

ASEAN Energy Cooperation: Its Impact on Thailand

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Abstract

This article gives an overview of the ASEAN energy sector and ASEAN energy-related cooperation. Energy cooperation is an important factor influencing the success of the ASEAN Economic Community. It is expected that such cooperation will bring various benefits to Thailand. These potential benefits include a reduction in energy costs, increased security of the energy supply, and an opportunity to become a production and trading hub for ethanol in this region. However, the ASEAN countries generally put more emphasis on their own national agendas than on cooperation. In addition, the development of the ASEAN Power Grid and Trans-ASEAN Gas Pipeline has necessitated a large investment requirement and been forced to contend with some technical difficulties. Thus, the progress of strengthening energy cooperation has been slow.

Keywords: ASEAN, Energy Cooperation, ASEAN Power Grid, Trans-ASEAN Gas Pipeline, renewable energy

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1. Introduction

In October 2003, ASEAN leaders signed the Declaration of ASEAN Concord II (Bali Concord II) in order to establish an ASEAN Community by 2020. Later, in January 2007, the ASEAN leaders agreed to accelerate the establishment of ASEAN Community to be within 2015. The ASEAN Community has three pillars: the ASEAN Political and Security Community (ASC), the ASEAN Economic Community (AEC), and the ASEAN Socio-Cultural Community (ASCC). The AEC aims to have a single market and single production base with a free flow of goods, services, investment and skilled labor and a freer flow of capital.

Energy cooperation is also an important factor influencing the success of the ASEAN Economic Community. It will enhance energy security and sustainability within the ASEAN region. The ASEAN Plan of Action For Energy Cooperation 2010-2015 (APAEC 2010-2015) declares the main objective as being to move ASEAN towards becoming a cleaner, more efficient and sustainable ASEAN Energy Community. This cooperation will incur various benefits for ASEAN countries, including Thailand.

This article gives an overview of the ASEAN Energy Sector in Section Two and Energy Cooperation in Section Three. The potential impact of the energy cooperation on Thailand is discussed in Section Four. Finally, concluding remarks are made in the last section.

2. Overview of the ASEAN Energy Sector

Primary energy consumption in ASEAN grew by 3.6% per year during the period of

1990-2007 (ACE, 2011). In 2009, ASEAN's total primary energy consumption was 437.8 million tonnes of oil equivalent (MTOE). Oil is the major energy source in ASEAN, its share of primary energy consumption was 41.91% in 2009 (Table 1). Natural gas had the second largest share, 22.68% in 2009, while coal recorded the third largest share, 18.46%. Among these energy sources, coal had the highest growth rate at 13.0% per year during the period of 1990-2007 (ACE, 2011) because the installation of coal-fired power plants was able to reduce the cost of power generation in the region.

ASEAN's final energy consumption grew by 4.2% per year during the period of 1990-2007 (ACE, 2011). In 2009, ASEAN's total final energy consumption was 294.8 million tonnes of oil equivalent (MTOE). The share of oil in final energy consumption was 51.3% in 2009 (Table 2).

Among ASEAN countries, Indonesia has been the largest energy user due to it possessing the biggest population with 247 million people in 2012. In 2009, Indonesia consumed 35.2% of ASEAN's primary energy consumption, and 37.4% of ASEAN's final energy consumption. By sector, Indonesia's industry sector consumed 47.7%, and its transport sector 28.5% of its final energy consumption in 2009 (ERIA, 2012).

Although Thailand's population (with 67 million people) is the fourth largest in ASEAN (smaller than the populations of Indonesia, Philippines, and Vietnam), Thailand has been the second largest energy user in ASEAN due to its economic development level. In 2009, Thailand consumed 26.7% of ASEAN's primary energy consumption, and 24.8% of ASEAN's final

energy consumption. By sector, Thailand's industry sector consumed 33.3 %, and its transport sector 26.1% of its final energy consumption in 2009 (ERIA, 2012).

Malaysia, with a population of only 29 million people, has been the third largest energy user in ASEAN due to its high per capita income. In 2009, Malaysia consumed 12.7% of ASEAN's primary energy consumption, and 12.9% of ASEAN's final energy consumption. By sector, Malaysia's industry sector consumed 31.8%, and its transport sector 42.1% of its final energy consumption in 2009 (ERIA, 2012).

In Indonesia, Brunei, and Malaysia, the prices of gasoline and diesel are controlled and heavily subsidized. Those prices are lower than world market rates (GIZ, 2013 and Kojima, 2013). In Thailand, diesel prices are subsidized. The price is below the price level of the United States. However, the Thai government imposes taxes on gasoline and Thailand's gasoline price is higher than the level of the United States (GIZ, 2013).

In terms of energy supply, Southeast Asia has been an important producer of fossil

fuels (coal, gas, and oil). In 2011, Southeast Asia produced 348 million tonnes of coal equivalent (MTCE), constituting about 6.3% of world production. It is of particular note that Indonesia has been one of the world's major producers and exporters of coal. During the period of 2000-2011 Indonesia's coal production increased by 15% per year. In 2011, Indonesia's coal exports go to china (31%), India (22%), Korea (21%), Japan (11%), and Chinese Taipei (8%) (IEA, 2013).

In 2011, Southeast Asia produced 203 billion cubic metres (bcm) of gas, about 6% of world production. In this region the major gas producers are Indonesia, Malaysia and Thailand, whereas gas exporters are Indonesia, Malaysia, Myanmar and Brunei (IEA, 2013)

In 2012, Southeast Asia produced 2,503 thousand barrels of oil per day (kb/d), about 2.9% of world production. Indonesia has been the largest oil producer (36%) in this region, having become a net importer of oil since 2004. IEA (2013) projected that by the end of this decade all ASEAN countries would be net oil importers.

Table 1 ASEAN Primary Energy Consumption in 2009

unit: MTOE

	Coal	Oil	Natural gas	Hydro	Geothermal	Others	Total
Brunei	0	0.7	2.4	0	0	0	3.1
Cambodia	0.1	1.4	0	0	0	0.1	1.6
Indonesia	37	67.6	24.8	1	16	7.6	154
Lao PDR	0.1	0.6	0	0.7	0	-0.5	1
Malaysia	10.6	21.5	22.8	0.6	0	-0.1	55.4
Myanmar	0.1	2.2	3.2	0.5	0	0.2	6.1
Philippines	6.9	15.4	3.4	0.9	11.7	2.4	40.7
Singapore	0	12.6	7.1	0	0	0	19.7
Thailand	14.6	46	26.6	0.6	0	29.2	117

Table 1 ASEAN Primary Energy Consumption in 2009 (cont.)

unit: MTOE

	Coal	Oil	Natural gas	Hydro	Geothermal	Others	Total
Viet Nam	11.4	15.5	9	2.4	0	0.7	39.1
Total	80.8	183.5	99.3	6.7	27.7	39.6	437.8
Total (%)	18.46	41.91	22.68	1.53	6.33	9.05	100.00

Source: ERIA (2012), and Thailand's Ministry of Energy.

Table 2 ASEAN Final Energy Consumption in 2009

unit: MTOE

	Coal	Oil	Natural gas	Electricity	Heat	Others	Total
Brunei	0	0.6	0.8	0.3	0	0	1.7
Cambodia	0.1	1.0	0	0.2	0	0	1.3
Indonesia	19.8	55.7	16.3	11.6	0	6.9	110.3
Lao PDR	0.1	0.6	0	0.2	0	0.1	1
Malaysia	1.6	21.9	6.1	8.3	0	0.1	38
Myanmar	0.1	1.1	2	0.4	0	0.3	4
Philippines	1.6	13.5	0.1	4.6	0	1.8	21.6
Singapore	0	10.4	0.6	3.1	0	0	14.1
Thailand	7.9	32.6	10.4	11.6	0	10.5	73
Viet Nam	8.8	13.8	0.6	6.6	0	0	29.8
Total	40	151.2	36.9	46.9	0	19.7	294.8
Total (%)	13.6	51.3	12.5	15.9	0	6.7	100

Source: ERIA (2012)

3. ASEAN Energy Cooperation

In December 1997 ASEAN leaders adopted the ASEAN Vision 2020. With respect to the energy sector, it called for cooperation in order to establish interconnecting arrangements for electricity and natural gas within the region through the ASEAN Power Grid and Trans-ASEAN Gas Pipeline, in addition to promoting cooperation in energy efficiency and conservation, together with the development of new and renewable energy resources.

In order to make the ASEAN Vision 2020 a reality, there are three consecutive strategic plans of action: the ASEAN Plan of Action for Energy Cooperation (APAEC) 1999-2004, APAEC 2004-2009, and APAEC 2010-2015. The APAEC 2010-2015 includes seven program areas: 1) ASEAN Power Grid, 2) Trans-ASEAN Gas Pipeline, 3) Coal and Clean Coal Technology, 4) Energy Efficiency and Conservation, 5) Renewable Energy, 6) Regional Energy Policy and Planning, and 7) Civilian Nuclear Energy.

To help ensure the coordination of related activities, ASEAN established the ASEAN Centre for Energy (ACE) in 1999. The center has been active in sharing and exchanging information on the regional energy sector, together with cooperation on regional energy policy analysis, planning and training.

3.1 ASEAN Power Grid (APG)

In 1997, under the ASEAN Vision 2020, the APG is mandated as being the flagship program of the energy cooperation. ASEAN gives high priority to both developing an efficient and reliable electricity infrastructure and promoting electricity trade across borders through the APG. Under the APAEC 2010-2015, ASEAN planned to have 15 bilateral interconnection projects.

Due to high economic growth, the electricity demands of ASEAN members have increased rapidly. It is projected that demand will be 3-4 times the current level by 2030. However, on the supply side, the energy resource endowments of the ASEAN countries are diversified and unbalanced. While Indonesia and Malaysia have a large amount of coal, gas and oil reserves, Lao PDR and Viet Nam have plenty of hydropower.

According to the study of Chang and Li (2012) the uneven distribution of energy resource endowments and uneven demand of electricity across ASEAN countries, causes the development of APG to be necessary because it allows electricity trade across borders. Under a more open electricity trade regime, more development of hydropower and renewable energy for power generation is encouraged. Moreover, it reduces the cost of electricity in the region.

With regard to electricity access, ASEAN had an electrification rate of 78.7 percent in 2012. On the other hand, the population of ASEAN member countries living without electricity amounted to about 131 million in 2012 (ACE, 2013). The development of APG and electricity trade across borders will increase the electrification rate in the region, especially in rural areas.

However, the APG will take time to be successful because investment in power plants necessitates a substantial budget, and the existing transmission systems of ASEAN countries have different characteristics. Suthep Chimklai (2013) reported that, in 2013, ASEAN had five existing cross-border projects, four cross-border projects under construction and seven planned projects.

3.2 Trans-ASEAN Gas Pipeline (TAGP)

The TAGP aims to integrate ASEAN's gas fields and consumption centers. It also intends to link the gas pipeline infrastructure of the ASEAN countries and to transport gas across the borders of ASEAN countries. Currently, eight bilateral gas pipeline interconnection projects (approximately 2,300 km) are operating in ASEAN. Several more projects with approximately 4,500 km of pipeline are under construction.

The TAGP is an important infrastructure project because many of Southeast Asia's gas production fields are located far from consumption centers. However, due to the limitation of gas sources and large investment requirement, the development of the TAGP has been slow (IEA, 2013).

3.3 Coal and Clean Coal Technology

Within ASEAN coal has been the fastest growing primary energy source because coal-fired power plants constitute the lowest cost power generating plants in the region (IEA, 2013). ERIA (2012) projected that the share of coal in ASEAN primary energy consumption would increase from 18.46% in 2009, to 29.3% in 2035. Thus, ASEAN needs clean coal technologies and intra-ASEAN coal trade to ensure regional energy security. The APAEC 2010-2015 has the objectives to promote both clean coal technologies and intra-ASEAN coal trade and investment. It also aims to build and strengthen the ASEAN coal image with the public. However, currently, there has been very little progress towards achieving this cooperation.

3.4 Energy Efficiency and Conservation

Energy efficiency entails making better use of energy resources. It helps both reduce the cost of energy and enhance energy security. ASEAN aims to strengthen cooperation in energy efficiency and conservation through institutional capacity building and expanding private involvement. Specifically, the APAEC 2010-2015 set the collective goal of reducing energy intensity by at least 8% of the 2005 level by 2015.

Each ASEAN country sets its national target independently. For example, Brunei has a goal of a 25% reduction in energy intensity¹ from the 2005 level by 2030. Moreover, Singapore established a target of a 35% reduction in energy intensity from the 2005 mark within 2030 (ACE, 2011).

Meanwhile, Thailand's Energy Conservation Plan (2011-2030) formulated a goal of a 25% reduction in energy intensity compared to the 2005 level by 2030.

3.5 Renewable Energy

The APAEC 2010-2015 set a collective target of 15% for the installation of renewable energy based capacities of power generation in ASEAN by 2015. It also plans to promote intra-ASEAN trade in renewable energy, the development of centers of research and development concerning renewable energy, and promote bio-fuels for use in the transportation sector in ASEAN.

Each ASEAN country sets their national targets independently. For example, Brunei has a target of 10% electricity being generated from renewable sources by 2035, while Vietnam has a target of 6% electricity generation from renewable sources within 2030 (International Renewable Energy agency, 2013).

Meanwhile, Thailand's Alternative Energy Development Plan (AEDP 2012-2021) set a target for using renewable energy at 25% of total energy consumption by 2021. According to the AEDP, renewable energy includes bio-fuels (ethanol and bio-diesel), bio-energy (biomass, biogas), hydropower, solar energy, wind, tidal waves and geothermal sources.

3.6 Regional Energy Policy and Planning

ASEAN countries need to move away from independent national energy policies and planning to establishing more inter-dependent, inter-country and outward-looking policies.

¹ Energy intensity is calculated as units of energy per unit of GDP, it indicates the energy efficiency of an economy.

Thus, the APAEC 2010-2015 aims to encourage increased cooperation on regional energy policy and planning to help drive sustainable development.

3.7 Civilian Nuclear Energy

In 2008, ASEAN high officials met and agreed to explore nuclear power as an alternative source of energy operating under safe and environmental friendly standards. By the way, some ASEAN countries, such as Vietnam, have considered the use of nuclear energy for power generation (ERIA, 2012). Thus, the APAEC 2010-2015 aims to cooperate on a voluntary and non-binding basis in the sharing of information, technical assistance, and training connected to the promotion of nuclear energy for power generation.

However, currently, there is no operational nuclear power generation in the ASEAN countries. In Thailand, after the Fukushima nuclear disaster (March 2011), the Thai government suspended their nuclear power plan. It seems that cooperation on nuclear energy has seen little progress.

4. The Potential Impact of ASEAN Energy Cooperation on Thailand

It is expected that ASEAN energy cooperation can give significant benefits to Thailand. These benefits include a reduction in energy costs, increased security of the energy supply, increasing intra-ASEAN energy trade, together with more stringent energy policy analysis and planning as arising from related discussions.

First, Thailand is a net importer of electricity. In 2013, Thailand imported electricity

from Lao PDR and Malaysia totaling 2404 mega-watts, approximately 7.22% of Thailand's total capacity (Electricity Generating Authority of Thailand, 2013). Thailand imports electricity from Lao PDR because it is cheaper than domestically produced electricity. Phatthriya (2013) reported that the imported price of electricity from Lao PDR was about 75% of the domestic electricity cost. However, imports from Malaysia (with only 300 mega-watts) are only used for occasional power shortages.

Thus, a totally integrated ASEAN Power Grid system with a more open electricity trade regime in ASEAN will reduce the cost of electricity, together with providing increased security for the power supply system in Thailand.

These findings are consistent with the study conducted by Chang and Li (2012). They concluded that an APG in connection with a more open electricity trade regime would be able to reduce the cost of electricity in ASEAN countries which have uneven energy resource endowments together with uneven demand.

Second, Thailand is a net importer of natural gas, importing 210,884 million Baht worth of natural gas in 2013. The majority of imported gas came from Myanmar (Thai Ministry of Commerce). IEA (2013) projected that Thailand's net import of gas would increase from 11 bcm in 2011 to 60 bcm in 2035 due to a decrease in Thai gas production and rising domestic gas demand.

The Trans-ASEAN Gas Pipeline will be able to reduce the transportation cost for imported gas into Thailand. Moreover, it will also enhance the security within the gas supply network in Thailand.

Thirdly, according to the APAEC 2010-2015, ASEAN aims to facilitate intra-ASEAN trade for renewable energy and develop ASEAN to become a hub for renewable energy.

With regard to bio-fuel as a substitute fuel for the transport sector, Thailand has been the largest user and producer of ethanol and biodiesel in ASEAN in recent times (IEA, 2010). In 2012, Thailand produced 655.5 mega-litres of ethanol (Ml/yr) and 884mega-litres of biodiesel (Ml/yr) (Thailand's Ministry of Energy).

With respect to ethanol, Thailand exported 276.2 mega-litres in 2012. Most of this was exported to the Philippines and Singapore. Thus, Thailand currently has the opportunity to become the production and trading hub for ethanol in ASEAN.

However, Malaysia is a large exporter of palm oil and biodiesel because Malaysian palm oil industry incurs a lower cost of production. Thailand often imports crude palm oil from Malaysia for domestic consumption. Thus, in ASEAN, Malaysia is likely to be the production hub for biodiesel.

Fourthly, ASEAN has cooperated on regional energy policy analysis, planning, training, sharing and exchange information concerning energy issues, including energy efficiency and conservation, and renewable energy. Thai government agencies, academic institutes and the private sector have received significant benefits from these activities.

5. Concluding Remarks

ASEAN energy cooperation is both an integral part of the ASEAN Vision 2020 and of achieving AEC by 2015. To implement the

ASEAN Vision 2020, The APAEC 2010 specified seven cooperation programs: 1) ASEAN Power Grid, 2) Trans-ASEAN Gas Pipeline, 3) Coal and Clean Coal Technology, 4) Energy Efficiency and Conservation, 5) Renewable Energy, 6) Regional Energy Policy and Planning, and 7) Civilian Nuclear Energy.

Such energy cooperation results in various benefits for Thailand. These benefits include (1) a reduction in energy costs, especially the costs of electricity and natural gas, (2) increased security of the energy supply system, (3) increasing intra-ASEAN energy trade, together with an opportunity to become a production and trading hub for ethanol, and (4) energy information sharing, energy policy analysis and planning.

However, the implementation of energy cooperation initiatives is still sometimes fragmented. The APG and TAGP are mainly bilateral cooperation entities. The development of a real regional integrated Tran-ASEAN Energy network (comprising of the APG and TAGP) engenders a large investment requirement and some technical difficulties. In addition, the ASEAN countries generally put more emphasis on their own national agenda than regional energy cooperation considerations. Thus, development and progress within the realm of energy cooperation has been relatively slow.

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