Title: “The Security of Energy and Regional Cooperation in Asia”

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Introduction

In the Asia region, there is a noted trend of deepening inter-regional alliances primarily in the area of economy and trade. With regard to energy issues, various attempts of policy cooperation have also been made based on the framework of regional partnerships. First, discussions and efforts toward implementing joint action programs for promoting a variety of energy-related cooperation initiatives have been in progress under a cooperative process called “ASEAN+3”, comprising the ten member countries of the Association of Southeast Asian Nations（ASEAN） and Japan, China as well as Korea. In recent years, progress in energy cooperation has also been made under the framework of so-called “ASEAN+6” (the initial constituents of the East Asia Summit or EAS) made up with the ASEAN+3 countries plus India, Australia, and New Zealand which take important positions in the Asia-Pacific energy market. Furthermore, the initiatives taken up by the Asia-Pacific Economic Cooperation (APEC) toward energy cooperation in the region have even longer history than the above, dating back to the establishment of APEC Energy Working Group in 1990.

This report first presents an overview of changing energy supply-demand structure with a focus on the framework of ASEAN+6 which is increasingly playing a central role in the strategic alliance in Asian region. It then discusses the changes in the international energy situation surrounding the region and the heightening interest held by various countries in energy security as well as global warming issues. Finally, consideration is given to the current status and the outlook of efforts on energy-related cooperation in the region and the role of Japan thereof.

1. Characteristics of energy supply-demand structure of ASEAN+6 and their challenges

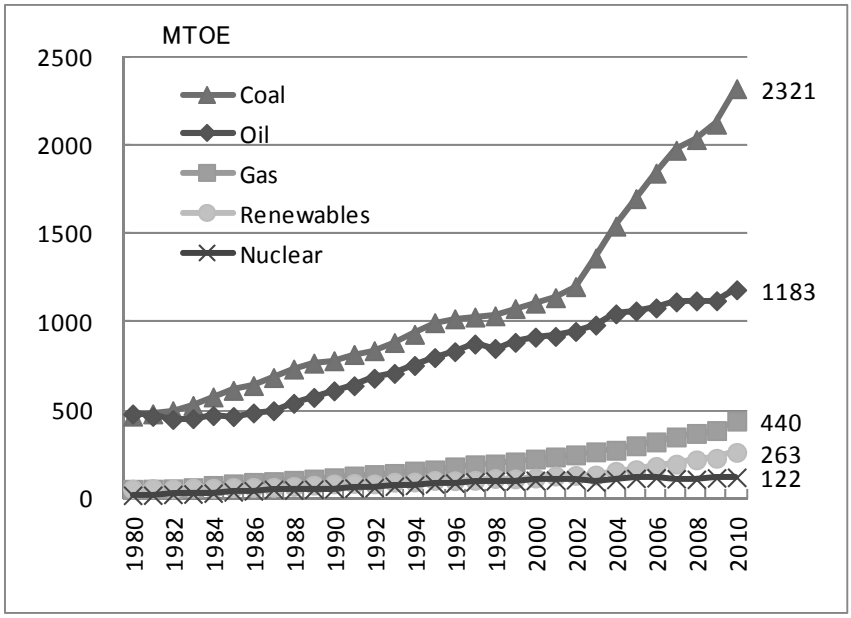
Along with the steady recovery of regional economy after overcoming the Asian economic crisis, the primary energy consumption of ASEAN+6 in 2010 reached 4,328 million tons of oil equivalent (hereafter abbreviated to MTOE) or 4.0 times the amount in 1980, reflecting the average annual growth of 4.7% since that year[1]. The above amount accounted for as much as 36.1% of the global primary energy consumption (it was 16.3% back in 1980). In terms of a source-wise breakdown of the primary energy consumption by the ASEAN+6 region as a whole in 2010, coal made up 53.6%, oil 27.3%, natural gas 10.2%, nuclear 2.8%, and hydroelectricity and other sources 6.1%, where coal and oil alone occupied nearly 81% of the total picture.

With respect to the make-up by country, consumption by China at the leading position was 2,430

[1] The data used here are prepared by the author based on the “BP Statistical Review of World Energy” (BP, June 2011). The ASEAN+6 quoted here refers to ASEAN6 (Indonesia, Malaysia, The Philippines, Singapore, Thailand, Vietnam) plus Japan, China, Korea, India, Australia, and New Zealand.

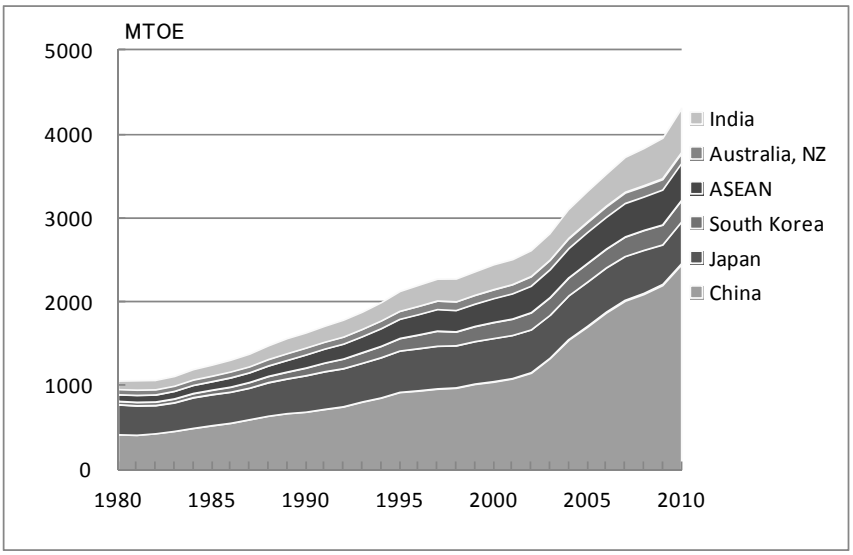
MTOE accounting for 56.2% of the total, India was 520 MTOE and 12.1%, followed by Japan's 500 MTOE and 11.6%, and Korea's 250 MTOE and 5.9%, with the top four countries occupying nearly 90% of the total picture.

Figure 1: Historical Changes in Primary Energy Consumption in ASEAN+6 by Sources



Source: BP "BP Statistical Review of World Energy June 2011".

Figure 2: Historical Changes in Primary Energy Consumption in ASEAN+6 by Country

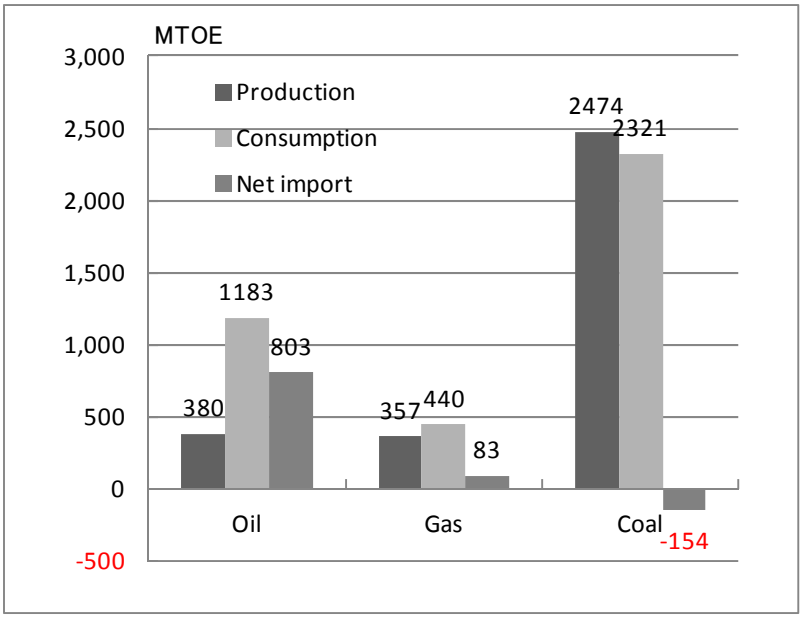


Source: BP "BP Statistical Review of World Energy June 2011".

It is known that the energy production in ASEAN+6 back in 1981 was 814 MTOE, whereas the energy consumption at 1,081 MTOE was larger than the production, indicating a net import position

of 267 MTOE. While energy production continued to expand in subsequent years to reach 3,596 MTOE in 2010, the net energy import also grew and stood at 732 MTOE. A closer look, however, shows that the supply/demand balance picture widely differs between respective energy sources. In the case of coal, against the regional consumption of 2,321 MTOE the production was 2,474 MTOE indicating a self sufficiency rate of 107%, whereas for natural gas the consumption was 440 MTOE against the production of 357 MTOE with the self sufficiency rate of 81.1%, both items showing a strong position of regional production in the supply structure. In the case of oil, however, against the consumption of 1,183 MTOE the regional production of 380 MTOE with the self sufficiency rate of 32.1% suggests an overwhelmingly high dependency on imports from outside the region[2].

Figure 3: Supply/Demand Balance in ASEAN+6 by Energy Sources (2010)



Source: BP "BP Statistical Review of World Energy June 2011".

The majority of Asia's oil imports is supplied from the Middle East[3]. In 1990, the Asian oil imports were 423 MTOE of which 314 MTOE came from the Middle East. From then on, however, oil imports into Asia kept on increasing to pace with the growing demand and reached 1,239 MTOE by 2010. While the volume of oil imported from within Asia was 268 MTOE (i.e. the regional dependency of 21.6%) that from the Middle East was 708 MTOE with the Middle East dependency of 57.1%. The fact that the Middle East dependencies of the North American and European oil imports in that same year were 14.0% and 19.6% respectively suggests Asia's oil imports can be

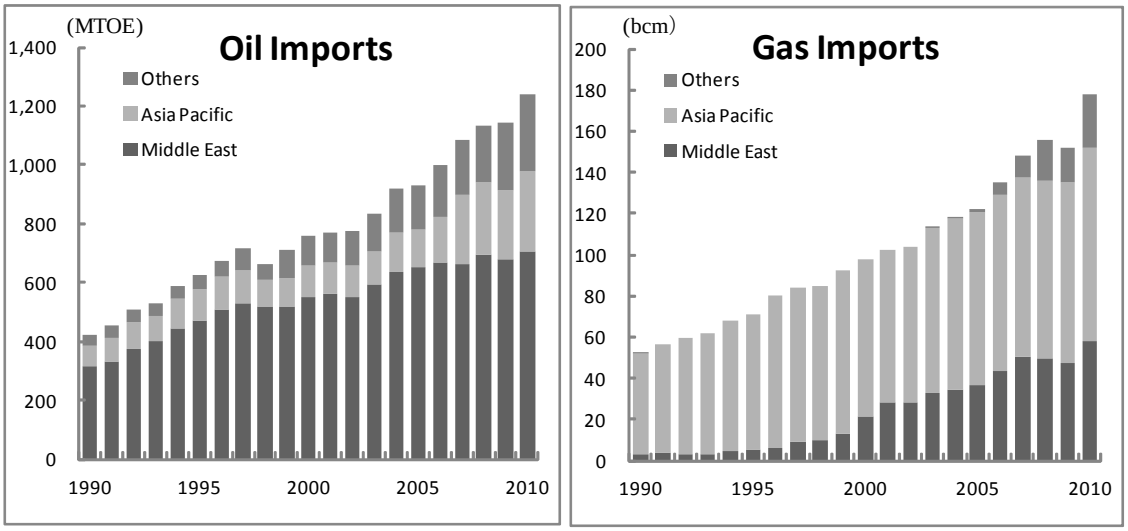
[2] In terms of regional self sufficiency rates in comparison with ASEAN+3, ASEAN+6 has slightly higher figures than the ASEAN+3 positions of 32.4% for oil, 74.2% for natural gas, and 101.1% for coal. The substantially higher self sufficiency of coal and natural gas in particular was largely due to the participation of Australia which is a strong exporter of coal and natural gas.

[3] The figures discussed in this section include those of non-ASEAN+6 countries in Asia such as Taiwan.

characterized with an exceptionally high dependency on the Middle Eastern sources.

Furthermore, with respect to the LNG imports showing significant growth in recent years, in place of the historical main supply sources such as Indonesia, Malaysia, or Australia that are inside the region, imports from the Middle East (UAE, Qatar, and Oman) or Russia are increasing. Against Asia's LNG imports of 177.8 billion cubic meters (BCM) in 2010, 93.9 BCM came from within Asia (i.e. the regional dependency of 53%), while 57.7 BCM or 32% was supplied from the Middle East.

Figure 4: Historical Changes in Asia's Oil and Gas Imports by Sources



Source: BP "BP Statistical Review of World Energy June 2011".

It is most likely that the above-mentioned trends will essentially continue into the future, and the primary energy consumption in East Asia will inevitably continue its substantial growth as supported by the robust economic expansion in the region.

According to the latest projection published by the IEEJ in November 2011, the primary energy consumption in ASEAN+6 will expand from 3,809 MTOE in 2009 to 7,216 MTOE in 2035, at an average annual growth rate of 2.5%, with its share in the global picture rising from 34% in 2009 to 42% in 2035[4]. Among energy sources, coal with the largest share will grow at an annual rate of 1.8% from 2,102 MTOE in 2009 to 3,344 MTOE in 2035, chiefly driven by the consumption for power generation to satisfy the growing electricity demand. Natural gas will show the fastest growth among projected energy sources, and at an annual rate of 4.5%, increasing its consumption from 377 MTOE in 2009 to 1,184 MTOE mainly for use in the power generation and consumer sectors. Oil consumption is also projected to grow at an annual rate of 2.0% from 1,050 MTOE in 2009 to 1,777

[4] The ASEAN+6 quoted here refers to ASEAN6 (Indonesia, Malaysia, The Philippines, Singapore, Thailand, Vietnam) plus Japan, China, Korea, India, Australia, and New Zealand.

MTOE due to the progress in motorization.

On the other hand, since there is little prospect of a substantial increase in the future crude oil production within Asia, net oil imports will increase from 700 MTOE in 2009 to 1,560 MTOE in 2035, pushing up the dependency on imports from 65% to 80%[5]. As the majority of imported crude oil will come from the Middle East having superior supply capability and economics, Asia's dependency on the Middle East oil supply is expected to rise together with the volume of oil transiting the Malacca Strait.

In addition, as energy consumption expands, CO_2 emissions in ASEAN+6 are expected to increase at an average annual rate of 2.1%, from 11.6 giga tons (Gt) in 2009 to 19.8 Gt in 2035, accounting for 61% of the global increase in CO_2 emissions during the same period (with the share of North America at 0.2% and Europe at minus 0.2%). In particular, as China and India will continue to expand their respective energy consumption with high CO_2 generating coal in the main, the two countries will eventually account for 49% of the global increase in CO_2 emissions.

2. Growing interest in energy security and global warming issues

In the face of the structural changes in energy supply-demand such as higher dependency on energy imports and the Middle East, Asian countries are becoming increasingly aware of their increased vulnerability as an individual country or as an entire region in terms of energy security and the global environment. Behind this is the growing importance of energy issues across the world, such as the steep rise in energy prices in recent years and the changes in the international energy situation surrounding the above.

Since 2000, crude oil prices have drastically fluctuated to an unprecedented extent. The West Texas Intermediate (WTI) crude oil futures as the benchmark price (daily closing price for the front-month contracts), which stood at around US$ 17 per barrel at the end of 2001, marked a record high US$ 145 per barrel in July 2008. This skyrocketing trend was triggered by supply-demand factors such as steadily increasing demand in developing Asian countries including China and India, sluggish oil production growth in non-OPEC countries and a declining spare supply capacity in the international energy market. Soaring prices were also a result of factors that are not related to supply/demand balance, such as increased geopolitical risks in major resource-rich countries and leading suppliers as well as the emergence of resource nationalism and its impacts amid a shift to sellers' market. Other influencing factors include the development of the oil futures market and massive flow of investment and speculative funds. Surging prices were also observed in international markets for coal, natural gas (LNG) and uranium which fuels nuclear power plants.

In the mean time, after July 2008, a deteriorating financial crisis and a global development of

[5] The figures for oil imports include those of non-ASEAN+6 countries in Asia such as Taiwan, but exclude those for Australia and New Zealand.

recession reduced oil demand in Europe and the US, increased oil inventories and caused an outflow of funds from the oil futures market to hedge risks, causing a sharp drop of the WTI crude oil futures price to approximately US$ 30 per barrel in December the same year. However, prospects of economic recovery and associated movement in the stock market and dollar exchange rates reversed the downward trend on crude oil prices in 2009, boosting them back to approximately US$ 110 per barrel in 2011.

Table 2-1 Impact of Higher Oil Price

	GDP (2008)	Net Oil Import (2008)	Impact (+20$/b) Rise in Oil Import		(Ref.) ADB	
				per GDP	GDP (2009)	CPI (2009)
	Bil. US$	1000b/d	Bil. US$	%	%	%
Australia	1039	376	2.7	−0.3		
China	4737	4005	29.2	−0.6	−0.7	0.4
India	1214	2160	15.8	−1.3	−0.6	1.9
Indonesia	510	202	1.5	−0.3	−0.7	1.2
Japan	4880	4442	32.4	−0.7		
Korea	931	2039	14.9	−1.6	−0.1	0.7
Malaysia	222	−195	−1.4	0.6	−0.6	1.6
NZ	118	146	1.1	−0.9		
Philippines	174	246	1.8	−1.0	−0.6	1.6
Singapore	189	1041	7.6	−4.0	−0.6	1.3
Thailand	273	714	5.2	−1.9	−0.7	1.7
Vietnam	90	−27	−0.2	0.2		

Sources: World Bank “World Development Indicator”, BP “BP Statistical Review of World Energy June 2011”, Asian Development Bank “Asian Development Outlook 2008”.

Crude oil price rises diversely affect Asian countries, in particular, the economies of crude oil importers. Direct impacts include higher prices and a resulting decline in purchasing power and stagnation of domestic demand, and a larger transfer of income (i.e. the amount of imports), whereas indirect impacts involve decreasing imports owing to the sluggish growth of global economy, subjecting the GDP to negative effects in the short term. An estimate of the impact that the recent upsurge of crude oil prices had on Asian economies in terms of transfer of income[6] reveals that the real price of crude oil rose by about US$20 per barrel from the previous year[7], causing income transfers in the amount of US$32.4 billion for Japan, US$29.2 billion for China, US$15.8 billion for India, and US$14.9 billion for Korea. The total amount paid additionally by the above four countries to oil exporters as a result of the rising prices was equivalent to Vietnam’s GDP in 2008.

[6] Increases in imports (transfer of income) are calculated based on the idea that increasing crude oil prices reduce oil consumption and imports through price and income effects (smaller domestic demand) but in the short-term do not affect oil demand.

[7] According to BP’s “Statistical Review of World Energy 2011,” the real price of crude oil (annual average, 2010) increased by US$22.4 from US$76.1 per barrel in 2007 to US$98.5 per barrel in 2008.

Furthermore, the ratio of the income transfer to GDP was high in countries such Singapore (4%), Thailand (1.9%), Korea (1.6%), India (1.3%) and the Philippines (1.0%), possibly having a degree of negative impact on respective economic growth[8].

In addition to income transfer, Asian developing countries face the serious issue of increased spending on subsidies resulting from rising energy prices. Many developing countries in Asia maintain low domestic energy prices in comparison with international prices in order to allow access to energy for the poor. In such countries, the negative net worth of domestic retail prices over import prices are assumed by national or local governments or state-owned enterprises. Accordingly, higher international energy prices increase the burden imposed upon national finance and corporate revenues. Against this backdrop, energy-consuming countries are becoming more concerned about energy security.

Furthermore, there is growing global concern over climate change and other environmental issues as well as the energy issues discussed above. After the Fourth Assessment Report of the UN Intergovernmental Panel on Climate Change (IPCC) was published in 2007, the acknowledgement that climate change is an urgent issue that must be addressed by all mankind through the establishment of long-term targets for significant emission reductions was widely shared globally at forums such as the subsequent G8 summit meeting, the MEF (Major Economies Forum on Economy and Climate) meeting comprising emerging economies as well, and the APEC Economic Leaders' Meeting. The 16th session of the Conference of the Parties (COP16) to the United Nations Framework Convention on Climate Change (UNFCCC) and the Conference of the Parties serving as the meeting of the Parties to the Protocol (COP/MOP) which were held in Mexico in December 2010 formally acknowledged mitigation targets for developed countries and mitigation actions for developing countries in a multilateral process and mandated the establishment and implementation of a measurement, reporting and verification (MRV) process, which had been a major point of controversy. Asian developing countries tend to pay more attention to local environmental issues, such as pollution and air contamination. Nevertheless, against the backdrop of growing global concerns about climate change, major developing countries in Asia, including China, India and Indonesia, have submitted mitigation action plans[9], thereby exhibiting rapidly enhanced awareness towards global environmental issues and their countermeasures.

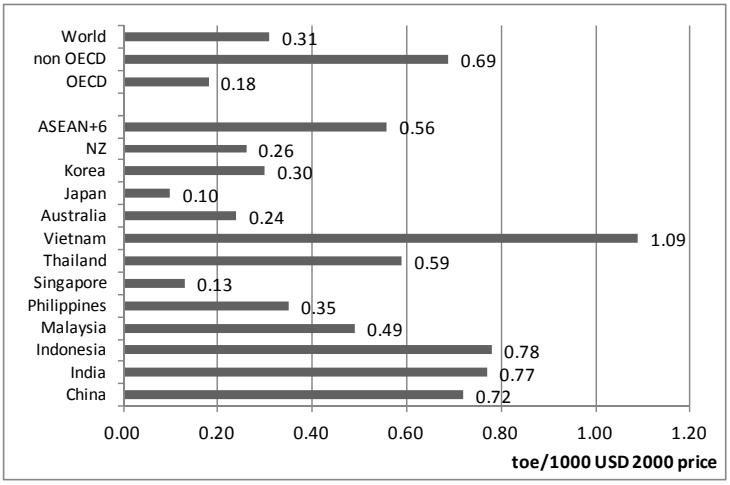
Under the above circumstances, there is ever-growing interest towards securing energy security among Asian countries, each of which has studied and implemented various energy policies and strategies. However, many Asian countries, with the exception of Japan and other developed countries, embrace slow developments in energy conservation and efficiency, energy diversification

[8] According to a sensitivity analysis employing an econometric model, conducted by the Asian Development Bank (ADB) on how surging crude oil prices affect the macro-economy, the US$20 rise from US$70 per barrel to US$90 per barrel is expected to inflate the consumer price by 0.4 to 1.9 % and lower the GDP growth by 0.1 to 0.7 % in 2009.

[9] UNFCC "FCCC/AWGLCA/2011/INF.1".

and establishing stockpiling systems, and are hence extremely vulnerable to international energy market fluctuations. As for energy conservation and efficiency, energy intensity (primary energy consumption per unit GDP) is significantly high in Asia compared to developed countries; suggesting that Asian countries have substantial potential in improving energy efficiency. In terms of developing alternative energy sources to substitute oil, the clean use of coal abundantly available in the region, and the wider introduction of natural gas and nuclear power are essential. Moreover , the only ASEAN +6 countries that own both national and private oil stockpiling and also participate in the IEA's Co-ordinated Emergency Response Measures (CERM) are the IEA members such as Japan, Korea, Australia and New Zealand[10]. China and India, with increasing imports, have begun setting up oil stockpiling bases and China's first stockpiling base just commenced operations in 2009.

Fig. 2-1 Primary Energy Consumption per GDP (2009)



Sources: IEA "Key World Energy Statistics 2011".

3. Current status and the outlook of efforts on energy-related cooperation in the region

3.1 Current status of efforts on energy-related cooperation in the region

In response to the different situations in terms of energy reserves, economic development and the development stage of energy industries, each Asian country is engaged in policies according to country-specific priorities. However, against the backdrop of enhanced linkage between the global economy and the energy market, attempts of a single country to address wide global issues naturally have their limits. From this perspective, in the energy field, regional alliance and mutual cooperation based on a multilateral framework promise to effectively complement national efforts, as well as to enhance energy security in the context of an international system and to favorably influence

[10] As IEA member nations, Japan, Korea, Australia and New Zealand bear oil stockpiling obligations (equivalent to 90 days of net import).

environmental measures. Therefore, the approach of strengthening energy security through regional partnership has come to be stressed in Asia as well.

Frameworks for energy-related regional partnership in Asia include APEC, ASEAN+3 and ASEAN+6[11], in which energy-related cooperation have been implemented and enhanced in a mutually complementary form and through close collaboration with other such international frameworks in the international momentum of promoting cooperation in the energy field.

In the energy cooperation program under APEC, short-term measures such as oil stockpiling and setting up of an information-sharing system for emergencies were implemented as well as long-term measures such as an Energy Peer Review Mechanism in which countries (or economic zones) mutually check the progress made towards voluntary energy efficiency targets and other measures. Furthermore, an APEC-wide energy intensity improvement target of 25% from 2005 levels to be achieved by 2030 has been adopted.

Dialog for energy-related cooperation among ASEAN+3 countries has been promoted in five forums, each designated with different policy issues, which were established under the Energy Policy Governing Group in 2003[12]. Examples of outcomes of dialog include implementing feasibility studies for the establishment of national oil stockpiling systems in the Philippines and Vietnam, and improving emergency response and market transparency through the compilation of energy data and the establishment of an information-sharing system.

Energy-related cooperation programs under the ASEAN+6 are promoted in three priority areas - 1) energy efficiency and conservation, 2) energy market integration, 3) biofuels for transport and other purposes - in the Energy Cooperation Task Force Meeting (EAS ECTF) established in 2007. Countries are submitting voluntary Energy Efficiency and Conservation Goal and Action Plans based on the mutual agreement.

Promoting energy-related cooperation in ASEAN+6 holds some advantages compared to its promotion among ASEAN+3 countries. Firstly, a larger energy market promises stronger bargaining power against energy producers in the Middle East and Russia. Furthermore, the ASEAN+6 offers wider options for cooperation in promoting energy market reform and emergency responses, energy efficiency and conservation, and environmental measures. Also, given the circumstances that many Asian countries are dependent on oil and gas imports from Middle East producers as well as Australian gas and coal, the participation of Australia and India has significant meaning from the perspective of securing safety of marine transportation routes which pass through their territorial waters. The ASEAN+6 group also faces the challenges of higher oil import dependency due to rising

[11] Bilateral cooperation in the energy field is also being promoted to complement regional cooperation.

[12] The five policy areas represented in the forums are: oil stockpiling, oil market, natural gas, new and renewable energy and energy security. In 2005, energy efficiency and conservation was added to the new and renewable energy forum. In 2010, the forums were integrated and reorganized into three policy forums (natural gas and oil market, new and renewable energy / energy efficiency and conservation, and energy security) to enable more efficient operations.

energy demand, increased vulnerability in energy security resulting from higher dependency on Middle Eastern oil and gas, and intensified environmental burden from increased CO_2 emissions. China and India will step up their energy diplomacy and energy Acquisition rivalry.

Table 3-1 Energy Efficiency and Conservation Goal of ASEAN+6 countries

Country	Indicator	Goals
Australia	★Carbon Pollution	5% reduction below 2000 levels by 2020
Brunei	★Energy Intensity TPES/GDP	25% improvement by 2030 from 2005 level
Cambodia	★Final Energy Demand	10% reduction from BAU by 2030
China	★Energy Intensity TPES/GDP	16% improvement during 12th 5-year plan (2011-15)
India	not submitted	
Indonesia	★Energy Intensity TPES/GDP	Reducing 1%/Y until 2025
JAPAN	★Energy Intensity TPES/GDP	30% improvement by 2030 from 2003 level
KOREA	★Energy Intensity TPES/GDP	46.7% reduction by 2030 from 2006 level
Lao PDR	★Final Energy Demand	10% reduction from BAU by 2030
Malaysia	★Final Energy Demand	8.6% reduction from BAU by 2020
Myanmar	★TPES	5% by 2020 from 2005 10% by 2030 from 2005
NZ	★Energy Intensity TPES/GDP	40% improvement by 2025 from 1995 level
Philippines	★Final Energy Demand	10% saving from BAU by 2030
Singapore	★Energy Intensity TPES/GDP	20% by 2020 from 2005 level 35% by 2030 from 2005 level
Thailand	★Energy Intensity TPES/GDP	15% by 2020 from 2005 level 25% by 2030 from 2005 level
Vietnam	★Energy Intensity TPES/GDP	3-5% saving from BAU (2010) 5-8% saving from BAU (2015)

Source: Asia Energy Efficiency and Conservation Collaboration Center/Energy Conservation Center, Japan

At the Sixth East Asia Summit (EAS) meeting held in November 2011, the ASEAN+6 countries were joined by the U.S. and Russia. Energy-related cooperation efforts in the future are likely to be promoted among 18 countries, including the above two newcomers. Being the second and fourth largest energy consumers, respectively, the U.S. and Russia are also two of the world's largest resource-rich countries; and therefore, their participation will significantly reduce the region's dependency on fossil fuel imports. This is because of Russia being an exporter of oil and natural gas, ASEAN+6+2 (US and Russia) group will find its oil import dependency reduced to 44% and its natural gas exports in excess over imports. However, in reality, the majority of Russian oil and natural gas, which are promising sources of intraregional energy supply, are to be exported to Europe. In order to expand exports of resources from Russia to the Asia Pacific region, energy supply

infrastructure to transport resources to the eastern coast must be provided and improved; and this is likely to become an important area of future regional energy-related cooperation.

3.2 Prospects of energy-related cooperation

Energy-related cooperation in Asia has steadily developed in various frameworks for cooperation and through mutually complementary linkages. The most crucial key to further enhancement of such trends is making sure that the action plans for cooperation in the energy field currently under discussion in different forums and in dialogs are implemented. This involves some important factors including accurate knowledge and judgment of international energy trends, recognition of the need for participation of relevant countries in energy cooperation and understanding of their current capability, and coordination on efforts made under other regional frameworks.

As a part of energy-related cooperation in the Asian region, the promotion of energy efficiency and conservation, as well as information-sharing in preparation for emergencies are currently being addressed for more concrete progress. However, in many Asian developing countries, where energy prices are under state control, price effects are likely to be irrelevant in achieving energy efficiency and conservation. Although countries are well aware of the need to reconsider their domestic price systems, such solutions are complicated by political factors. Furthermore, insufficient energy consumption data make it difficult to capture the status quo of consumer consumption and are posing problems in the formulation and implementation of energy efficiency and conservation measures and the evaluation of policy effects.

With the experience of two oil crises in the past and through the efforts on counter-climate change measures, Japan has been one of the world's top runners in achieving both hard and soft technology solutions for higher energy efficiency. Also, Japan has exhibited a meaningful progress in developing alternative energy sources, such as natural gas and nuclear energy, and in enhancing emergency response capacity. Many Asian countries have yet to introduce full-scale energy policies and systems and more or less look to Japan for leadership. In this context, Japan will be continually required to steadily develop its international energy strategy, with the Asian region at its core. In May 2006, the Ministry of Economy, Trade and Industry (METI) announced the New National Energy Strategy, which provides the "commitment to assist Asian and world nations in addressing energy problems" as one of its goals and sets the Asia Energy and Environment Cooperation Strategy as a means for its achievement. Energy security and global environmental issues are the most important challenges Japan is faced with in relation to energy issues. There will be growing importance for the development of international strategies, as Japan's efforts as a single country will have its limits under the stringent circumstances of recent international energy trends. Given the close relationship among Japan and other Asian countries and the increased importance of the Asian

region in international energy issues, strategies for energy-related cooperation in the Asian region will surely compose an essential part of such international strategies.

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