

Economic Community:

Renewable Energy

How can ASEAN Enhance the Development, Adoption and Sharing of Renewable Energy Sources?

Welcome note

A very warm welcome to the S Rajaratnam Endowment-Youth Model ASEAN Conference (SRE-YMAC) 2017! We are Daryl and Raphael, your Committee Chairs for the issue “How can ASEAN enhance the development, adoption and sharing of renewable energy sources?”. Raphael and I are both Year 2 students from Singapore Polytechnic, from the Diploma in Marine Engineering and the Diploma in Nutrition, Health and Wellness respectively. It will be both our first time being involved in the SRE-YMAC (and chairing on top of that but do not fret, we have been well-trained), and we do hope that all of us will be able to learn from one another to make SRE-YMAC 2017 a fantastic journey for all of us! Please do not hesitate to forge friendships with the other delegates along the way.

Do make full use of this opportunity to gain an experience about what ASEAN regional conferences are like by being participative. Although speaking to an audience might be a challenge for some of you, do keep an open mind and seize every possible opportunity to learn and grow. After all, the largest

degree of growth is spurred when one is thrown out of their comfort zone.

We look forward to meeting all of you during this conference and have the highest hopes that your time here with us will be meaningful and memorable!

All the best,
Daryl and Raphael

1. Introduction

ASEAN is one of the most dynamic and fastest growing economic regions in the world. According to the ASEAN Secretariat News (2015), the share of ASEAN growth domestic product (GDP) in the world has increased from 3.18% in 2013 to 3.33% in 2014, which is approximately 15% of the US economy as compared to only 7% in 2004. ASEAN has been experiencing a period of long, fast and stable GDP growth as illustrated in Figure 1 below, with ASEAN GDP growing by 4.6% from 2015 to 2016 (ASEAN Secretariat News, 2015), and this trend is expected to continue, with ASEAN member countries such as Indonesia having a projected growth rate of 5.3% in 2017 (Financial Times, 2016).

As energy fuels economic growth, it is expected that energy demand would increase by 4.7% per year, which translates to about 619 million tonnes of oil (Mtoe), from 2013 to reach 1,685 Mtoe in 2035. The ASEAN Economic Community (AEC), that entails a well-connected, integrated, competitive and resilient ASEAN region, is heading

towards a cleaner, more efficient and sustainable ASEAN region in terms of energy and for that reason, energy plays a key role in realising this goal (Zamora and ASEAN Member States, 2015). Renewable energy is thus becoming increasingly relevant to ASEAN's interest in order to fuel further growth in the region, especially since fossil fuels (oil, coal and natural gas) are finite sources of fuel that will eventually be exhausted.

There is a common misconception that the terms - renewable energy and sustainable energy - are interchangeable. However, some forms of sustainable energy have negative effects on the environment whereas renewable energy sources do not (Jenden et al., 2017). Seeing that ASEAN is committed to enhancing the environmental well-being of the region, renewable energy is able to fulfil multiple interests.

Therefore, to support both economic growth and the conservation of the environment, ASEAN must consider renewable sources of energy in ensuring its sustainability in the future.

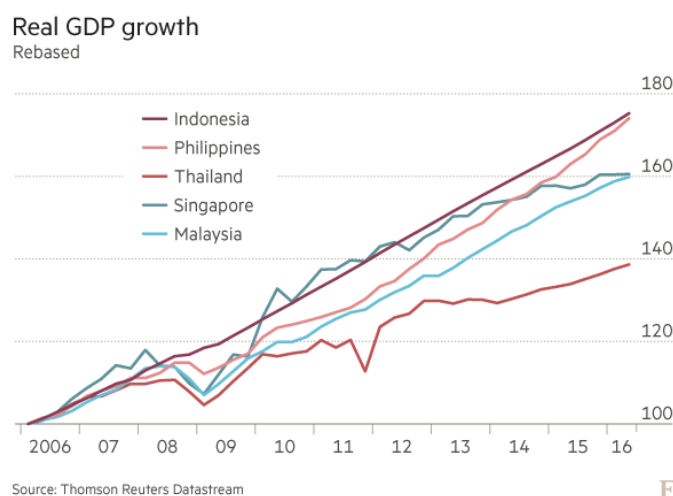


Figure 1: Real GDP Growth of ASEAN Countries from 2006-2016 (Financial Times, 2016)

2. Definitions

2.1 Renewable Energy

Renewable energy is energy that is derived from natural processes (e.g. sunlight and wind) that are replenished at a higher rate than they are consumed. Sources of renewable energy include: solar, wind, geothermal, hydropower, bioenergy and ocean power (International Energy Agency, 2017).

2.2 Sustainable Energy

Also known as Alternative Energy, sustainable energy includes renewable energy sources such as solar, wind, biomass, geothermal, hydro, tidal, ocean thermal, and waves. It also includes non-renewable energy such as nuclear and hydrogen that are considered by some to be more abundant and cleaner than fossil fuels (Taylor, 2010).

3. History

1997: ASEAN Vision 2020

The ASEAN Vision 2020, signed on 15th December 1997 during the 1997 Summit declarations, has been described as “a shared vision of ASEAN as a concert of Southeast Asian nations, outward looking, living in peace, stability and prosperity, bonded together in partnership in dynamic development and in a community of caring societies. It was adopted by the ASEAN Leaders on the 30th Anniversary of ASEAN” (ASEAN, 2012) and has been manifested into a series of medium term plans entitled the ASEAN Plan of Action for Energy Cooperation (APAEC) 2010-2015, covered under the AEC Blueprint 2015 which guides the energy development of ASEAN (Zamora and ASEAN Member States, 2015). Its aims include the establishment of interconnecting

arrangements for electricity, natural gas and water within ASEAN through the ASEAN Power Grid and the Trans-ASEAN Gas Pipeline and promoting cooperation in energy efficiency and conservation, as well as development of new and renewable energy sources (Suryadi, 2015).

2009: ASEAN Plan of Action for Energy Cooperation (APAEC)

Signed in July 2009, the ASEAN Plan of Action for Energy Cooperation (APAEC) is the blueprint for ASEAN cooperation in the field of energy for the period of 2010-2015, themed under ‘Bringing Policies to Action: *Towards a Cleaner, more Efficient and Sustainable ASEAN Energy Community*’ (Suryadi, 2014). It aimed to direct ASEAN to achieve a specific objective of enhancing energy security and sustainability for the ASEAN region including concerns for health, safety and the environment through accelerated implementation of action plans. Some of the targets set include achieving 15% renewable energy in the total installed power capacity by 2015, which has been achieved (Suryadi, 2015), as well as to reduce regional energy intensity by at least 8% from levels in 2005 by 2015. It was noted during the 30th ASEAN Ministers on Energy Meeting (AMEM) held on 12 September 2012 in Phnom Penh, Cambodia, that ASEAN’s energy intensity was reduced by 4.97% between 2005 and 2009 as a result of measures to improve energy efficiency (ASEAN Ministers of Energy, 2012).

2010: The Renewable Energy Support Programme for ASEAN (ASEAN-RESP)

ASEAN-RESP is a joint cooperation between Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the ASEAN Centre for Energy under international cooperation of

ASEAN-Germany (AGP) that aims to promote renewable energy activities within ASEAN. The programme entailed the sharing valuable information on renewable energy policies and implementation in ASEAN Member States.

2014: ASEAN Plan of Action for Energy Cooperation (APAEC)

Signed on 23rd September 2014, the APAEC was further extended to 2016-2025, with the measurable aim of achieving 23% renewable energy in the energy mix by 2025, as well as to reduce energy intensity by 20% in 2020 based on 2005 level (Suryadi, 2015) (Zamora and ASEAN Member States, 2015).

4. Recent Developments

4.1 Renewable Energy in ASEAN member states

In the 2012 ASEAN power mix, renewable electricity generation held a significant share of about 17%, of which 14% was produced by hydro resources and 3% by geothermal resources. Use of bioenergy, wind and solar, however, are only contributing marginally to the power mix. Given the technological and political conditions in the current market, the dominance of fossil fuels in the ASEAN power generation mix is expected to continue into the future unless significant policy changes take place (International Energy Agency, 2015). For a breakdown of energy sources utilised by the ASEAN member states, refer to *Appendix A*.

4.1.1 Solar Energy

Due to their geographical location and situation in regions with high amounts of sunlight, countries such as Thailand, Malaysia, Singapore, Indonesia, Vietnam, Cambodia and Laos all have plans to harness solar energy as a part of their renewable energy policy. For

example, Singapore has established a total number of 942 installations of solar panels in both residential and non-residential estates as of 2016, 305 of which are new installations in 2015 (Singapore Energy Market Authority, 2016).

4.1.2 Wind Energy

Countries such as Thailand, Philippines, Vietnam have been implementing wind farms at locations that are prone to high wind speeds to harness the available wind energy. For example, Thailand has set up almost 11 wind farms, supplying roughly 234,542kW of energy to the country (Thailand Department of Alternative Energy Development and Efficiency, 2015)

4.1.3 Geothermal Energy

Geothermal energy remains largely untapped on by ASEAN member states. Most Asian countries, ASEAN member states included, have been attempting to ramp up their geothermal capacity in response to growing energy needs as well as reduce their reliance on fossil fuels, however high exploration costs and strong public opposition are challenges that inhibit the growth of this field. Among the ASEAN member states, Malaysia has entered the market with the announcement of its pilot geothermal project at the 2016 Geothermal Power International market update, and Enel Green Power (EGP) in Indonesia has also announced that it will be developing its first project, the Way Ratai plant in Lampung (Asianpower, 2017).

4.1.4 Hydropower Energy

Hydropower energy presents itself as a unique case in the context of ASEAN. This is due to the existence of the Greater Mekong Sub-region (GMS) project, an economic collaboration between 5 Indochinese countries: Cambodia, China, Vietnam, Myanmar

and Laos. The GMS project began in 1992 and has been extended from 2012 to 2022. Laos sees its role in the GMS program as the “battery of Asia,” with plans for a total of 70 hydroelectric projects, among which only 12 are operational such as the 1,070 MW Nam Theun 2 which was commissioned in 2010 (Knive, 2011). The ASEAN Hydropower Competence Centre (HYCOM) was established as well, targeted at enhancing expertise and to contribute to the improved implementation and operation of small-scale hydropower schemes (ASEAN Hydropower Competence Centre, 2017).

4.2 Nuclear Energy

Despite the 2011 Fukushima disaster, nuclear remains a viable alternative energy source due to its mature technology and its capability to produce stable power supply. Some of the ASEAN member states, namely Vietnam, Malaysia and Indonesia, are considering nuclear power and plan to diversify their energy mix by 2035. Nuclear power is projected to enter the region’s energy mix only after 2020 on the basis that the first nuclear power plant in the region is successfully commissioned in Vietnam (Caballero-Anthony et al., 2014).

5. Scope

Considering that the topic of renewable energy is rather broad and the aim of the conference sessions would be to come up with a declaration, the scope of this debate can be limited to a few key issues.

The Mekong Dam situation and the fierce nuclear energy debate provide excellent opportunities to discuss the development, adoption and sharing of renewable energy among ASEAN nations. As such, the chairs would like

to suggest that hydropower and key takeaways from the debate on nuclear energy be a possible avenue to delve into and begin with for delegates of the countries involved.

6. Problems

The possible problems that might arise due to renewable energy are: the lack of knowledge of the potential benefits, financial challenges, bureaucracy and technical challenges. These problems all play a part in hindering renewable energy penetration in the regional market.

6.1 Lack of knowledge on potential benefits

The lack of knowledge and information of the public, governments and industries regarding renewable energy, results in the delay of its adoption. These include information concerning opportunities, reliability and lifetime of technologies, availability and sustainability of resources, biomass and of renewable energy and its purported benefits (International Energy Agency, 2014).

6.2 Financial Challenges

Renewable energy developments are costly, and due to the limited access to financing options and insufficient financial incentives provided, investors are dissuaded from participating in renewable energy development in the region (International Energy Agency, 2014).

6.3 Bureaucracy

The development and implementation of renewable energy plans entail cumbersome administrative processes, and some challenges that might surface as a result is the lack of coordination among relevant authorities, government agencies and private sectors which ultimately

hampers renewable energy development (International Energy Agency, 2014).

6.4 Environmental Challenges

Renewable energy sources often require large land areas for implementation (e.g. wind farms), and are thus often situated in remote areas where land space is available. This renders connection to main power grids a significant technical hurdle. Additionally, renewable energy sources are far less economically competitive than the dominant fossil fuel-based energy sources, and there is a lack of effective measures to prevent the possible negative impacts of renewable energy technologies on the environment (Riddell et al., 2017).

7. Possible Solutions

Some solutions that have been adopted to resolve the aforementioned challenges are as follows.

7.1 Raising Awareness

One possible solution would be for ASEAN member state governments raise awareness through campaigns and summits (e.g. Singapore has organised the Asia Clean Energy Summit) addressing current and existing environmental and sustainable issues, the benefits of implementing renewable energy and the possible development of facilities that will cater to these rising needs. However, people living in more remote rural areas might not be as informed as compared to those living in the urban city areas, where information is more readily accessible (Asia Clean Energy Summit, 2017).

7.2 Financial Incentives

ASEAN member states have implemented more financial incentives for renewable energy in their own

countries. Some examples exist as incentives on Research and Development in Singapore and reductions in taxes on machinery and raw materials in Thailand to encourage companies to invest in the development of renewable energy (ASEAN Briefing, 2015). However, conditions such as suitability of locations for renewable energy infrastructures and the readiness and willingness of the public to accept the change, play a part in determining if such incentives will eventually work.

8. Guiding Questions

8.1 Development

- What can be done in overcoming financial difficulties faced in the implementation and development of renewable energy technology?
- What are some of the ways that ASEAN can enhance its Renewable Energy technology development and how?

8.2 Adoption

- How can ASEAN mitigate environmental and socio-economic impacts that might arise from the use and implementation of renewable energy technology?

8.3 Sharing

- How can ASEAN make renewable energy technology equally as accessible to all its member states?

9. References

ASEAN, 2012. *ASEAN Vision 2020*. [online] Available at: http://asean.org/?static_post=asean-vision-2020 [Accessed 22 Jul. 2017].

ASEAN Briefing (2015). *Incentives for Renewable Energy Investment in ASEAN*. [online] ASEAN Business News. Available at: <http://www.aseanbriefing.com/news/2015/11/09/incentives-for-renewable-energy-investment-in-asean.html> [Accessed 28 Jul. 2017].

ASEAN Hydropower Competence Centre, 2017. *Objectives*. [online] Hycom.info. Available at: <http://www.hycom.info/index.php/objectives> [Accessed 25 Jul. 2017].

ASEAN Ministers of Energy, 2012. *Joint Ministerial Statement of the 30th ASEAN Ministers of Energy Meeting (AMEM)*. [online] ASEAN. Available at: http://asean.org/joint-ministerial-statement-of-the-30thasean-ministers-of-energy-meeting-amem/?category_id=26 [Accessed 22 Jul. 2017].

ASEAN Secretariat News, 2015. *ASEAN GDP Grows by 4.6%*. [online] Available at: <http://asean.org/asean-gdp-grows-by-46/> [Accessed 22 Jul. 2017].

Asia Clean Energy Summit (2017). *Asia Clean Energy Summit (ACES) 2017 - Singapore*. [online] Asiacleaneenergysummit.com. Available at: <https://www.asiacleaneenergysummit.com/> [Accessed 28 Jul. 2017].

Caballero-Anthony, M., Cook, A., Trajano, J. and Sembiring, M. (2014). *The Sustainability of Nuclear Energy in Southeast Asia: Opportunities and*

Challenges. NTS REPORT 2014. [online] Singapore: S. Rajaratnam School of International Studies. Available at: <https://www.rsis.edu.sg/wp-content/uploads/2014/10/NTS-Report-October-2014.pdf> [Accessed 26 Jul. 2017].

Economic Research Institute for ASEAN and East Asia, 2016. *Cambodia National Energy Statistics 2016*. ERIA [Online] Available at: http://www.eria.org/RPR_FY2015_08.pdf [Accessed 23 June 2017].

Financial Times, 2016. *Datawatch: GDP growth in Asean countries*. [online] Available at: <https://www.ft.com/content/e8828814-8ad0-11e6-8cb7-e7ada1d123b1> [Accessed 22 Jul. 2017].

International Energy Agency, 2014. *International Workshop on Bioenergy in the ASEAN Region: Country Presentation on Status of Bioenergy Development in LAO PDR*. [PowerPoint presentation]. Available at: <https://www.iea.org/media/technologyplatform/workshops/southeastasiabioenergy2014/Laos.pdf> [Accessed 29 Jul. 2017]

International Energy Agency, 2015. *Development Prospects of the ASEAN Power Sector*. [online] France: International Energy Agency (IEA). Available at: https://www.iea.org/publications/freepublications/publication/Partnercountry_DevelopmentProspectsoftheASEANPowerSector.pdf [Accessed 26 Jul. 2017].

International Energy Agency, 2017. *Topic: Renewables*. [Online] Available at: <https://www.iea.org/topics/renewables/> [Accessed 10 June 2017].

International Energy Agency, 2017. *Renewables*. International Energy Agency (IEA). [online] Available at: <https://www.iea.org/topics/renewables/> [Accessed 10 Jun. 2017]

Jenden, J., Lloyd, E., Stenhouse, K. and Donev, J., 2017. *Renewable and sustainable energy - Energy Education*. [online] Energyeducation.ca. Available at: http://energyeducation.ca/encyclopedia/Renewable_and_sustainable_energy [Accessed 22 Jul. 2017].

Knive, E., 2011. *Hydropower in Asia - Let the rivers run*. [online] Asian Power. Available at: <http://asian-power.com/power-utility/commentary/hydropower-in-asia-let-rivers-run#sthash.ID1LSc3y.dpuf> [Accessed 25 Jul. 2017].

Monsada, Z. Y., 2016. *Energy Prospects for the Philippines*. [Online] Available at: <http://www.upecon.org.ph/epdp/conference/wp-content/uploads/2016/01/Plenary-3-Monsada-Energy-Prospects-for-the-Philippines.pdf> [Accessed 23 June 2017].

Organisation for Economic Cooperation and Development (2016). *Increased investment in renewable energy is key to spur sustainable growth in Emerging Asia - OECD*. [online] Oecd.org. Available at: <http://www.oecd.org/dev/asia-pacific/increased-investment-in-renewable-energy-key-to-spur-sustainable-growth-in-emerging-asia.htm> [Accessed 29 Jul. 2017].

Phouthonesy, P., 2015. *Energy Policy of Laos PDR 2015*. [Online] Available at: <https://eneken.ieej.or.jp/data/6233.pdf> [Accessed 23 June 2017].

PricewaterhouseCoopers, 2016. *Power Guide 2016*. [Online] Available at: <https://www.pwc.com/id/en/energy-utilities-mining/assets/power/power-guide-2016.pdf> [Accessed 23 June 2017].

Riddell, A., Ronson, S., Counts, G. and Spenser, K., 2017. *Towards Sustainable Energy: The current Fossil Fuel problem and the prospects of Geothermal and Nuclear power*. [online] Stanford University. Available at: https://web.stanford.edu/class/e297c/trade_environment/energy/hfossil.html [Accessed 27 Jul. 2017].

Shin, A., 2016. *ASEAN SME Service Centre: News*. [Online] Available at: <http://www.aseansme.org/news?id=199> [Accessed 23 June 2017].

Singapore Energy Market Authority, 2016. *Singapore Energy Statistics 2016*. [Online] Available at: https://www.ema.gov.sg/cmsmedia/Publications_and_Statistics/Publications/SES/2016/Singapore%20Energy%20Statistics%202016.pdf [Accessed 23 June 2017].

Suryadi, B., 2014. *ASEAN Initiatives: Enhancing Energy Security and the Sustainable Use of Energy* [PowerPoint presentation]. Available from: http://www.unescap.org/sites/default/files/2_Beni_ASEAN%20Initiatives_2014%20Policy%20Dialogue%2C%20BK%20%2826-28%20Nov%2014%29_F.pdf [Accessed 22 Jul. 2017]

Suryadi, B., 2015. *Development of ASEAN Energy Sector - ASEAN Centre for Energy*. [online] Aseanenergy.org. Available at: <http://www.aseanenergy.org/blog/development-of-asean-energy-sector/> [Accessed 22 Jul. 2017].

Taylor, 2010. Alternative energy. In M.J. Lindstrom (Ed.), *Encyclopedia of the U.S. government and the environment: history, policy, and politics*. [Online]. Santa Barbara: ABC-CLIO. Available from:
http://eliser.lib.sp.edu.sg/ezp?rdURL=https://search.credoreference.com/content/entry/abcgovenv/alternative_energy/0?institutionId=2167 [Accessed 22 July 2017].

Thailand Department of Alternative Energy Development and Efficiency, 2015.

แผนที่แสดงที่ตั้งโรงไฟฟ้าพลังงานทดแทนในประเทศไทย. [online] Available at: http://www4.dede.go.th/dede/index.php?option=com_content&view=article&id=11336&lang=th [Accessed 22 Jul. 2017]

Zamora, C. and ASEAN Member States, 2015. *ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025*. [online] Available at: <http://www.aseanenergy.org/wp-content/uploads/2015/12/HighRes-APAEC-online-version-final.pdf> [Accessed 22 Jul. 2017].

APPENDIX A

Tables 1 and 2 below summarises the energy sources utilised by ASEAN and the various ASEAN member states.

Table 1: ASEAN Electricity generation by source (International Energy Agency, 2015)

Source	Share				2013-40	Share	
	1990	2013	2020	2040		2013	2040
Fossil fuels	120	648	925	1 731	3.6%	82%	77%
Coal	28	255	482	1 097	5.6%	32%	50%
Gas	26	349	406	578	1.9%	44%	26%
Oil	66	45	45	24	-2.2%	6%	1%
Nuclear	0	0	0	32	n/a	0%	1%
Renewables	34	141	180	481	4.7%	18%	22%
Hydro	27	110	119	255	3.2%	14%	12%
Geothermal	7	19	27	58	4.2%	2%	3%
Bioenergy	1	10	22	75	7.7%	1%	3%
Other	0	1	12	93	16%	0%	4%
Total	154	789	1 104	2 212	3.9%	100%	100%

Table 2: Total Primary Energy Supply for individual ASEAN Countries

<u>ASEAN Countries</u>	<u>Energy Sources</u>	<u>% of each Energy source (Latest update)</u>
Singapore (Energy Market Authority, 2016)	Coal Oil Gas Nuclear Other Renewables (Solar)	1.1 0.2 96 0 3.2
Indonesia (PricewaterhouseCoopers, 2016)	Coal Oil Gas Hydropower Nuclear Geothermal Other Renewables (Solar, Wind, Ocean, Biofuels)	56.06 8.58 24.89 5.93 0 4.34 0.2

Cambodia (Economic Research Institute for ASEAN and East Asia, 2016)	Coal Oil Hydropower Nuclear Biofuels Other Renewables (Imported Electricity)	11 38 4 0 44 3
Myanmar (Shin, 2016)	Coal Oil Gas Solar Hydropower Wind Nuclear Geothermal Biofuels	2 22 16 0 5 0 0 0 55
Philippines (Monsada, 2016)	Coal Oil Gas Solar Hydropower Wind Nuclear Geothermal Biofuels	22.4 31.3 6.4 0 4.8 0 0 18.7 16.4
Laos PDR (Phouthonesy, 2015)	Coal Oil Gas Solar Nuclear Geothermal Biofuels Other Renewables (Imported Electricity, Hydropower)	3 32 0 0 0 0 59 6
Thailand (International Energy Agency, 2014)	Coal Oil Gas Solar, Geothermal and Wind Hydropower Nuclear Biofuels	11.9 40.1 28.3 0.1 0.4 0 19.2

Brunei Darussalam (International Energy Agency, 2014)	Coal	0
	Oil	16.8
	Gas	83.2
	Solar	0
	Hydropower	0
	Wind	0
	Nuclear	0
	Geothermal	0
	Biofuels	0
Vietnam (International Energy Agency, 2014)	Coal	28.9
	Oil	27
	Gas	13.4
	Solar	0
	Hydropower	7.6
	Wind	0
	Nuclear	0
	Geothermal	0
	Biofuels	23.1
Malaysia (International Energy Agency, 2014)	Coal	17
	Oil	36.9
	Gas	42.8
	Solar	0
	Hydropower	1.3
	Wind	0
	Nuclear	0
	Geothermal	0
	Biofuels	2