CHAPTER 5

Promoting Energy Market Integration in the EAS Region through Trade Facilitation: a Chinese Perspective

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Intro-regional energy trade is increasing rapidly in EAS Region in recent years. There are a lot of factors contributing for intro-regional energy trade booming, such as market demand, trade liberalization and trade facilitation. However, there are still several problems in the energy market of EAS region, such as insufficient level of energy supply, concerted effort, and the necessary infrastructure construction. An integration energy market is urgently required for resolving the problems. With the growing energy trade among the EAS Region, the improvement of the trade facilitation is one of key tools towards market integration, and will benefit both the resource-rich countries and energy-deficit countries in the region.

1. A Sketch of Intra-Regional Energy Trade

Intra-regional trade in energy is a way of life for member economies participating in the East Asian Summit (EAS) forum. Among the key points of rationale underpinning the establishment and progression of the EAS is pursuit of stronger ties in trade and investment among its member states. Amid continuation of uncertainties in world energy supply, in both physical and financial terms, given changes in energy economies outside the region, it is in the interest of all EAS states to make promotion of energy trade ties among themselves a goal for future discussion and action.

This study begins with a overview of intra-regional trade in energy. Our observation proceeds by observing flows in primary energy (oil, liquefied natural gas or LNG, coal, and electricity). In the second part of the study, we examine a number of policy mechanisms in place for facilitating overall trade flows. This examination is coupled with identification of challenges that still remain. On this basis, in the third and final section, we offer a few thoughts for making energy market integration in the EAS region an agenda item for action under the EAS framework for consultation and possible action.

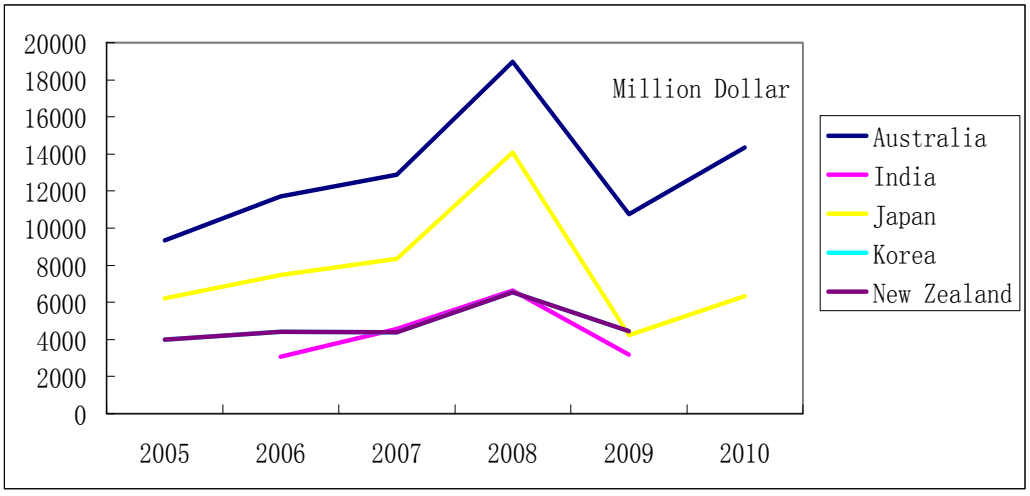
A note of coverage of EAS in our study is in order. EAS membership has evolved to formally include Russia and the United States in the 2011 meeting. However, this study leaves inclusion of these two economies to future studies. The primary basis for our choice is the record of policy activism among those EAS members that seek to deepen energy trade ties among them. Indeed, promotion of primary energy trade has yet to become a major agenda item for U.S. policy choice with economies in the Asian side of the Pacific. Interconnectivity of energy flows between Russia and the EAS economies under the study warrants a separate study of its own. For a similar reason, the study touches on India only when available statistics is available. Most fundamentally, our approach reflects a matter-of-fact belief in that the EAS framework can become more effectual in dealing with sector-specific challenges among its

members through solidifying its own existent trade policy programs. We emphasize that our approach by no means imply prejudicing future routes and choices of interactions within the forum.

1.1. Trade in Oil

The Association of Southeast Asian Nations (ASEAN) countries have abundant oil reserves. Traditionally, ASEAN oil exports flow to Northeast Asian markets of China, Japan, and South Korea. As indicated in Figure 1 below, in the more recent years, Australia emerged as the largest destination of ASEAN's exported oil. Japan, Korea and New Zealand continue to be significant for ASEAN oil export, while India has also entered ASEAN's oil trade scene. Obviously, the upward movement in Australian and Japanese imports of ASEAN oil is an indication of demand in those economies in the wake of the recent round of world economic fluctuations.

Figure 1. Major ASEAN Oil Export Destinations except China, 2005-2010



Data sources: UNComtrade

China is both an oil importer from and exporter to other EAS economies. In terms of import (see Table 1), Australia has emerged as a significant source of supply to China.

Papua New Guinea, New Zealand, and Myanmar became exports of oil to China in 2010 as well. Traditional suppliers such as Malaysia, Indonesia, Brunei and Thailand maintained their activism in supplying the China market.

Table 1. Selected EAS Sources of China's Crude Oil Import, 2005-2010, in 10,000 tons

Import Source	2005	2006	2007	2008	2009	2010
Australia	23	40	46	90	157	287
Malaysia	35	11	50	89	223	208
Indonesia	409	212	228	139	323	139
Brunei	50	42	40	8	53	102
Vietnam	320	87	50	84	103	68
Thailand	119	115	110	77	61	23
Papua New Guinea	0	0	0	0	0	7
Myanmar	0	0	0	0	4	0

Data source: Tian Chunrong.

Table 2 offers a summary of China's crude oil export to selected EAS countries. As shown, China's crude oil export destinations diversified to include India for the first time in 2010.

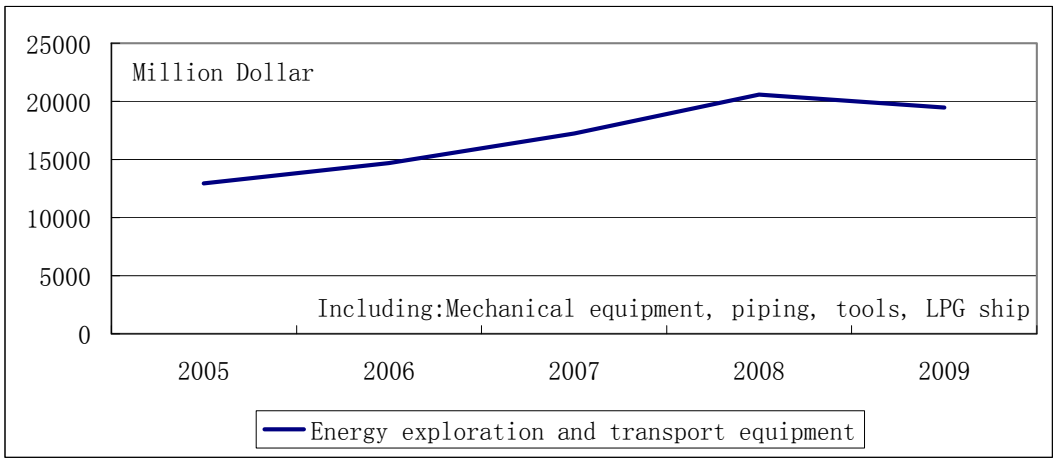
Table 2. Selected EAS Destinations of China's Crude oil Export, 2005-1020, in 10,000 tons

Export Destination	2005	2006	2007	2008	2009	2010
South Korea	206	175	107	65	163	61
Japan	95	86	46	117	74	61
United States	121	118	62	58	72	52
Thailand	6	1	14	5	24	24
Malaysia	59	15	0	16	4	12
Indonesia	162	104	35	26	9	8
Singapore	71	54	53	35	78	8
Australia	35	27	8	0	33	6
India	0	0	0	0	0	10

Source: Tian Chunrong.

Observation about the interconnected between China and ASEAN economies in energy should include attention to the role China plays in energy infrastructure investment and project development within ASEAN countries. In recent years, along with the implementation of "going abroad" program, Chinese enterprises have accelerated trade and investments in developing infrastructure development in energy projects within ASEAN economies. As can be seen in Figure 2, China's export to ASEAN of oil drilling equipments, oil and gas pipelines and liquefied gas vessels has been on the rise. It goes without saying that such trade is conducive to maintaining and enhancing energy production capacity of ASEAN economies.

Figure 2. China's Energy Exploration and Transport Equipment Exports to ASEAN



Source: UNComtrade

1.2. Trade in LNG

Before 2007, natural gas imported from Australia accounted for nearly 80% of the total import in the whole East Asia. In 2009, the amount of gas imported from Australia was about 774 million, still accounting for 62% of total gas import from East Asia.

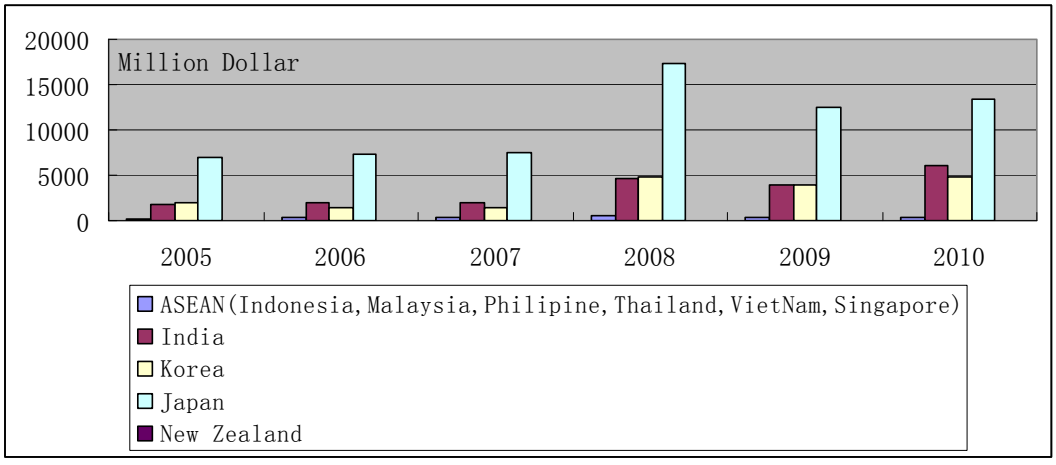
Due to the lack of gas transport infrastructure between China and ASEAN, China

and ASEAN gas trade has a long way to go in reaching its potential. At present, ASEAN is second behind Australia in exporting natural gas to China. Cross-border gas pipelines under construction or plan is expected to increase the share of ASEAN gas to the China market.

1.3. Trade in Coal

Australia is the one of the largest coal exporters in the world. The country is the main coal supplier of East Asia (except ASEAN). Japan is the largest coal importer of Australia in East Asia whose coal import from Australia was more than 15 billion dollars in 2008. India and Korea import about 5 billion dollars in recent years (Figure 4). Since 2009, China has become the net coal importer. Australia, Vietnam and Indonesia are the major coal exporters to China. There is a sharply increase of coal import from Australia in 2009,when the trade reached 4.89 billion in dollar terms, nearly 8 times as the trade in 2008. In 2010, China's coal import from Australia reached 5.44 billion dollars. New Zealand and ASEAN could satisfy the coal demand by domestic supply. The pattern of Australia being a key supplier of coal to the rest of Asian EAS countries is likely to continue.

Figure 4. Australia Coal Export to East Asia



Source: UNComtrade

1.4. Trade in Electricity

Cross-border trade in electricity is one feature, though often not prominently featured in general surveys, of China's pursuit of energy supply. For instance, Chinese import of electricity from Myanmar increased sharply in 2009. The import value was 239.9 thousand dollars in 2008. That value increased to 38.8 million dollars in 2009, an increase by 161.7%. This resulted largely from the entrance into full operation of the Ruili River hydropower station in the end of 2009. As background information, in 2006, China began investing in the Ruili River hydropower station in the border regions of the Myanmar. The project is the largest Chinese investment in Myanmar's Hydropower construction under a BOT (build - operate - transfer) mode.

Development of hydropower in the Greater Mekong Sub-region has a long history. As envisioned by such regional development promoting organizations as the Asian Development Bank, the countries of Cambodia, Laos, Myanmar, Thailand, Vietnam and China (its Yunnan Province and Guangxi Zhuang Autonomous Region), regional grid network interconnection is one effective way for addressing energy poverty that continues to hamper development potentials of the countries therein (Yu, 2003).

2. Is Trade Facilitation Promoting Energy Trade in EAS?

Several factors contribute to the intro-regional energy trade that is showing signs of a boom in the EAS region. Such factors include market demand, trade liberalization and trade facilitation policies. In the process of economic growth it's normal that energy demand is also increasing. The challenge is there must be sufficient infrastructure and facility in order to make potential demand becomes real demand. The energy consumption data and trade dada above show that energy supply both from domestic and international market has been provided in EAS. Therefore, the authors

think that it's necessary to analyze whether the energy trade increasing is promoted by the factor of trade facilitation including infrastructure improvement or not.

Among the Asian EAS member states, Regional Trade Arrangements (RTAs) have been proliferated in the wake of the Asian Financial Crisis in 1997-98. In addition to ASEAN–China, ASEAN-Japan and ASEAN-Korea FTA, there are other bilateral FTAs such as China-New Zealand, ASEAN-Australia-New Zealand, ASEAN-India, Korea-India, and so on. Every FTA is a stage of the market integration. FTAs are benefiting for promoting energy and relative product trade by reducing and simplifying the custom procedures, improving infrastructure and transparency, and promote the economic cooperation about energy exploration and extraction cooperation projects. More and more dialogues within the FTA implement progress also help the related countries improving energy trade efficiency. All these have laid the solid basis for the preliminary integration of regional energy market.

As expected by related countries in EAS, the establishment and implement of 3 ASEAN+1 FTAs are promoting the trade among the area. In spite of the global economic downturn, trade in energy among ASEAN and the three Northeast Asian countries has remained robust. According to the BP Statistics Review of World Energy June 2010. Trade within these countries reached USD 413.8 billion in 2009, declining by only 15.5 per cent compared to USD 489.5 billion reported in 2008, registering a 27% share of total ASEAN trade last year. The 2009 value of total trade between ASEAN and its Plus Three Dialogue Partners was still higher than its pre-crisis level of USD 405.4 billion in 2007. Total flows of FDI from the three Northeast Asian countries into ASEAN were still strong with a slight decline of 1.3% from USD 8.4 billion in 2008 to USD 8.2 billion in 2009. Especially, ASEAN becomes the third biggest trade partner of China, surpassed Japan in 2009. Energy trade booming has made great contribution on trade booming between China and ASEAN. China's import ratio of energy and energy related products from ASEAN in the total import from ASEAN climbed to 3.3% in 2010 from 2.5% in 2009.

2.1. Effect of Tariff Reduction for Energy Trade

Tariff reduction is one of the most important contents in FTA. Taking China-ASEAN FTA as an example: Trade facilitation arrangements between China and ASEAN include two parts phases of tariff reduction: early harvest tax reduction and comprehensive tariff reduction, which is follow upon implementation of the first phase. When we kook at the tariff reduction tables for main energy products, we can see that the applicable tariffs were 0 before the FTA established, such as crude oil, anthracite and other coal, LNG and electricity etc. Just for fuel oil from ASEAN to China, the tariff has declined to 5% from 20%; for aviation turbine fuel from ASEAN to China the tariff has declined to 5% from 14%. However, considered the formal implementation of China-ASEAN FTA started on January1 2010, the conclusion is that tariff reduction has made no sense for intro-regional energy trade booming. That means in practice trade facilitation countermeasures play a very important role for energy trade in the EAS region. It is reasonable to believe that as the tariff levels fell over in recent years, governments have turned their focus on to non-tariff barriers (NTB) and other “non-traditional” sources of trade costs. Measures to facilitate trade and reduce such costs have therefore become a key priority for policymakers and international development institutions (World Bank IEG, 2006). The question is if the process of development ASEAN RTA facilitates the integration of regional energy market?

2.2. How Does Trade Facilitation Promote Energy Trade In EAS?

WTO, UNCTAD, UN/ECE and APEC have their different definitions on trade facilitation. The definitions from WTO and UNCTAD are mainly focusing on the process of international trade. APEC have more broad understanding such as "Adopting a more effective way to standardize the trade course and to improve the variables that have impact on the transaction process, such as customs procedures, transport formalities, insurance and the standardization of services, thus to achieve the purpose of reducing the trade costs. "This paper adopt the definition of APEC and

refers infrastructure improvement as the part of trade facilitation.

That means trade facilitation is a very broad and complicated concept that includes all the efforts that during the cross-border movement of goods. For example how to reduce unnecessary procedures and controls? This is an important question because under the premise that the realization of legitimate management objectives is ensured, to reduce the associated costs and maximize the efficiency? The detailed contents of trade facilitation are covering many parts: transparency of laws and regulations, infrastructure improvement, the customs procedures; standards and harmonization; business mobility and e-commerce etc. For energy trade, huge energy investment and infrastructure improvement are playing critical roles.

UNCTAD estimates that the average customs transaction involves 20-30 different parties, 40 documents, 200 data elements (30 of which are repeated at least 30 times) and the re-keying of 60-70% of all data at least once.

2.2.1. Policy Dialogue and Coordinating

APT (ASEAN Plus Three) cooperation in energy has witnessed good progress. At the 13th APT Summit in October 2010 in Hanoi, Vietnam,oi the Leaders supported the on-going efforts to develop the "3rd ASEAN Energy Demand Outlook" and welcomed APT initiatives in specific fields such as energy security and oil stockpiling; natural gas and oil market; new and renewable energy; and energy efficiency and conservation, including the APT Oil Stockpiling Roadmap and APT Joint Workshop on Effective Energy Efficiency and Conservation Policy Guidelines, which was held in June 2010.

2.2.2. Energy Infrastructure Investment and Cooperation Promoting Energy Trade

Actually， ASEAN countries have already initiated a comprehensive set of cooperation with China, Japan and Korea on energy exploration and production. The China-ASEAN FTA provides a strong foundation for the continued expansion of regional economic, trade and investment activity. In recent years, with the deepening

cooperation of China and ASEAN, the energy investment from China to ASEAN increased rapidly. A lot of projects have produced oil, gas, coal, electricity etc which have been exported to China or other EAS countries. This is a very important reason for energy trade and energy related products trade booming. Some bi-lateral co-operations are as following:

In Indonesia, Chinese energy investment reached US$9.47 billion in 2002. In 2006 China Huadian Corp. and PT PLN pumped US$2 billion into building an electricity generation plant on South Sumatra Island. CNOOC also paid for a 16.96 per cent share of the Tangguh Project which will produce 2.6 million LNG yearly for 25 years. Malaysia's PETRONAS and China's oil companies are jointly exploring a block in Indonesia. China's energy companies have invested a few projects in Malaysia. The China National Electric Equipment Corp. was contracted to build a coal electricity generation in Sabah and the Three Gorges General Corp. was authorized to construct a hydroelectricity plant in Sarawak.

China's energy companies in Philippine become active in recent years. In 2008, CNOOC was awarded a service contract by PNOC, and the Shenhua Group promised to offer 1.82 million tons of coal under a renewed contract with NAPOCOR. In 2009, China's State Grid invested US$3.9 billion to manage the Philippines National Power Transmission System for a period of 25 years (Li Tao and Liu Zhi, 2006). The booming Vietnamese energy market appears attractive to Chinese energy companies which have invested over US$6 billion in Vietnam since 2006. China's Harbin Electricity and Vietnam's Cam Pha Thermal Electricity are jointly financing US$348 million to build a thermal electricity generation plant in Quang Ninh province (Vietnam National Coal-Mineral Industries Holding Limited Company 2011, <http://vinacomin.net.vn/en.html>). CNOOC and Petrovietnam are cooperating 45 companies to explore oil and natural gas in the Beibu Gulf (CNOOC,2006, <http://www.cnooc.com.cn/>). China's Southern Grid and Vietnam Coal & Mining Group will build a US$1.1 billion thermal electricity plant in Vinh Tan, Binh Thuan

province(Jin Yang,2010). US$4.5 billion will also be given by SINOPEC and Petrolimex to build the Nha Trang refinery(2008,<http://www.icis.com>).

In Myanmar China had invested in 28 projects, with the total investment to US$1.331 billion(Myanmar government, 2008). Energy cooperation between the two countries focuses on offshore energy resources and the China-Myanmar oil and gas pipelines. The total offshore E&P area for CNPC, SINOPEC and CNOOC is about 10 square kilometers. The route for the oil and gas pipeline runs from Kyaukryu Island to Mandalay, then to Ruili and Kunming. The pipeline will be 900 kilometers and pump 20 million barrels of crude oil to China, which amounts to a quarter of oil shipped via the Straits of Malacca. The pipeline which capacity is designed about 40 million barrels per day started to construct in 2010.

China and ASEAN have also developed widely cooperation on power grid interconnection and joint investment on power plants or hydropower station. China established the power forum and power grid interconnection & trade expert group, and signed the inter-government agreement on power interconnection and trade. Until the end of 2010, China have completed the 28 kw Plunglung station and 60 kw Ruili River station with the cooperation of the Myanmar, Sambor and stung Cheay Arenge station are ongoing under the cooperation of China and Cambodia. The Cheay Arenge station is planed 3.26 million kw accounting 63.3% of the total hydropower volume in Cambodia. China Southern Grid participated into investment in Vietnam's largest power project, Yongxing coal-fired thermal power plants.

Very naturally, all those huge energy investment projects have promoted the trade in energy including oil, gas, electricity etc, and related products including energy related products such as pipes, equipments and downstream products.

2.2.3. Improved Trade Facilities and Logistic Channel

2.2.3.1. The Trade Facilitation between China and ASEAN

Trade facilitation is an important part in China-ASEAN Cooperation. Both China and ASEAN have done amount of works to promote trade facilitation:

First, China and ASEAN countries have poured huge human and material resources in the infrastructure construction, such as of Kunming - Bangkok Road, and Kunming - Yangon Railway, improving the railway between China's Yunnan province and Vietnam to form the transport network from Kunming to Singapore. China and ASEAN also strengthen the development of the Mekong sub-region as well as encouraging the improvement of the Lancang-Mekong River navigation capabilities. Meanwhile, the Chinese Ministry of Communications also plans to sign with ASEAN, "China - ASEAN Framework Agreement on maritime transport cooperation" to strengthen bilateral maritime cooperation (Wu Chaoyang, 2011).

Second, in the field of customs inspection and quarantine cooperation, China and ASEAN started one-stop service test sites in some key border crossings, and strove to achieve "one declaration, one inspection, one release " management model. China and ASEAN countries Customs also proposed to establish an electronic verification system, using modern means to improve trade efficiency and facilitate customs clearance.

Third, in the labor-force and human resource exchanges, China and ASEAN have also simplified the visa application procedures. For example, the foreigners coming to China to discuss trade and investment, can apply for visas on arrival in many cities. China implements short-stay visa-free policy to foreigners coming from Singapore, Brunei and other members. In addition, APEC Business Travel Card holders can enter to China to conduct business without applying for a visa.

Fourth, China and ASEAN are committed to advance the standards with international standards. At present, the proportion of the China use of international standards has reached 46%. ASEAN countries have adopted international standards and the proportion is rising. China and ASEAN countries have actively participated in

standards assessment activities in international and regional organizations to create conditions to facilitate bilateral trade.

Fifth, China and ASEAN countries customs adopted the "China - Nanning-ASEAN trade facilitation" mechanism. The initiative of “China-Nanning-ASEAN trade facilitation” mechanism is focusing on the process of WTO negotiations. Some countries proposed the establishment of national trade facilitation commission, and actively promote the process of national trade facilitation.

All of those measures have very positive impacts on energy trade between China and ASEAN. The trade process becomes smoother and efficiency improves higher and higher so that the energy trade volume is expending step by step. Meanwhile, complementary on energy between China and ASEAN is also embodying gradually.

2.2.3.2. The Trade Facilitation among ASEAN Countries

After signed a series of FTAs with other countries, ASEAN countries has to improve trade facilitation in order to meet with new trade situation. Especially, on the aspect of energy, ASEAN countries need to seek for multilateral cooperation and make energy as priority.

ASEAN Trade Repository

ASEAN is working towards the establishment of an ASEAN Trade Repository (ATR) by 2015 that would serve as a gateway of regulatory information at regional and national levels(2009,<http://www.cafta.org.cn>). The ATR, among others will carry information on tariff nomenclature; preferential tariffs offered under the ASEAN Trade in Goods Agreement (ATIGA); Rules of Origin; non-tariff measures; national trade and customs laws and rules; documentary requirements and list of authorized traders of Member States. Once established and fully functioning, the ATR and information will be accessible through the internet to business agencies like exporters, importers, traders, as well as government agencies and the interested public and researchers. Currently, ASEAN is developing the design and mechanism of the ATR.

ASEAN Single Window

With a view to achieve a more expeditious clearance and release of containerized shipments by Customs authorities, AMS are developing the ASEAN Single Window (ASW) which would provide an integrated platform of partnership among government agencies and end-users in the movement of goods across AMS. The AMS are also engaged in the process of continuously reforming and enhancing the ASEAN Rules of Origin (ROO) to respond to changes in global production processes, including making necessary adjustments.

The objective is to make the ROO more trade facilitative and, at least, as liberal as those contained in the ASEAN FTA arrangements. The revision of the ROO undertaken to this date has introduced other origin criteria as an alternative to the long-standing Regional Value Content (RVC) of 40%. This provides economic operators a wider option of co-equal methods of achieving ASEAN origin status for regionally traded products. AMS are also considering the establishment of the Self Certification scheme for the declaration of origin, which is a priority effort as envisaged in the ASEAN Economic Community (AEC) building process. The self certification scheme provides "certified economic operators" like exporters, Traders and manufacturers who have demonstrated their capacity to comply with the origin requirements to self certify the originating status of goods in replacement of presenting a Certificate of Origin issued by the issuing government authority.

2.2.4. Port Construction

Australia is important for China energy safety, as the main gas and coal resource supplier for China. The role of port in Australia becomes more and more important for energy trade between China and Australia. Australia has maintained its global leading coal exporter position. China and other Asian countries' surging demand, leading to unprecedented prosperity in NSW coal export industry Accompanied with coal exports booming, problems of transportation bottlenecks come up. In order to meet export

demand from coalmining companies, the proposal of New South Wales (NSW) coal port expansion and renovation work has put on the schedule. According to relevant information, NSW PWCS Ports Corporation has two subsidiary ports, one of the world's largest coal export port of Newcastle, the other is Port Kembla. The current Newcastle port capacity is about 1.02 million tons / year, which has been upgraded to 113 million tons / year as the expansion project completed in the fourth quarter of 2009(2010,http://www.miningweekly.com). Australia Newcastle Coal Company and other major coalmining companies plan to build a new coal port on the second half of 2009. In the future, the trade facilitation between China and Australia can be the elementary concern by both sides. It can also be an important part of and contribute to the energy market integration (EMI) in the summit region.

3. Main Challenges

Although in the EAS region there is a substantial progress of trade facilitation which promoted energy trade and EMI, the related countries are still faced with challenges.

First, in many countries domestic oil and gas pipelines need to be constructed and improved. For example in Indonesia, Myanmar, Thailand, and Vietnam, the potential for pipeline construction remains very high. Currently, Vietnam’s growing demand for gas is met by LPG imports from Indonesia, Malaysia and Thailand. Indonesia’s success in developing a natural gas pipeline network will be dependent on the effective integration of field development activities in Sumatra and Kalimantan. The current situation poses a great challenge all countries in the region to achieve the goal of realizing an integrated energy market because of diversity among the nations.

Second, domestic EMI is a very essential basis for the integrated market in EAS.

It has distinct policies which are usually based on the sovereign law of the country. It's very difficult to imagine that the related countries will be interested and able to promote regional integrated market without domestic integrated market. At the same time, dynamic domestic market and regional market may impact each other. At least domestic EMI will impact on energy export to other countries. Energy markets in majority countries of the region are relatively immature, with strict import barriers and tight regulations. Cross subsidies in energy price and entangled energy tax systems can also deter creation of a competitive energy market and an influx of foreign investment capital.

Third, it's obvious that trade facilitation measures in all countries are still not enough for EMI. In resent years ASEAN becomes the opened and positive economic entity in Asia. At the same time, it's very obvious trade facilitation is still need to be improved in many aspects, such as transparency of laws and regulations, infrastructure improvement, capacity building, efficiency of custom and inspection procedure, business personnel movement etc.

Fourth, national energy policies can also impact on energy trading particularly, and obviously, those requiring self-sufficiency or diversity in energy supply. Big economic entities, such as China, Japan, South Korea, India and Indonesia, are seeking their energy security by multilateral approaches(Doh Hyun-jae ,2003). To some extent it seems that they are easier to become competitors in stead of cooperators. How to facilitate their negative behavior in the regional energy market also is a headache problem.

Fifth, lack of investment will be the main bottleneck both for trade facilitation and EMI. Improvement of trade facilitation and progress of EMI need a lot of investment both for soft projects and hard projects. While many energy cooperation schemes, such as oil and natural gas development projects and interconnection of electricity grids, involve enormous investment and the risks of investment are also high due to political tensions in the region as well as institutional impediments. It's relatively easier to

construct domestic or bilateral energy projects but more difficult to construct multilateral cross border energy project because investment scale would be too big and negotiation would be too complex. Meanwhile, most of ASEAN members are developing countries and some of them are least developed and seriously lack of capital. That‘s why the multilateral regional financing approaches should be explored and established.

4. Case Study

At present integration of energy market in the EAS region is promoting and embodying by intro-regional energy trade on one hand, on the other hand the networks construction of crude oil and natural gas pipelines and power grids are the most significant contents which could be on behalf of a part of integration promoted by infrastructure improvement which is also belonging to the scope of trade facilitation.

4.1. Case study 1: ASEAN GAS GRID

On the basis of domestic gas pipelines the network construction within the countries in the summit region also started and has become the most typical case for EMI.

The first cross-border gas pipeline in ASEAN exports gas from Malaysia to Singapore and was commissioned in 1991. Then several regional gas pipelines have been completed and several more are in the process of design and construction or are envisaged. Myanmar-Thailand pipeline came into existence in late 1998. There are also pipelines such as Indonesia (West Natuna) to Singapore, Indonesia (South Sumatro) to Singapore etc. To date, Brunei Darussalam, Indonesia, Malaysia, Myanmar, Singapore and Vietnam have a total domestic gas pipeline network of around 9,200 km, including pipelines connecting gas fields and delivering gas from offshore fields to onshore receiving terminals. 11 bilateral connections have been established with a

total of 3,020 kilometers of pipeline connections making possible the transmission of gas molecules to and from ASCOPE Member Countries. Over 2,400 km of pipelines are under construction, and over 4,200 km are being planned within the next few years. Full interconnection of these pipelines, which is envisaged by ASEAN to be done by 2020, would see the creation of an interconnected gas grid throughout ASEAN (Asia Pacific Energy Research Centre,2009)

A Trans-ASEAN Gas Pipeline (TAGP) Master-plan has been prepared and this serves as the blue print of action in undertaking the gas pipeline project in the region. ASCOPE has likewise started working on developing the necessary regulatory framework such as open access, gas transit principle and gas specification harmonization aimed at facilitating the implementation of the TAGP Project. The TAGP Project is already taking its shape with the completed gas pipeline interconnections. The TAGP project envisages the creation of a trans-national pipeline network linking ASEAN's major gas production and utilization centre. Once realized the TAGP will have the potential of linking almost 80% of the ASEAN region's total gas reserves and will embody a far-reaching expression of the region's energy interdependence and long-standing interest in the coordination of energy activities.

Next step, cooperating with China and India，Myanmar is becoming the most potential gas supplier and some of important gas pipeline will be constructed. India has been pushing for an early agreement on the Myanmar-Bangladesh-India gas pipeline proposal. Sino-Myanmar Oil & Gas Pipeline is important energy import channel of China which design capacity of oil is 22 million tons per year and the annual transport capacity of natural gas is 12 billion cubic meter per year. (Asia Pacific Energy Research Centre,2009) This project has been constructed since June 2010.

South Korea and India are cooperating in Myanmar is deepening EMI in the region. South Korea's Daewoo International operates and owns 60 per cent of Myanmar's gas-rich A-1 block, in which India's Oil and Natural Gas Corp. Ltd. holds 20 per cent

stake, while GAIL India Ltd and Korea Gas Corp each hold 10 per cent. Daewoo's 100 per cent-owned A-3 block is close to A-1, which could hold 6.0 trillion cubic feet of recoverable gas.

4.2. Case study 2：ASEAN Power Grids (APG) and Electricity Trade with China

Currently, electricity is accessed by roughly 66% of the ASEAN member countries' population through grid power supply, stand-alone and distributed power generation systems. However, in each country the situation is quiet different. For example, in Cambodia electricity is not accessed by more than 85% rural area population. Electricity becomes a very important factor which could impact living standard, industries production, education for children, poverty reduction etc. That is why it becomes very urgent to make electricity interconnection and trade in the summit region. ASEAN Power Grids are not only providing electricity for the relevant countries but also becoming one of the most important platforms and parts for EMI.

4.2.1. ASEAN Power Grids (APG)

ASEAN countries have different power grids. While power grids of ASEAN 6 old members are more developed, ASEAN 4 new countries' grids technically are obsolete with unstable performance. There are many obstacles in integrating the power grid, especially technical issues. The unstable voltage, frequent power outages and unguaranteed power level at 220kV, etc. could seriously affect the overall performance of power grid. On the other hand, Regional electricity production grew at an average yearly rate of 8% from 1990 to 2005 and is projected to grow at 6.1% annually from 2005 to 2030. Enhancing electricity trade across borders, through integrating the national power grids of the ASEAN Member States, is expected to provide benefits of meeting the rising electricity demand and improving access to energy services.

The ASEAN Power Grid (APG) is a leading program towards ensuring regional energy security while promoting the efficient utilization and sharing of resources. To

pursue the program, ASEAN adopts a strategy that encourages interconnections of 15 identified projects, first on cross-border bilateral terms, then gradually expand to sub-regional basis and, finally to a totally integrated Southeast Asian power grid system. Currently, the APG is in progress with four on-going interconnection projects and additional 11 projects are planned for interconnection in 2015(APAEC,2004). The investment requirement of the APG is estimated at USD 5.9 billion. A potential savings of about USD 662 million dollars in new investment and operating costs is estimated resulting from the proposed interconnection projects.

At present, there are three electricity interconnection routes lay through ASEAN: Thailand-Malaysia, Malaysia-Singapore, and Thailand-Lao. Several of proposed electricity interconnections those have substantial impact to ASEAN member countries of Thailand and Lao PDR under the ASEAN framework are designed for the capacity of 500 KV. Another major power transmission line proposed for the Greater Mekong is the one contained in the ASEAN plan between Myanmar and Thailand.

The APG also adds strength to the regional EMI and economic integration. Interconnected networks can provide countries with abundant natural resources but with relative low requirement for income generation from surplus electricity power. In contract, countries with huge power demand can tackle the problem of electricity shortage due to seasonal utility price fluctuation. Thus, the establishment of new electrical plants can be substituted by cross-border power transmission. At the same time, unnecessary and ineffective plants will be reduced and thus, make the Power Grid more efficient, cost saving and benefiting all countries in the region.

The grid interconnection between the countries in the region will bring huge economic efficiency to both investors and users, creating opportunities to expand power market, stimulate investment and trade, and greatly contribute to the each country’s energy security, as well as economic growth. In the near future, ASEAN will encourage small regions to cooperate to establish interconnect sub-regional power grid, after 2020, it will be expanded to all countries in the region.

Much of the rationale for enhanced interconnections in the Greater Mekong Sub-region are covering the exploration of hydro-power from Lao PDR and China's Yunnan province's exporting sectors to Vietnam and Thailand's logistic centers as well as the development of hydropower in Myanmar which is designed to export electricity to Thailand(Edvard Baardsen,2008). However, there are a lot of disputes on hydro-power construction which are mainly focusing on ecological and environmental impacts and immigrants issues

4.2.2. The Electricity Trade between China and ASEAN is Promoting APG+

In recent years China has jointed both power plants construction in those Southeast Asian countries that demand and welcomed some investments. Moreover, China has pursued cross-border electricity trade with those ASEAN countries where it is feasible to do so. That means China's has already been deeply involved in the process of regional electricity market integration on one hand. On the other hand China is also promoting the APG forward to APG + China and so on. China is playing a very important constructive role in the region. Regarding China's impact, it's very easy to see from the case of Vietnam and Laos.

Vietnam has joined ASEAN power grid for a long time, but mainly connected the grid with China, Laos, and Cambodia. Cambodia has potential in hydropower development, estimated at over 10,000 MW. Sub-regional energy integration and ASEAN regional grid help Vietnam to have better energy security. China's Yunnan Power Grid (YPG) is continuously strengthening cooperation with ASEAN countries. Electric power becomes a new growth point of Yunnan –ASEAN trade. YPG has built up 6 lines including two high voltage lines and four channels to transmit electricity to Vietnam. In the coming years, power transmitted from YPG to Vietnam would show rapid growth.

The electricity cooperation between Yunnan and Laos has also presented a rapid development in recent years. YPG and the northern Lao grid interconnected through a

115 kilovolt transmission line. As power interconnection projects has launched, YPG has undertaken the power transmission project in Laos. It is also the first offshore general contracting project for this corporation. As Yunnan's power producing capacity and market share continues to expand, it is becoming possible to supply power to other ASEAN countries so that the Yunnan-ASEAN cooperation will be deepened.

Being as major trade partner with China, ASEAN member countries draw massive Chinese investors' attention to electricity productions. China Guodian Corporation has cooperated with ASEAN and carried out a series of electricity projects with Vietnam, Laos, Myanmar, Thailand, and Cambodia. China Guodian has worked with Vietnam National Coal Corporation to jointly build a thermal power plant in Chongzuo, Guangxi. Chinese side has invested about 6.8 billion RMB in the project. The thermal power plant will enhance the industrial development in the northern part of Vietnam and play a significant supporting role. China Guodian has invested 5 billion RMB to build three power plants in Indonesia.

China Southern Power Grid (SPG) has also increased its investment in the ASEAN countries. Since 2004, SPG has constructed three 110-kv power lines to Vietnam. In 2006, the power grid connection between China and Vietnam was put into operation, whereby electricity from Yunnan was transferred to six provinces in Vietnam via a 220-kv power line. By the end of March 2010, China SPG had transferred 1.84 billion kilowatt hours of electricity to Vietnam via the four power lines which generated a sales volume of 80 million US dollars.

This case shows that the EMI between China and ASEAN at least could be reflected on three levels: electricity trade, power plants construction, and power plants and grids operation. In the process of project implementation, trade facilitation measures, especially infrastructure improvement is most needed and critical. Meanwhile, if the related countries are planning to go forward deepening integration of energy market, huge investment and applicable financial approaches would be priority which has to be emphasized.

5. Policy Implication

Integrating energy markets means opening-up and liberalizing the market for energy resources and are characterized by interconnections across states, free and open trade, secure and transparent investment frameworks, clear price signals, market transparency, and effective competition. In order to achieve goals above, the related foundational policies should be considered:

5.1. Consensus to Promote EMI in EAS Region by the Approach of Trade Facilitation is needed for all countries.

At present both trade facilitation and energy infrastructure are urgent to be improved in many countries. Governmental cooperation will rely on the consensus. There is still no a consensus for promoting EMI in EAS without which it would be difficult to go forward. It is no doubt the integrated market can enhance trade, boost infrastructure project, and compromise risk of energy market fluctuation. It's strongly recommend that all countries in the region should formulate the consensus to promote EMI by trade facilitation and to get benefit.

5.2. Institutionalizing a Regional Energy Cooperation Framework

In EAS, concerted energy strategies are absent due to the lack of energy cooperation mechanism in the region. Related countries have not garnered a position internationally that can match its amount of energy imports. Different legal and institutional system among the countries should be harmonized and transparency of laws and regulations should be improved so as to support the expansion of energy trade in the region. This is also important content of trade facilitation. The critical point is that Asian countries should institutionalize an energy policy cooperation framework. Such a framework should be modeled on the International Energy Agency (IEA),

coordinate the energy policies of member countries and establish "coordinated emergency response measures". A regional energy cooperation institution needs not to take a physical form, but at least it should be realized functionally in the form of policy cooperation. The "Energy Partnership" declared by the ASEAN+3 energy ministers in 2004 is a first step and should be nurtured. Institutionalizing Regional Energy Cooperation would be the best way to enhance the inter-regional trade, making the energy supply multiple and stable.

5.3. To Explore and Establish Multilateral and Applicable Financing Approaches

There should be relevant financial institutions those being as major fund-raising institutions in East Asian Energy Market Integration Action. The first applicable approach could be the regional infrastructure fund. ADB has acted for ASEAN infrastructure construction fund which will provide a part of capital contributing to EMI. ASEAN-China Investment Cooperation Fund is another positive action which is amounted to 10 billion USD. The second applicable approach could be the regional development banks. The proposal of establishing Northeast Asia Bank of Cooperation and Development Bank (NEABCD) has been provided 20 years. Now it's time to act. Right now there are a lot of cross border projects of large scale in Northeast Asia and its financing requirements are very huge. It's predicted in next thirty years, the upgrading and renovation of current energy infrastructure in the Far East Area of Russia at least need 150 billion dollar investment[1]. ADB focuses on the operation of the impoverished area of Southeast and Central Asia, the investment on NEA region accounts for 4% of ADB total investment. NEABCD can become a complementation and cooperate with the current multilateral financial institutions. The Establishing the NEABCD could promote the EMI in the Region, meeting the large financial

[1] According to Cho and Katz, required net foreign capital inflow to Northeast Asia for infrastructure development is estimated to reach at 7.5 billion dollars a year for the next 15 or 20 years. This estimated amount is beyond the region's means, and existing tools like international financial institutions (notably, IBRD, ADB and EBRD), private direct investment in commercially viable infrastructure projects, and bilateral, government-to-government assistance cannot adequately cover those needs.

requirements in infrastructure and the requirement of sustainable development. The proposal of establishing Southeast Asia Bank of Cooperation and Development (SEABCD) also could be considered.

5.4. Taking the Advantage of Existing RTA Platforms to Promote EMI

At present ASEAN becomes the hub of regional economic integration. There are a number of RTAs which are containing the arrangement of trade facilitation. No matter how difficult to promote trade facilitation, at least a series of measures on trade facilitation has been listed in the agreement and needed for implementation. The more trade facilitation are implementing, the more progress of EMI. RTAs have provided institutional platforms for the energy trade and investment among the countries in EAS including the equipment trade on the infrastructure and facilitated the infrastructure investment including energy distribution channel, the power grid connection and power station construction. Taking the advantage of existing trade agreement requires more regulation transparency for both enterprises and government.

5.5. Improving the Quality of Energy Data, Statistics and Enhancing Information Exchange and Dialogue

Asian countries should strengthen their efforts to improve the quality and timeliness of energy data and statistics aiming at improving transparency in the energy market. Developed countries, such as Japan and Korea, should provide expertise to assist developing countries in capacity-building through proper channels. Enhancing dialogue between Asian energy consumers and producers is also very important. Major consuming countries should together to enhance dialogue with producing countries. Government dialogue should focus on removing of market bottlenecks such as investment and market substitution. In the dialogue, EAS countries, which are mostly energy importers, should take a common position as possible, based on consumers' interest vis-a-vis energy producers.

5.6. Improve Infrastructure and Creating Pre-conditions for EMI

Infrastructure such as pipelines and LNG facilities should be accelerated based on sound fundraising structure that allow cooperation between governments and the private sector. In particular, cross-border cooperation in energy projects should be promoted and financed. Such projects could include cross-border pipelines for oil or natural gas and joint development of oil and natural gas. Development and dissemination of technology on natural gas utilization, such as combined heat and electricity generation, and gas-to-liquid conversion, should be encouraged. Governments should provide sound public support for the commercial conducting of such projects, bearing in mind the necessity of practicality. Governments should show strong political leadership by acting as principles of promoting energy economics of scale, while guarding against impulses of economic nationalism.

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