and Zha find that trade facilitation, including energy investment and infrastructure improvement, has played critical roles in boosting energy trade.

In Chapter 6, Doshi and D'Souza reveals that for the three years from 2007–2009 there is no secular Asian premium. On the contrary, in 2007 and 2009, Asia received a *discount* in its crude oil bill relative to the Atlantic markets.

Chapter 7 by Kojima and Bhattacharya finds that even if a partial removal of energy subsidies can ripe the benefits of market efficiency improvement and energy subsidy reduction also helps to push down the demand for subsidised commodities. Chapter 7 also shows that introduction of FDI increases not only the national GDP of the investing countries but also the regional GDP as the whole EAS region by 0.04%.

Wu in Chapter 8 shows that gas market integration has undergone through a common trajectory that consists of several steps including the creation of intra-country regional markets, formation of a national regulated market, deregulation, and international integration. In addition, LNG market will certainly play an important role in the regional gas market integration.

Chang and Li in Chapter 9 show that by adopting an integrated and competitive natural gas market in the region, overall welfare of countries involved in natural gas trade in the region improves by 5.5%. As a result of introducing new infrastructure, welfare of countries involved in natural gas trade in the region further increases by 0.3%.

In Chapter 10, Khalid, Zakariah, and Zarina find that resilient economies, especially developed EA countries, have consistent performance in terms of value added creation and imported inputs during the period of energy price surge.

Using a top-down CGE model, Itakura in Chapter 11 shows that nuclear energy is still the most favourable energy source in terms of costs and emissions in the current scenario. He finds that as Japan reduces the power generation by nuclear, the real GDP in Japan would be negatively affected and the deeper the cut, the larger the negative impact. He

finds that even with the substituting role of fossil fuels being placed, it is not effective enough to mitigate the negative impacts.

From the energy system perspective, Bhattacharya and Kojima in Chapter 12 demonstrate feasibility of meeting future energy demand with certain emission reductions without nuclear in Japan, China and India. They analyse two alternative energy scenarios of nuclear phase-out, one is renewable energy dependent path and the other is fossil fuel dependent path. They show that electricity price is expected to increase under both the scenarios compared with the nuclear energy scenario, but renewable energy dependent path will have lesser increase than fossil fuel dependent path. Compared to the renewable energy dependent path, fossil fuel dependent path appears costly in the long term scenario for Japan, China and India given the same level of CO2 emissions reduction. Benefits of renewable energy are multifarious and observed in terms of total system cost, electricity generation cost and also in terms of reduced import.

2. Policy Implications

A significant amount of policy implications is proposed by these studies. It shows that EMI should be promoted actively, but in a gradual and incremental manner; interregional governance is necessary, and a regional coordinating agency is desirable; Cross-border cooperation in energy projects should be promoted and financed with proper funds; and gas market can lead the EMI. The following is detailed discussion.

One clear message from this report is that EMI is beneficial theoretically and empirically and thus should be promoted in a continuous and confident manner. Developed countries can play an important role by helping LDCs overcome the difficulty through capacity building programs. Even though LDCs may need more time to make preparation, a workable roadmap toward EMI is valuable.

Governments or public bodies should take the responsibility for managing or stimulating EMI based on the findings that EMI has public goods characteristics. A single

high level organisation or an energy policy cooperation framework, similar to IEA, should be established. Different legal and institutional systems among the countries should be harmonized, and transparency of laws and regulations must be improved so as to support the expansion of energy trade in the region.

Cross-border cooperation in energy projects should be promoted and financed with proper funds. In addressing the shortage of investment, it is recommended to explore and establish multilateral and applicable financing approaches urgently. It is also recommended to remove fossil fuels subsides.

East Asia should develop a formal program to boost cross-border connectivity and trading for gas within the area and eventually achieve regional gas market integration. Steps should be taken to construct emergency gas stocks to support the effective operation of the growing transboundary gas networks. Gradual harmonisation of regulatory and technical standards in the gas sector should be started.

Completely shifting away from nuclear energy in the short run is not advisable. It is therefore desirable to design an appropriate mix of electric generation types based on the existing facilities and the feasibly planned future investment. However, more aggressive renewable energy policy is required.

3. Recommendations

EMI in East Asia should be pursued in a gradual and incremental manner. East Asian countries may consider to institutionalize an energy policy cooperation framework, or establishing a single high level regional organisation, similar to IEA.

Different technical, legal, and institutional systems among the member countries should be harmonized, and transparency of laws and regulations must be improved. The quality and timeliness of energy data and statistics need to be improved to enable transparency in the energy market.

Establish multilateral and applicable financing approaches, such as regional infrastructure fund and regional development banks.

Promote and nurture the development of gas markets in member states and phased sectoral reforms in relatively mature markets through multilateral agreements.

Act prudently to reduce fossil fuel subsidies.

Carefully review nuclear energy policy considering the revealed additional risks and uncertainties, as well as the costs and benefits. Individual and cooperative actions on improving safety operation and dealing with accidents should be considered. Meanwhile, East Asia needs to focus more towards its indigenous energy resources like renewable energy rather than looking for something which is not of its own like nuclear energy and or fossil fuel based technologies.