ENERGY MARKET INTEGRATION AND TRADE LIBERALIZATION

Abstract

Energy Market Integration (EMI) has been a goal for many regions, including East Asia, for quite a long time. This study treats trade and income as endogenous and estimates the overall impact of trade openness on environmental quality using the instrumental pricing variable technique for ASEAN economies. We find the impact is large in the long term, after the dynamic adjustment process, although it is small in the short term. Economic integration and trade liberalization in ASEAN had a sustained economic growth over the last several decades. Asia has become the world's most vibrant region. It maintained an impressive growth rate. Access to large markets allowed Asian countries to utilize their economies of scale on the one hand, and stimulate growth in their productive sectors on the other. With the rise of Asia, it is time for these countries to assist and become an integrated market of their own. Thus, energy is at the center of all issues due to its importance for domestic and international economy and environment. Certain countries that lag behind in energy market integration need to learn from either their past experiences or from other nations and focus their efforts on their relatively weak dimensions. A simple correlation has been used to see the relation between Trade, GDP Growth and other determinants; the results of which shows that there is a Moderate degree of Negative Correlation between trade and GDP growth, a high degree of positive correlation between trade & CO2 emissions and a high degree of positive correlation between GDP growth & CO2 emissions.

JEL: F4, Q4, Q5.

INTRODUCTION

A policy of trade liberalization is time and again recommended as a means of motivating economic growth in developing countries. Given the possible benefits of trade liberalization policies, it is important to scrutinize whether such policies are in fact in conflict with the environment as they accelerate economic growth.

ASEAN (Association of Southeast Asian Nations) has long been following the energy market integration to support their sustainable economic growth in East Asia Summit region. The present members of ASEAN are Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei, Darussalam, Vietnam, Laos and Myanmar, and Cambodia. The first energycontract, decided between Thailand and Lao PDR, was signed in 1966, one yearearlier than the first ASEAN Declaration in August 1967 (Feenstra, Robert , 1998). After the establishment of the ASEAN Council on Petroleum (ASCOPE) in 1975, collaboration broadened to comprise all other fuels. In 1981 the Heads of ASEAN Power Utility Authorities (HAPUA) was recognized for work on electricity interconnection, and in 1986 the ASEAN Energy Cooperation Agreement sketched an extensive variety of ranges for collaboration (Nicolas, Francoise, 2009).HAPUA is a body comprised of 5 nations namely Indonesia, Malaysia, Philippines, Singapore and Thailand which works towards the projects like:

1. Micro/Mini-Hydro Development (Focal Point: Indonesia)
2. Rural and Urban Electrification (Focal Point: Thailand)

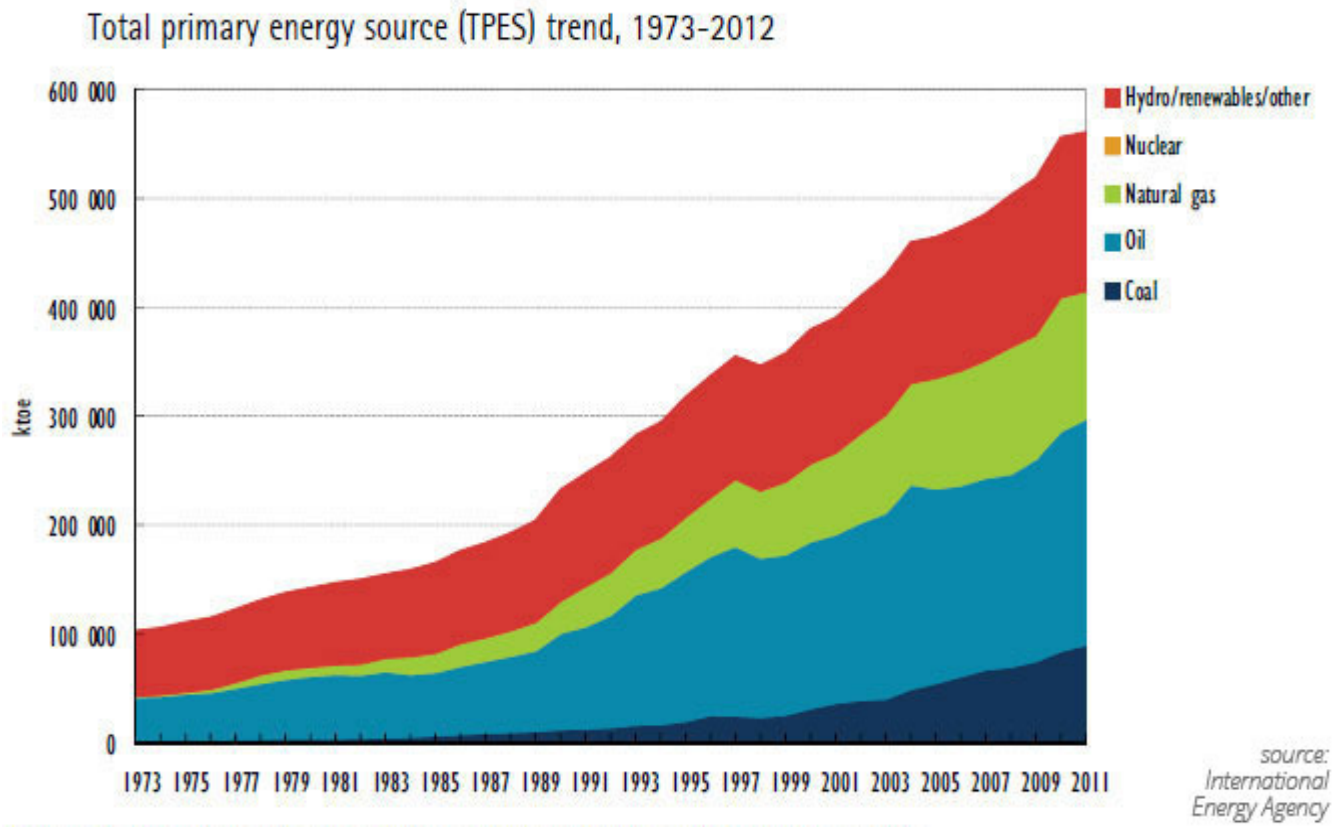
3. Standardization (Focal Point: Singapore)

4. Electric Power Information Center (EPIC) (Focal Point: Thailand)

5. Use of Combined Cycle Power Plant (Focal Point: Thailand)

6. Geothermal Energy Development (Focal Point: Philippines). The countless efforts that participant countries have made in the past forty years have given rise to noteworthy advancement in the way of forming a regional amalgamated energy market.

Figure 1:-



The above graph [1] briefly illustrates the cumulative primary energy source trends in ASEAN economies. It clearly shows the widening of natural gas and hydro power since last few decades but it is less substantial than oil. Additionally, to endorse integration, more information on the position of each country's degree of

integration should be measured to inform the parallel government for their forthcoming future policymaking.

Higher investment has to be done by ASEAN on energy infrastructures. Energy defines the worth of our daily lives and determines economic development.

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1. ASEAN overview –Energy Supply Security 2014

With the rising population growth energy consumption is also rising.

Table 1:-

Energy demand by country 2015: (with future projections) :

	1990	2011	2020	2025	2035	2011-2035*
Indonesia	89	196	252	282	358	2.5%
Malaysia	21	74	96	106	128	2.3%
Philippines	29	40	58	69	92	3.5%
Thailand	42	118	151	168	206	2.3%
Rest of ASEAN	42	119	161	178	221	2.6%
Total ASEAN	**223**	**549**	**718**	**804**	**1 004**	**2.5%**

* Compound average annual growth rate. Source: Southeast Asia Energy Outlook Unit - Compound average annual growth rate.

Increasing energy demand appeals for fresh investments in energy production and infrastructural expansion in order to secure sufficient and steady supply of energy. Access to sufficient, inexpensive and affordable energy is vital to eliminate poverty, improve and increase human well-being and improve standard of living. One of the United Nations study[(2)] opinions that the productivity of one-third of global population is negotiated by lack of access to commercial energy and another

third suffers from economic insecurity and hardships due to undependable energy provisions. The deficiency of access to contemporary and sustainable energy is a chief cause of environmental degradation in hugezones of the developing world, and a keyobstruction to sustainable development.

ASEAN must decrease its dependency on imported energy, particularly oil. One predominant obstacle to economic growth is high oil prices. High oil prices often harm exporting economies. It directly adds to production expenditures and inflation, resulting to instability in financial markets and intensifies economic slowdowns in major economies. One study [(3)] estimated that a US$ 35 per barrel of oil lasting a year would shave 0.8% off Asia's GDP growth. The Philippines and Thailand will have a corresponding 1.60% and 1.75% cut in GDP.

Natural gas is fast evolving as a worthwhile alternative fuel, especially in fulfilling with more severe national and global policies on environmental protection and conservation. Natural gas is accessible in a number of ASEAN member countries such as Brunei Darussalam, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam.

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2. World energy assessment, energy and the Challenge of Sustainability – ISBN: 92-1-126126-0

3. Keynote Speech ASEAN, Economic Integration and Energy Cooperation in ASEAN.

They have made substantial efforts to develop the natural gas industry. Natural gas use has become asignificantconstituent of the scheme for energy self-sufficiency and fuel diversification.

Natural gas has become the leading fuel for power generation. Most ASEAN power plants now use natural gas to generate power, with about 60% in Myanmar

and Singapore and about 70-75% in Malaysia and Thailand. ASEAN's established gas reserves, at current usage charges, are expected to last for 50 years, and to about 130 years, if the apparent reserves are added. Contrastingly, ASEAN oil reserves are exhausting.

More cross-border trade in energy should be carried out by ASEAN.. Cross-border trade in energy, particularly gas and electricity, offers noteworthy benefits both in terms of security, elasticity and quality of energy supply and greater competition.

The interconnection of national gas pipelines, through the Trans-ASEAN Gas Pipeline (TAGP) Project, will augment and guarantee the convenience and accessibility of energy in the region. Gas interconnections will enhancereasonable and accessible gas to industries, businesses and households across the entire ASEAN. Availability and access to natural gas will certainly contribute to increasing productivity, and result to changes in the quality of life, social behaviors and standard of living.

ASEAN economies under the effectiveness of HAPUA the energy – environment policy has been also pursuing 11 bilateral power interconnection projects under the ASEAN Power Grid Project, to optimize the exploitation of regional energy resources. Five of these power interconnections have been operational for the period 2005-2010. The ASEAN Power Grid Project has resulted in cheaper electricity for all ASEAN countries, guarantee sustainability of energy resources and contribute to energy proficiency. As also highlighted by Sheng et al (2015), there is an imperfect substitution between different energy products and this substitution subsequently weakens the efficiency of aggregate energy trade. It suggests that the ability of cross-product substitution affects energy trade

efficiency improvement which results from regional market integration and related trade policy.

Interconnected electricity networks enhance strength to ASEAN's economic integration. Interconnected networks can deliver those countries with plentiful natural resources but with little necessity for electric supply to generate income from their excess power. On the other hand, countries with high power demand can meet their electricity deficits with power imports from neighboring countries at judicious prices. Interconnection will reduce national investment in power reserves to meet ultimate demand, provide a more consistent supply of electricity and increase consumers' access to electricity.

Conclusively, the economic outlook for ASEAN is bright and the aims of the AEC intend to be within reach. This means stronger energy demand in ASEAN, which resultantly will expose it to greater energy support.

OBJECTIVES, DATA BASE AND METHODOLOGY:

In view of the above the current paper attempts to study the environmental degradation and growth impact in ASEAN countries with particular reference to market integration and liberalization of trade. The objectives of the study have been identified as follows:

1. To measure the development profile of the ASEAN countries.
2. To study the index of electricity and energy resources in ASEAN countries.
3. To establish the relationship between intra-regional trade, growth and pollution in ASEAN countries.

The study attempts to test the following Hypotheses;

- Growing trade in ASEAN countries have resulted in better development and growth.

- Growing trade in ASEAN countries have resulted in the increase of environmental pollution.

The paper is based on secondary data pertaining to ASEAN countries collected from various sources such as Annual Reports of various countries, Central Statistical Organization, State Publications of the Directorate of Economics and Statistics of U.S, Economic & Political Weekly Research foundation, Reserve Bank of India /State Bank of India publications, Innovation Report, Human Development Report, World Bank data and The Global Competitiveness Report.

The levels of growth are taken as proxy to GDP growth rates and the levels of development to GDP Per Capita of chosen countries. In order to measure the development profile of ASEAN countries HDI is taken as additional variable so as to reflect the currently popular connotation of Human Resource Development as being an important indicator of development process. The variable chosen to reflect the environmental pollution are CO2 emissions and decadal rate of growth of CO2 emissions.

In order to establish the degree and nature of relationship between growth, trade and pollution, simple Correlation Coefficients have been calculated.

To withstand its economic competitiveness and to guaranteecontinuous social development, ASEAN needs to strengthen its energy resources and to jointly explore new and alternative sources of energy supply without delay. This is particularlycrucialat the present time, as global prices of conventional sources of energy such as oil are increasing at a very high rate.

ASEAN has been setting regional policy frameworks to escort its energy cooperation and development. Jointly, ASEAN member countries are developing

the required trade, legal, fiscal and policy frameworks in the direction of the realization of the trans-ASEAN energy grid to meet the long-term energy supplies in the ASEAN region. All this will contribute to the formation of a promising environment for energy investment and trading.

But public effort will not be sufficient alone. Greater private sector participation is ultimately necessary to safeguard the success of these regional initiatives. ASEAN will continue to encourage private-sector involvement and implement policies and modifications that are required to generate a more responsive and empowering environment.

ENERGY SUPPLY IN EAST ASIA

East Asia is a comparatively resource-rich zone in terms of both energy reserves andcurrent accessible supply. Situated in southeast of Asia, most ASEAN+6 countries haveconsiderable energy resources. As shown in Table1, eight of the sixteen countries haveconfirmed oil and gas reserves, and seven countries have considerable coal reserves. Moreover, China and the Northern part of the ASEAN region are rich in extremely powerful stream power which can be connected to generate electricity (Nicolas, Francoise, 2009).

Oil production in East Asia is considerable. Explicitly, China is the fifth largest Oil- producing countries in the world, according to the latest BPstatistical review of World Energy (2010). India, Malaysia and Indonesia also produce large amounts of oil.Moving towards the reserves and production in the gas market, one sees a parallel story.ASEAN+6 countries hold more than 7% of worldwide established natural gas reserves, with themost important reserves in Indonesia,

China and Malaysia. East Asia accounts foraround 12% of world natural gas production.

In addition to this, the region holds substantial amounts of coal, especially in China andIndia. Since most of ASEAN+6 are developing countries, coal still plays a dynamic role. Presently it is already extensively recognized that East Asia has been the most significant "world factory" and adored the fast economic growth. However, without the plentiful resources of coal, it is challenging to imagine countries in the area to attain such economic growth.

While the overall energy resource accessibility is not a major challenge in East Asia, resource distribution is uneven in this region. Some countries are energy resource plentiful whereas some others are resource scarce. As shown in Table 1, some of the northern East Asian countries like Japan and South Korea have almost no energy resources, in spite of being the most developed countries in East Asia.

Table 2:

Energy resources in East Asia (Reserves and production) in 2009

Types	Oil reserves(1000 million tonnes)	Oil production(million tonnes)	Natural gas reserves (1000 million tonnes)	Natural gas production (million tonnes)	Coal reserves (1000 million tonnes)	Coal production (1000 million tonnes)
Brunei	0.1	8.2	0.35	11.4	-	-
China	2	189.0	2.46	85.2	114500	1552.9
India	0.8	35.4	1.12	39.3	58600	211.5

Indonesia	0.6	49.0	3.18	71.9	4328	155.3
Malaysia	0.7	33.2	2.38	62.7	-	-
Myanmar	-	-	0.57	11.5	-	-
Thailand	0.1	13.6	0.36	30.9	1354	5.3
Vietnam	0.6	16.8	0.68	8	150	25.2
Japan	-	-	-	-	355	0.7
South Korea	-	-	-	-	133	1.1
World total	181.7	3820.5	187.49	2987	826001	3408.6

Source: BP Statistical review of World Energy

Contrastingly, China and India, as the two developing giants, are relatively abundant in energy reserve and production. Another distinguished exception is Singapore, which is deprived of any energy natural resources and therefore heavily depends on its immediate neighbors (i.e., Indonesia and Malaysia) for its energy supply (Nicolas, 2009). The third feature of energy situation in East Asian countries is the strongrising demand. In particular, according to the forecast of World Energy Outlook(2009), ASEAN primary energy demand expands by 76% between 2007 and 2030, an average annual rate of growth of 2.5%. This is much more rapid than the average rate in the rest of the world. Annual energy demand of India is expected to grow at 3.4 percent, followed by China at 2.9 percent. At the same time as still in safe greenhouse gas (GHG) emission levels, the annual demand growth of ASEAN (2.1%) is still much higher than global average (1.5%). For example China, will surpass the United States to become the world's biggest importer of oil and gas within a decade. China, along with India, also has the

highest anticipated growth rate of gas consumption in the first three decades of the new century. All of these statistics obviously suggest that East Asia is a considerableenergy market in the world today.

Even though East Asia is a moderately resource-abundant area, its energy market is imbalanced. Energy supply cannot meet the immediate increase in primary energy demand. Such an additional demand for the whole area needs additional efforts in regional collaboration and intra-regional energy trade.

ENERGY TRADE LIBERALIZATION

As predicted by Nicolas Francois (2009), the ASEAN Free Trade Agreements were announced in 1992. The full free trade was set for 6 original ASEAN countries in 2010, and free trade expanded before 2015 for the CMLV (Cambodia, Myanmar, Laos, and Vietnam) groups. The current objective for ASEAN countries is to form a larger FTA, comprising other Asia-Pacific countries. There were three different agendaswhich were widely debated.

The first possibility was that the ASEAN countries join with China to have a new ASEAN+1 free trade area. The second possibility is to an ASEAN+3 FTA to include both ASEAN 10 countries and three other countries: China, Japan, and Korea. The last possibility is to extend the ASEAN+3 FTA to ASEAN+6 by including Australia, India, and New Zealand. The present paper takes a wider understanding, following the last suggestion to examine energy market integration in the 16 Asia-Pacific countries.

Hence, to measure the trade liberalization in the energy sector for each country, we use the number of countries that have a FTA relationship with the country in the Asia-Pacific area. Even though East Asia is a moderately energy-abundant area in terms of its reserve and production, it still encounters a challenge of insufficient

energy supply problem because of theuneven energy allocation and excess demand for energy. Therefore, intra-regional energy trade and further integration of energy markets is in vitalneed.

THE IMPORTANCE OF ENERGY MARKET INTEGRATION

The continuous growth in the usage of fossil fuels in East Asia Summit (EAS) economies has a considerableinfluence on energy security and also the upsurge in carbon dioxide (CO2) emissions. The Association of Southeast Asian Nations (ASEAN), together with China and India,is in the process of shifting the center of gravity of the global energy system toward Asia. In addition, the total population of the sixteen countries of ASEAN and East Asia, which is roughly 3.3 billion people, puts enough burden on future energy consumption and supply security in the region. The primary energy consumption of EAS countries is projected to increase from 4,079 million tons of oil in 2010 to 8,533 in 2035[(4)]. In this respect, gas consumption is likely to riseconsiderably. Gas consumption has been growing the fastest in China (at a rate of almost 13% annually). Japan's gas demand is met almost entirely by imports, particularly of LNG, and its natural gas consumption has increased at an average annual rate of 1.6%. India's natural gas consumption is likewiseexpected to increase by 4.9% per year between 2010 and 2035. Coal remains strategically vital for its member states, although ASEAN has also experienced fast growth in demand for natural gas, showing the dissimilarities in the energy policies of countries and regions. Whereas Japan and China, taking into account ecological issues, are shifting their energy sources from coal to gas, ASEAN and India are shifting to the consumption of inexpensive coal. Both shifts are supported by the vigorous increase of electricity consumption.

The ASEAN and East Asia region depends significantly on imports of fossil fuel from the Middle East to power its economy. This dependence makes the region highly susceptible to disturbances in the supply of oil and gas, as a result of political instability in the Middle East. In some major energy consumers within ASEAN and East Asia, demand for fossil fuels is increasing at a faster speed than domestic production; thus, their import reliance, particularly on oil and natural gas, is becoming larger and larger, rendering greater energy security concerns.

Realizing the risks related to energy security in the region, the heads of state of Australia, China, India, Japan, South Korea, New Zealand, and the member countries of ASEAN, on the occasion of the second East Asia Summit on January 15, 2007, adopted the Cebu Declaration focusing on energy security. In order to maintain energy security and sustainable economic growth in the ASEAN and East Asia region, the leaders promised to not only focus on reducing dependency on fuel imports by oil stockpiling but also improve fuel-use efficiency and the diversification of fuel sources, especially by increasing the share of renewable energy in total consumption. In addition, they agreed to improve energy efficiency by promoting conservation, the clean use of coal, the use of biofuels or renewable sources of energy for transportation, and energy market integration.

Energy cooperation between the ASEAN and East Asia region and the rest of the world, especially the United States, open up vast opportunities and advantages. The United States, European countries, Australia, New Zealand, Japan, and South Korea are leading countries in energy and thus could cooperate with China, India, and ASEAN countries in improving technologies, management, and regulatory frameworks. Australia is particularly important to the EAS region because of its endowment of energy resources, including coal, natural gas (distributed as LNG), and uranium, which can help safeguard the energy supplies of other EAS countries.

Brunei, Indonesia, Malaysia, and Vietnam also have large potential reserves of oil and gas and could profit from technology transfer and investment from Australia, China, Japan, Korea, India, and New Zealand (ASEAN +6 grouping). The refinery capacities in South Korea and Singapore and the oil storage capacity in Japan could provide additionalaids with more integration.

ENERGY POVERTY IN ASEAN

Globally, still today roughly 1.3 billion people lack access to electricity whereas 2.6 billion rely on conventional biomass stoves and open fires for cooking and heating (Ren21, 2013). Total number of people without electricity is about 127.4 million, of who about 49 percent are in Indonesia in the ASEAN region. However 42 million people also lack electricity access in Myanmar and the Philippines (Table 2). Only four countries (Brunei Darussalam, Malaysia, Singapore and Viet Nam) have electrification and urban electrification rates of about 100 per cent. In Indonesia, 128 million people still rely on conventional biomass for cooking or lack access to modern and clean cooking facilities, while the figure is close to 100 million in both the Philippines and Viet Nam (Table 3).In rural areas, the population deprived of electricity access is much greater than in urban areas. Cambodia and Myanmar have the lowest rural electrification ratios. Thus, viewing the electricity access among the 10 ASEAN members, refining the rural electrification ratio is still a major challenge at the national and regional levels.

336 **Table 3: Electricity access in ASEAN, 2010**

Region	Population without electricity (Million persons)	Electrification rate(%)	Urban electrification rate(%)	Rural electrification rate(%)
Brunei Darussalam	0.0	100	100	99
Cambodia	10.0	31	91	16
Indonesia	63	73	94	56
Lao PDR	2.2	63	88	51
Malaysia	0.2	99	100	98
Myanmar	26	49	88	28
Philippines	16	83	94	73
Singapore	0.0	100	100	100
Thailand	8	88	98	82
Viet Nam	2	98	100	97

337 **Source**:IEA, 2012.

338

339 **Table 4: Population relying on traditional biomass for cooking**

Regions and selected countries	Percent of population	Million
Developing Asia	51	1,814
India	66	772
Bangladesh	91	149
Pakistan	64	111
Indonesia	55	128
Philippines	50	47
Viet Nam	56	49
Rest of developing Asia	54	171

All developing countries	49	2,558
World	38	2,588

Source*:* REN21, 2013.

The main reason behind why some countries areable to escalate their electrification ratio more quickly than the others are supply and demand side reasons .Primarily, the growth of electricity production is comparatively lower than economic growth. Electricity production depends on several factors such as availability of investment funding and energy resources, the investment in the electricity sector, road infrastructure and geographical location (landlocked). Secondly, due to high fees for connection to the power grid and/or expensive monthly tariffs, poor households cannot attain benefits from the power grid extension. Thirdly, rural electrification programs are not sustainable in nature. Due to their low capacity to achieve and adoption of unsuitable technology, many households in rural areas find themselves back in the dark after obtaining electricity for a certain period of time. The Asian economic crisis in 1997-1998 had anadverse impact on the growth of electricity production across the ASEAN countries (table 4). Between 1991 and 1996, six countries recordeddouble digit growth, with Cambodia showing the highest growth and the Philippines recording the lowest. During the economic crisis, Thailand recorded electricity production growth of below 1 percent, while Indonesia noted almost 7.4 per cent electricity production growth while even Viet Nam, Singapore and the Philippines presented notably advancedgrowth. This specifies that the economic crisis affected the countries variably. Unexpectedly, post-crisis, the growth of electricity production was lower than before the crisis except in the case of Viet Nam. This pointed to an unwanted situation in countries that still had a moderately low electrification ratio.

Table 5: Average annual growth of electricity production (%)

Country	Pre-crisis (1991-1996)	During crisis (1997-1998)	Post-crisis (1999-2010)
Brunei Darussalam	10.47	8.70	3.79
Cambodia	26.77	22.94	9.67
Indonesia	12.94	7.38	6.71
Lao PDR	N.A	N.A	N.A
Malaysia	14.37	8.73	6.32
Myanmar	8.20	2.90	5.25
Philippines	5.87	6.42	4.20
Singapore	7.40	8.55	4.01
Thailand	12.56	0.18	4.91
Viet Nam	11.91	13.14	13.12

Source: Calculated from World Development Indicators, World Bank.

THE ECONOMIC IMPACTS OF INVESTMENT IN ENERGY MARKET INTEGRATION

Regional Power Connectivity

Economic Research Institute for ASEAN and East Asia (ERIA) examined the "effective investment of power infrastructure in ASEAN +6 through power-grid interconnection", as part of the ASEAN Interconnectivity Master Plan Study proposed by the Heads of ASEAN Power Utilities/Authorities, in order to calculate the benefits of a pan-regional power infrastructure.[1] If we assume that the study could be completed by 2020, ASEAN countries could save $12.1 billion on the cost of generation of new power plants (Ichiro Kutani, 2012). If ASEAN chose a firm environmental standard, there would still be a meaningful economic

4.Ichiro Kutani, "Effective Investment of Power Infrastructure in East Asia through Power Grid Interconnection," ERIA, Research Project Report, no. 23, December 2012

379 achievement from greater regional power connectivity. In this regard,
380 ERIA(Economic Research Institute for ASEAN and East Asia) suggests that
381 ASEAN countries make a policy to guaranteeenactment of the master plan. In
382 addition, ERIA continued to study ways to obtain the large amount of money
383 required for investment in pan-regional power infrastructure along with
384 institutionalcharacteristics such as agreements between producers and consumers
385 and the system of regional tariffs or taxes.
386

387 **The TRANS-ASEAN GAS PIPELINE**

388 The gas reserves of ASEAN are not very symmetrically distributed. Therefore, it
389 was very important to construct a regional gas pipeline, for the region's energy
390 security. In this respect, one of the most remarkable initiatives of the ASEAN
391 Council on Petroleum is the trans-ASEAN gas pipeline (TAGP) project, which is
392 in way to establish interconnecting provisions of electricity and natural gas in
393 ASEAN so that greater security and sustainability of energy supply in the region is
394 secured[(5)]. By the end of 2014, eleven bilateral connections have by then been
395 established. The TAGP is anenormous project that connects Southeast Asia to the
396 whole world, as the largest networks.The project is backed by the major oil and gas
397 companies in each of these countries, by linking the gas reserves of all the ASEAN
398 countries, andthis will be in in full operation by 2020 ((TAGP), Trans ASEAN Gas
399 Pipeline Project).
400

401 **ENERGY EFFICIENCY AND CONSERVATION**

402 ERIA's study on "Economic Impact from Investments on Energy Efficiency and
403 Saving" established that supplementary investments in technologies to protect
404 energy and lower carbon emissions would considerably reduce energy demand,

405 particularly coal demand in EAS countries, while reducing the price of fossil fuel
406 in both domestic and global markets (Shi, Xunpeng and Fukunari Kimura, 2010)[(6)]
407 .Most outstandingly, the study found that the total GDP of EAS countries would
408 increase by 4.0% under an alternative-technologies situation compared with a
409 normal business scenario. With the comprehensive effect of supplementary energy
410 investment, Japan and Korea would experience the largest GDP growth rate at
411 5.4%, whereas China and India would grow at 3.3%, Thailand at 2.7%, Indonesia
412 at 2.0%, Malaysia at 1.7%, the Philippines at 1.6%, and Australia at 1.7%
413 (Fukunari Kimura, Han Phoumin, and Brett Jacobs, 2013). Additionally, GDP
414 increases in ASEAN and East Asia would have an influence on the GDP of the rest
415 of the world.
416

417 **THE NEED FOR AN APPROPRIATE ENERGY POLICY FOR**
418 **RENEWABLES IN THE INTEGRATED MARKET**

419 ASEAN needs to endorse the study and distribution of green energy such as solar
420 photovoltaic, wind, geothermal, hydropower, advanced biofuels, and other
421 renewable energy. Renewable power generation can help countries meet their
422 sustainable development objectives through endowment of access to clean, secure,
423 dependable, and affordable energy.[2] To this end, governments will need to adopt
424 suitable energy strategies, including feed-in-tariffs, renewable portfolio standards,
425 and incentives for technology development. As green energy technology
426 progresses in developed countries, ASEAN will need to tap those technologies and
427 control them in an ASEAN context. Experience with these practices confirms that
428 considerable policy preparations in developed countries have by now led to steep

5. Fukunari Kimura, Han Phoumin, and Brett Jacobs, "Energy Market Integration in East Asia: Renewable Energy and its Deployment into the Power System," ERIA, Research Project Report, no. 26, August 2013.

429 rising demand for renewable energy, while China's supremacy and scale in supply
430 have greatly abridged the cost over the last five years. The Philippines, Thailand,
431 and Malaysia are now embarking on the application of renewable energy rules,
432 particularly feed-in tariffs. Other ASEAN members have been closely observing
433 the development of the application of feed-in-tariffs, which could be repeated for
434 the whole ASEAN region (Akira Yanagisawa, 2012).
435

436 **IS TRADE FACILITATION PROMOTING ENERGY TRADE IN EAS?**

437 Several factors contribute to the flourishing intra-regional energy trade-in the EAS
438 region. Such aspects include market demand, trade liberalization, and trade
439 facilitation strategies. In the process of economic growth, the increase in energy
440 demand is normal. The challenge is that there should be enough infrastructure and
441 facilities in order to make potential demand real demand.
442 Among the EAS member states, regional economic collaboration has flourished in
443 the wake of the Asian financial crisis in 1997-98.each and every kind of free trade
444 agreement represents a stage in the market integration. FTA's are advantageous for
445 the promotion of trade in trade by decreasing and streamlining the custom
446 procedures, improving infrastructure and transparency and promoting economic
447 cooperation in energy investigation and extraction projects. These agreements have
448 laid the superstructure for the preliminary integration of the regional energy market
449 (Yanrui Wu, Fukunari Kimura).
450 In spite of the global economic recession that was originated by the US financial
451 crisis from 2007 onwards, trade in energy among ASEAN and the North East
452 Asian countries remained vigorous. According to the BP statistical review of world
453 energy (BP, 2010), trade within these countries reached US$413.8 billion in 2009,
454 declining by only 15.9%, compared to US$49.5 billion reported in 2008, and it

registered a 27% share of the total ASEAN trade in 2009.ASEAN became the third largest trade partner of China, surpassing Japan in 2009.he energy trade boom had made a significant contribution to trade growth between China and ASEAN.

HOW DOES TRADE FACILITATION PROMOTE ENERGY TRADE AND MARKET INTEGRATION IN EAS?

The World Trade Organization (WTO), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Economic Commission for Europe (UN/ECE) and Asia-Pacific Economic Cooperation (APEC) each have their own definition of trade facilitation. The definitions given by WTO and UNCTAD are mainly focused in the aspects of international trade.

The perception of trade facilitation has many facets: transparency of laws and regulations, infrastructure improvement, the customs procedure, standards and harmonization, business mobility, e-commerce etc. Therefore trade facilitation is treated as a very comprehensive and complicated concept that includes all the steps involved in the cross border movement of goods (Yanrui Wu, Fukunari Kimura).

There has been good progress in terms of cooperation in the trade of energy in the ASEAN plus three (China, Japan and Korea)(APT).At the thirteenth APT summit in October 2010 in Hanoi ,Vietnam all the leaders supported the ongoing efforts to develop the energy cooperation and welcomed APT initiatives in specific fields such as energy security and oil stockpiling; natural gas and oil market integration; new and renewable energy production; 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.

ANALYSIS:

ASEAN countries have initiated a comprehensive set of cooperation initiatives with China, Japan, Korea on energy exploration and production since the first APT summit was held in Kuala Lumpur in Malaysia, in 1997.moreover the China ASEAN FTA provides a strong foundation for the continued expansion of regional economic, trade and investment activities.in the recent years with the deepening cooperation of China and ASEAN, the energy investment by China in ASEAN has increased rapidly. A lot of projects have produced oil, gas, coal, electricity etc., which have been exported to China or other EAS countries. This has been a key reason for the strong growth in trade in energy and energy related products, and energy and market integration (EMI) has promoted this trade (Yanrui Wu, Fukunari Kimura).

Table 6:-

Correlation between Trade, GDP Growth and other determinants:

INDICATORS	CORRELATION CO-EFF	SIGNIFICANCE
TRADE & GDP GROWTH	-0.32	Moderate degree of Negative Correlation
TRADE & CO2 EMISSIONS	0.988	High degree of positive correlation
GDP GROWTH & CO2 EMISSIONS	0.730	High degree of positive correlation

The correlation coefficients are significant at 5% level of significance

The table above clearly specifies that there is a high degree of positive relationship between trade, GDP growth and CO2 emissions in absolute as well as growth

terms. The argument will continue that the countries show a sound business environment on the cost of the environment. A renewed policy framework can be an answer to this for ASEAN. Energy conservation and strict environmental regulations may temporarily harm the expansion of these economies. It is rather important for the ASEAN countries to check the increasing levels of growth with constantly increasing pollution levels as well.

CONCLUSION

The descriptive trend analysis of the GDP growth rates in the ASEAN economies provides a base to conclude that the trade has not resulted in growth of these economies according to our study. The fact that these economies also emit large quantities of C02 and cause environmental pollution is a negative impact of such a trade. Taking into account environmental issues, ASEAN and India are promoting the utilization of affordable coal. Although ASEAN has also experienced fast growth in natural gas demand, coal remains of strategic importance for the region. Finally, green technology and low carbon emitting technology are critical for future sustained growth. A simple correlation analysis has been used between trade and GDP Growth as linked with energy-generated pollution shows that there is a high degree of positive correlation between trade & CO2 emissions and a high degree of positive correlation between GDP growth & CO2 emissions. A very moderate degree of negative correlation is seen in between trade and growth. The reason for this could be some incongruent outliers in time series due to crisis and reform years.

Thus, promoting energy market integration in both soft and hard infrastructure is fundamental to allowing markets to interact and integrate. Without proper policies

and frameworks, adequate infrastructure, cross border interconnection, and new technologies, energy market integration would not be successful.

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APPENDIX

LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
ASCOPE	ASEAN Council on Petroleum
HAPUA	Heads of ASEAN Power Utility Authorities
TAGP	Trans-ASEAN Gas Pipeline
AEC	ASEAN Economic Community
FDI	Foreign Direct Investment
HDI	Human Development Index
GHG	Green House Gas
CMLV	Cambodia, Myanmar, Laos, and Vietnam
FTA	Free Trade Agreement
EAS	East Asia Summit
LNG	Liquid Natural Gas
ERIA	The Economic Research Institute for ASEAN and East Asia
UNCTAD	The United Nations Conference on Trade and Development
WTO	World Trade Organization
APEC	Asia-Pacific Economic Cooperation
APT	ASEAN plus three (China, Japan and Korea)
EMI	Energy and Market Integration

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