

DUNMAN HIGH MODEL ASEAN PLUS SUMMIT



6 - 8 June 2019

Study Guide

ASEAN MINISTERS ON ENERGY MEETING

1. The Question of Alternative Energy Development
2. The Question of Energy Connectivity





INTRODUCTION

THE QUESTION OF ALTERNATIVE ENERGY DEVELOPMENT

With a growing population of more than 600 million and booming industrial growth, the Association of Southeast Asian Nations (ASEAN) faces an exponentially rising demand for energy resources¹. With rising demand and falling supply of fossil fuels, ASEAN member states remain heavily reliant on coal, natural gas and oil, which made up 78% of ASEAN's energy mix in 2016². However, such reliance on non-renewable energy resources is unsustainable due to depleting finite resources and increasing demand. Should this pattern continue, ASEAN's energy security, which refers to the uninterrupted availability of energy resources at an affordable price, would be put at risk. Furthermore, ASEAN would be a significant contributor of greenhouse gas emissions, accelerating climate change.

In response to the rising demand for energy in ASEAN, the case for diversification of energy resources through alternative energy is further strengthened. Alternative energy sources would refer to energy sources apart from fossil fuels, inclusive of non-renewables such as nuclear energy. Diversification into alternative energy is favoured due to it being unlimited in supply (with the exception of nuclear energy) and it being much more environmentally-friendly as compared to traditional energy sources such as coal, oil and natural gas. Switching to alternative energy would allow ASEAN to tap on its hidden potential to provide energy for her population and cost reductions³ would make alternative energy development easier for all stakeholders. ASEAN, seeing the potential benefits, is making significant efforts to increase its utilisation of renewable energy sources⁴. Notably, ASEAN member states are also making efforts to increase civilian nuclear energy capabilities within their countries⁵.

Despite the many opportunities for the development of alternative energy, each form of alternative energy poses its own set of problems, uncertainties and risks. These include, but are not limited to, the increased flooding risk caused by dams in hydropower development, unpredictability of the weather affecting long-term reliability of hydropower, wind and solar energy. Not to mention, nuclear energy presents its dangers such as a potential nuclear meltdown and radiation-induced cancer. This could create backlash among the general public and reduce their confidence in harnessing such energy for their use. Coupled with some risks brought about by alternative energy, lack of expertise and its relatively high costs for certain developing countries stall the progress of its development for many. In comparison with fossil fuels, stakeholders may think twice before switching to alternative energy sources due to their lower fuel efficiency and lack of portability. The specificity in location for the construction of alternative energy infrastructure makes its implementation more difficult than that of fossil fuels. Furthermore, the disparity between the economies of the member states may mean that some may lag behind with regards to alternative energy development, making the realization of the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 seem like a distant reality.

In view of these issues, delegates of the ASEAN Ministers on Energy Meeting (AMEM) are encouraged to weigh the benefits and costs and decide which forms of alternative energy can cater to the needs of ASEAN member states while minimizing its negative effects. Delegates may consider weighing the benefits and costs in terms of their scale and their variation across space and time. Delegates are also encouraged to think of a more equitable ASEAN policy that would allow member states to support one another and move forward on alternative energy development together as one ASEAN. Should these considerations be taken into account, ASEAN's cohesion would be strengthened and the quality of life for all its citizens would improve drastically with a reliable and safe supply of energy.

HISTORICAL PROGRESS

Timeline	Event
1980	<p>First AMEM Meeting The ASEAN Economic Ministers on Energy Cooperation, which served as a precursor to today's AMEM, was inaugurated on 29-30 September 1980⁶. This platform aimed to bring ASEAN's ministers together for dialogue on energy resources and its management within Southeast Asia.</p>
APRIL 1986	<p>The Philippines Decides Against Operating Bataan Nuclear Power Plant (BNPP)⁷ The BNPP began construction 1976 and was believed to be the solution to meeting the country's energy needs while reducing reliance on foreign imports of oil. The BNPP still remains to be the only nuclear power plant in Southeast Asia despite it being defunct.</p> <p>Corruption, the Chernobyl disaster and anti-nuclear protests eventually led to the government deciding not to operate the completed BNPP. During the 1970s and 80s, anti-nuclear protests were held with the BNPP as its main point of focus, calling out the safety risks due to it being situated in an earthquake zone.</p>
24 JUNE 1986	<p>Agreement on ASEAN Energy Cooperation⁸ The ASEAN member states began their cooperation on energy resources with the implementation of a framework to enable ASEAN countries to obtain security of supply, whereby member states aimed to reduce dependence on imported oil. The member states also agreed to accelerate the development of indigenous energy sources and committed their efforts towards energy conservation. The range of cooperation spanned planning, development, manpower training, information exchange, efficiency and conservation, supply and disposal.</p> <p>After its successful implementation, the agreement marked the foundation of energy cooperation in ASEAN, and served to guide the plans and courses of action in the following decades with regards to ASEAN's energy sector.</p>
1 JANUARY 1999	<p>Establishment of the ASEAN Centre for Energy⁹ The ASEAN Centre for Energy (ACE) was established to represent the ASEAN member states and their interests in the energy sector. ACE provides relevant information and expertise; thus accelerating the integration of energy strategies within ASEAN. This ensures energy policies and programmes take into account the economic growth and the environmental sustainability of the region.</p> <p>In more recent times, ACE has evolved to serve three critical roles: an energy think-tank, a catalyst for the strengthening of ASEAN energy cooperation and a data centre and knowledge hub for member states.</p>
NOVEMBER 2005	<p>Greenpeace Protest against Expansion of Masinloc Coal Power Plant¹⁰ During a non-violent protest by Greenpeace activists against the expansion of the Masinloc coal-fired power station in the Philippines, a German activist was heavily beaten up and the other activists had stones thrown at them by plant personnel. This highlights the attitudes of workers who depend on such plants for a living, thus protecting their own interests and the interests of the power plant would thus come first.</p> <p>It can be expected that other such workers in developing ASEAN nations would be against the switch away from fossil fuels as this may affect their livelihoods in the future.</p>
23 SEPTEMBER 2014	<p>ASEAN Plan of Action on Energy Cooperation (APAEC) During the 32nd AMEM held in Vientiane, Lao PDR, the theme of the new ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 was endorsed as "Enhancing Energy Connectivity and Market Integration in ASEAN to Achieve Energy Security, Accessibility, Affordability and Sustainability for All"¹¹. Some key targets include increasing the component of renewable energy in the ASEAN Energy Mix, enhancing civilian nuclear capabilities and a reduction in energy intensity. This sets the agenda for energy development in ASEAN between 2016 and 2025 in which ASEAN now places great focus on alternative energy, building on the progressive achievements brought about by the previous three plans.</p>
2019	<p>Commencement of Commercial Operation of the Xayaburi Dam¹² The Xayaburi Dam, located in Xayaburi, Laos, is a hydroelectric dam constructed as part of Laos' ambition to be the 'battery' of ASEAN. After beginning construction on 15 March 2012, it was halted on 11 May 2012 due to complaints from neighbouring countries and environmentalists. However, within a few months the dam resumed construction and it is scheduled to commence commercial operation in 2019.</p>



PROBLEMS/SCOPE OF DEBATE

ASEAN seeks to increase its alternative energy capabilities in order to ensure energy security in the long run coupled with a reduction in traditional fossil fuel usage, while at the same time minimising the impacts of alternative energy should they come about during and after their implementation.

While diversification into alternative energy may seem like the solution to ASEAN's energy needs, the main issue lies in the fact that alternative energy may not be the most feasible source of energy for some member states. Key considerations for countries when deciding its feasibility in usage and development include but are not limited to its costs, safety and management in the long run. Should countries decide that alternative energy is not feasible in comparison to traditional fossil fuels currently in use, ASEAN's momentum toward building alternative energy capabilities will be significantly slowed down due to reluctance by member states to cooperate. This undermines the spirit of cooperation and harmony that ASEAN seeks to promote.

1) Challenges of Public-Private Partnerships

Alternative energy's sustainability and falling costs make it an attractive source of energy that countries look to develop and utilise to its fullest potential. Despite this, the cost of alternative energy development still remains exorbitant for many of ASEAN's developing countries. An example would be that of Laos and China, where Laos is already heavily dependent on Chinese investments for their energy projects. China is currently involved in about half of Lao's hydropower projects, and Laos would likely be crippled in this regard without the aid¹³.

However, many of ASEAN's member states have turned to public-private partnerships (PPP) to enable themselves to better develop alternative energy capabilities. This refers to cooperation between the public and private sector to facilitate and finance alternative energy development, in a manner which would be more efficient and would help to overcome constraints limited public resources and government reserves. Despite this seemingly ideal solution, PPPs are not the perfect solution at the end of the day and thus require apt management for effective partnership. Firms are not incentivised to do more than what they are contracted to do, assuming that they are rational economic agents and profit-motivated. Thus delegates are required to determine what would be mandatory for firms to take into account when building or developing alternative energy infrastructure. This could include safety and environmental considerations or guidelines that firms may not be incentivised to look out for under contract.

Also, as private firms often have greater expertise in alternative energy than governments, this can lead to information asymmetry, which could lead to accountability issues. The private and public sector both have differing interests, to find the right balance, ASEAN can leverage on PPPs to enhance alternative energy capabilities, but the challenges that could arise need to be addressed or this could backfire and become stumbling blocks for governments.

2) Unfamiliarity with Alternative Energy

The lack of expertise and experience in the alternative energy sector, results in the inability of governments to evaluate the risks of alternative energy investment. This turns governments away from the hassle of switching away from the status quo and creates inertia in increasing alternative energy use. Lagging infrastructure and the lack of regulatory frameworks mean member states are not entirely sure on how to efficiently and adequately manage the use of alternative energy in their nations¹⁴. These obstacles impede the development of alternative energy in ASEAN and its progress toward building nuclear energy capabilities along with increasing the composition of renewable energy in the ASEAN Energy Mix to 23%, double the 12.4% (2016) by 2025. Delegates should examine how their individual countries can better prepare themselves for renewable energy development, so as to unlock its immense potential and ensure that there is forward-moving momentum in these areas of alternative energy development and usage.



PROBLEMS/SCOPE OF DEBATE

3) Potential Socio-economic and Environmental Impacts

Although alternative energy usage might reduce the impact brought about by emissions from traditional fossil fuel usage, alternative energy may bring along a new spectrum of environmental issues if not well-managed, which can be just as significant. Apart from environmental considerations, lives may be affected drastically and the potential for alternative energy development to hinder economic growth may lead countries to hesitate in stepping up alternative energy efforts.

Land-intensive alternative energy infrastructure can cause habitat loss and land degradation. This would be especially harmful should forests or other green spaces have to be cleared for its development¹⁵. In this respect, the land use is no different from fossil fuel extraction activities, causing the same disastrous impacts. In the case of alternative energy, social and environmental aspects are often closely intertwined. With heavy land use and land degradation, populations may be deprived of arable farm land and may even be forced to leave their homes. This greatly disrupts the livelihoods of many citizens, especially those living in developing countries where many still engage in traditional forms of agriculture. Hydropower often requires massive relocation efforts and increases the risk of flooding, which also destroys land. Wildlife loss from infrastructure construction also destroys the biodiversity in the area¹⁶.

In addition, member states that are already exporting fossil fuels and benefitting from its sale may see reluctance in cutting down fossil fuel usage and switching to alternative energy. In 2017, Malaysia and Indonesia both ranked 24th and 26th respectively in the world for crude oil exports in terms of dollar value worth¹⁷. For the developing countries, venturing into alternative energy may not be their priority because they are more focused on their short-term needs, which would be to tap on fossil fuels to gain revenue. Delegates are required to consider how communities, the economy and the environment surrounding alternative energy infrastructure remain as unaffected as possible by its construction through the implementation of policies that currently are lacking.

4) Feasibility of Nuclear Energy Usage

Nuclear energy has presented itself as a plausible option for ASEAN nations to meet the energy demand. Nuclear energy operates at a higher capacity factor than the other alternative energy sources and fossil fuels, which means it spends a larger percentage of a specific time period producing energy. This is a key area in which the other alternative energies lose out to nuclear energy due to them being intermittent energy sources, usually at the mercy of weather and environmental conditions. The reliability of nuclear energy if well-operated and managed can make it stand out from the rest of the other alternative energy sources, covering for the lapses they bring.

What makes nuclear energy different from other alternative energy sources as well would be ASEAN's unfamiliarity with it, in turn being unable to fully maximise its potential. From an economic standpoint, the cost of building a nuclear plant is very expensive and maintenance costs will continue to add to the total cost. Furthermore, the deadly consequences that could arise in the event of a meltdown are unlike that of the other alternative energy sources, making it necessary to discuss nuclear energy capabilities separately.

In a bid to explore nuclear energy's place in ASEAN's future, ACE published a "Pre-Feasibility Study on the Establishment of Nuclear Power Plant in ASEAN." This is ASEAN's first official report which explores the use of nuclear energy in the mid- to long-term and highlights certain member states to be at the forefront of nuclear energy development in the region¹⁸.

However, ASEAN's more natural disaster-prone countries such as Indonesia, which experiences a high frequency of tectonic activities due to its location on the Pacific Ring of Fire, may find it tougher to implement civilian nuclear energy projects. This is for fear of affecting the lives of their citizens should a natural disaster result in nuclear meltdown. Potentially low public acceptance due to fear for their safety may also spark protests which will stall development and fuel unrest. Taking into consideration the close proximity between neighbouring countries, a nuclear power plant meltdown may implicate them as well. Delegates will need to set the ground rules for ASEAN's nuclear energy development and ensure regional safety and energy security should a decision to harness nuclear energy even be made in the first place.



PROBLEMS/SCOPE OF DEBATE

5) Public Awareness and Support

In ASEAN, public support is mixed, with some welcoming the influx of new jobs and more sources of energy for their use and some not keen on the increase in alternative energy capabilities due to the acquisition of the land in which they live off and live on. Many are worried about the environmental damage these alternative energy sources could bring, destroying biodiversity and their livelihoods. Public support is especially divided for nuclear energy as the public are afraid of the consequences of a nuclear meltdown in the region and what that could mean for their future. Many land owners and owners of industrial facilities in ASEAN utilise very low levels of alternative energy, which could be attributed to the lack of awareness of the benefits that these alternative energy sources could bring to their businesses. Public resistance can also be attributed to the lack of awareness and knowledge on the different alternative energy sources and the potential issues that they bring.

However, some of the concerns are not unfounded and need to be addressed to the public in order to properly allay their fears. Raising public awareness and support can reduce the resistance brought about by the people, which could impact the progress of alternative energy development. Delegates must address this issue as the aim of building alternative energy capabilities is supposed to directly and indirectly benefit them. The public needs to be able to make decisions equipped with the proper knowledge, enabling them to best decide what is ideal for them.

6) Fostering Alternative Energy Cooperation

ASEAN embraces the spirit of cooperation and unity as seen from their consensus-based decision-making¹⁹. However, ASEAN member states are seemingly not on the same page when it comes to alternative energy development, raising the question on whether the common goals set by the countries would be reached. Many are focused on achieving economic growth as developing countries, where fossil fuel exports form a large component of it. This shifts the focus away from alternative energy development unless the economic gain from its usage outweighs that of fossil fuels. Thailand's new administration has put an almost complete stop to the expansion of renewable energy in the country while Vietnam continues to push for coal usage despite proclaiming a desire to develop solar capabilities. Over time, Malaysia has seen a decline in solar panel installations, being the only country in the world to experience such a trend²⁰. These are just a few examples of ASEAN member states failing to live up to their potential, illustrating how common goals require common action and the lack of collective action will hinder alternative energy development. Delegates should explore how each member state can contribute to supporting one another in developing alternative energy capabilities given their different financial capacities, areas of expertise and conflicting objectives.



KEY STAKEHOLDERS

Republic of Indonesia^{21,22}

Indonesia is recorded to have the largest energy consumption in Southeast Asia and is heavily reliant on the use of natural gas and oil to power industries and transportation infrastructure. Despite rich energy resources, the energy security and sustainability in the country is at risk of being disturbed due to its highly oil-dominated energy demand.

The Indonesian government is committed to the diversification of its energy sources, and increasing renewable energy's component in its energy mix. Yet, at the same time, the government is aiming to bolster oil, coal and natural gas production in order to increase the availability of primary sources of energy. With fossil fuel exports being crucial to the country's economic growth, the government's main focus is unlikely to be on alternative energy development.

Regardless, alternative energy potential in Indonesia is very high and largely untapped, especially in areas such as nuclear, wind, solar and geothermal energy. This is due to inadequate and inefficient investment across the energy sector, poor planning and ineffective regulatory environment that hinders foreign investment, which make up only a few of the factors. Indonesia is currently home to three nuclear research reactors and has been considering large-scale nuclear energy development in order to meet energy needs. The affordability of alternative energy, however, remains a question for Indonesia. Furthermore, many areas of the country are uninformed of the benefits of alternative energy. Thus, in order to bridge this information gap, additional costs will be incurred, slowing growth for alternative energy in Indonesia.

Kingdom of Thailand

Thailand is the second largest importer of oil in Southeast Asia and natural gas fuels 67% of its electrical power generation in 2016²³. Thailand faces rising energy demand from non-renewable sources of energy, such that at current usage levels, the country's existing oil and gas resources will deplete within the next decade²⁴. As such, it becomes imperative that Thailand switches to renewable sources of energy to supplement their depleting non-renewables. Thailand is heavily reliant on imported energy sources, thus the government is looking to reduce this reliance and diversify its energy sources to include a larger proportion of renewable energy usage²⁵. When it comes to alternative energy, Thailand's total renewable energy generating capacity has more than doubled from 2000 to 2016. Thailand possesses huge potential in alternative energy development. However, unrest by the Thai people, who are worried about the ill effects of nuclear energy and dam creation for hydropower, make it tougher for the government to move ahead with development. Inefficient governance resulting in high transaction and coordination costs also prove to be a major stumbling block for alternative energy development, coupled with poor transparency and accountability, growth remains slow²⁶.

Republic of the Philippines

The Philippines' energy mix currently favors fossil fuels, with coal being the most heavily used energy source. As a rapidly developing nation, the energy needs of the country have been significantly increasing. Compared to the other countries in ASEAN however, the Philippines has seen greater momentum in alternative energy development. To quote Alfonso G. Cusi, the Philippines' Secretary of Energy, "The Philippines has been exploring a variety of options to build an energy independent future supplied by sustainable, stable, secure, sufficient, accessible and reasonably-priced energy sources."

The Philippines is committed to alternative energy development in recognition of the economic gains and benefits to its energy supply. This is evident in the active efforts taken by the government to put into place legislation that supports alternative energy development such as the Renewable Energy Act (2008) which mandated a minimum percentage of generation of electricity from renewable sources. However, its heavy reliance on fossil fuels and apparent slow progress in alternative energy development show a reality of expectations not being met. The Philippines' hold great renewable energy potential, all of which will be able to put the Philippines on track to cut carbon emissions by 70% by 2030²⁷.



KEY STAKEHOLDERS

Republic of Singapore

Singapore is a small nation without her own natural resources, all of which automatically rules Singapore out from effectively utilising a majority of alternative energy sources. Solar energy poses itself to be the only viable alternative energy source out of the rest but even then, intermittency and land constraints remains to be a problem²⁸. These issues make Singapore's alternative energy profile significantly different from the rest of ASEAN's member states who generally have abundance of natural resources.

However, Singapore is not deterred by the issues faced and has a government that believes in the potential of alternative energy. This can be seen in the funding given to the research and development of alternative energy technologies to see how they can be better deployed in Singapore. Also, Singapore's human capital is its greatest asset, as Singapore continuously builds its expertise on alternative energy and is making robust efforts in implementing alternative energy sources where it is possible. This makes Singapore a key player that can share its expertise with ASEAN member states and collaborate to improve existing alternative energy sources and develop new technologies.

Lao People's Democratic Republic

Laos is known today for its ambition to become the 'battery' of ASEAN, with almost a hundred hydropower projects scheduled and in progress, the land-locked country has become a frontrunner in hydropower development and deployment. Laos faces few opportunities for economic development but saw the potential that hydropower held, aiming to make hydropower development its focus in order to secure a reliable source of energy that can not only provide for the people, but also assist in its economic development²⁹.

As such, calls for Lao to slow down its hydropower development in light of the dangers brought about by it will have no effect. Many liken this development to the opening of Pandora's Box, as the building of hydropower capabilities has made room for immense risk and danger to human life and the environment. With Laos not in a position financially to stop or even slow down development of hydropower capabilities, the collapse of the Xe-Namnoy Dam may not be the last incident it faces.



POTENTIAL SOLUTIONS

Implementation of Regional and National Frameworks

Delegates should devise a common ASEAN framework that tackles the safety and sustainability of alternative energy, by putting in place standards for capacity building and engaging respective governments to enforce strict regulation of these energy sources after construction that seeks to minimise environmental damage and harm to people living near them. This allows countries to provide mutual support, and explore how their own national renewable energy frameworks could be implemented in harmony with a common ASEAN framework for alternative energy. There is a strong correlation between policy and investment: when there are proper regulatory frameworks in place for alternative energy development, investor confidence will rise and this will allow the alternative energy industry to thrive in ASEAN, bolstering its development. A solid structure for information sharing could also help countries bridge information gaps and help ASEAN reach the common goals set in the APAEC.

Despite this, countries may not be able to come to a consensus on the policies and standards that should be implemented, resulting in a stalemate. Also, some member states may agree in its implementation but fail to comply and effectively enforce the compliance to standards. The solution may thus backfire as it would result in disharmony as opposed to greater cooperation.

Resource and Knowledge Exchange between Member States

With the lack of expertise and resources, the cost for alternative energy development and infrastructure building may discourage developing member states from venturing into alternative energy usage. In view of fostering cooperation between the member states as well, delegates should consider how member states can assist each other in alternative energy development as they already do in other aspects, such as trade and human resource development, where there are training centres established by Singapore to cater to other member states³⁰. As countries are often not on the same page due to differing levels of expertise, ASEAN can only move forward together if countries with more resources knowledge on alternative energy find suitable ways to share it.

Public Education

In order to foster acceptance of alternative forms of energy amongst the citizens of ASEAN, information gaps must be bridged and the general public must be convinced that the switch to alternative energy will do them more benefit than harm. Public education will serve as a long-term measure which will result in a gradual increase in confidence in these new sources of energy. This is especially pertinent should the ASEAN member states decide that nuclear energy is the way forward to enhance energy security in the region. Delegates should examine how public acceptance should be garnered and how such public education should be carried out in order to effectively move forward with alternative energy development.

Key Guiding Questions

- 1) How can ASEAN balance the needs of their respective countries (i.e. alleviating poverty, stimulating industrial growth) with alternative energy development?
- 2) How can ASEAN work with external organisations or firms to overcome obstacles and expedite the progress of alternative energy development?
- 3) How could ASEAN encourage much-needed foreign investment into the alternative energy sector?
- 4) In what way should ASEAN raise public awareness and garner public support towards increasing alternative energy use?
- 5.)How can the governments of ASEAN member states ensure that the safety and welfare of their people and environmental impacts are taken care of before and after the implementation of alternative energy sources?



BIBLIOGRAPHY

1. Andrews-Speed, P., & Singh, H. V. (2018, September 3). How to power a bright future for ASEAN. Retrieved from <https://www.weforum.org/agenda/2018/09/developing-a-shared-vision-for-aseans-energy-transition/>

2. The Role of Natural Gas in ASEAN Energy Security January 30, 2018 | by ASEAN Energy. (2018, January 30). Retrieved from <http://www.aseanenergy.org/blog/the-role-of-natural-gas-in-asean-energy-security/>

3. Dudley, D. (2018, January 13). Renewable Energy Will Be Consistently Cheaper Than Fossil Fuels By 2020, Report Claims. Retrieved from <https://www.forbes.com/sites/domicidudley/2018/01/13/renewable-energy-cost-effective-fossil-fuels-2020/#68f2f8a4ff2e>

4. Renewable Energy. (n.d.). Retrieved from <http://www.aseanenergy.org/programme-area/re/>

5. ASEAN countries gear up for a nuclear-powered future. (2018, January 17). Retrieved from <https://asian-power.com/regulation/in-focus/asean-countries-gear-nuclear-powered-future>

6. ASEAN Ministers on Energy Meeting (AMEM): Overview. (n.d.). Retrieved from <https://asean.org/asean-economic-community/asean-ministers-on-energy-meeting-amem/overview/>

7. The continuing struggle for a nuclear-free Philippines. (1998, October 16). Retrieved from <https://www.wiseinternational.org/nuclear-monitor/499-500/continuing-struggle-nuclear-free-philippines>

8. Agreement On ASEAN Energy Cooperation Manila, 24 June 1986. (2012, October 8). Retrieved from https://asean.org/?static_post=agreement-on-asean-energy-cooperation-manila-24-june-1986

9. ASEAN Centre for Energy: Introduction. (n.d.). Retrieved from <http://www.aseanenergy.org/about-ace/introduction/>

10. Greenpeace activists attacked in Philippine coal plant protest against climate change in Asia. (n.d.). Retrieved from <http://www.greenpeace.org/eastasia/press/releases/climate-energy/2005/20051110-philippine-coal-plant-protest/>




BIBLIOGRAPHY

11. JOINT MINISTERIAL STATEMENT OF THE THIRTY SECOND ASEAN MINISTERS OF ENERGY MEETING (32nd AMEM). (2014, September 23). Retrieved from <https://asean.org/wp-content/uploads/2017/01/Annex-12-AMEM-32-32nd-AMEM-JMS-final1.pdf>
12. Trandem, A. (2011, January 10). Opinion: The Mekong River's Pandora's box, National, Phnom Penh Post. Retrieved from <https://www.phnompenhpost.com/national/opinion-mekong-rivers-pandoras-box>
13. Tiezzi, S. (2018, August 02). China and Laos' Dam Disaster. Retrieved from <https://thediplomat.com/2018/08/china-and-laos-dam-disaster/>
14. Renewable energy challenges for ASEAN. (2018, August 25). Retrieved from <https://theaseanpost.com/article/renewable-energy-challenges-asean>
15. Environmental Impacts of Solar Power. (n.d.). Retrieved from https://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-solar-power.html
16. Environmental Impacts of Hydroelectric Power. (n.d.). Retrieved from https://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-hydroelectric-power.html
17. Hananto, A. (2019, January 06). World's Largest Crude Oil Exporting Countries (Southeast Asian Countries Included). Retrieved from <https://seasia.co/2019/01/06/world-s-largest-crude-oil-exporting-countries-southeast-asian-countries-included>
18. Pre-Feasibility Study on the Establishment of Nuclear Power Plant in ASEAN. (2018, April). Retrieved from [https://aseanenergy.sharepoint.com/PublicationLibrary/Forms/AllItems.aspx?id=/PublicationLibrary/2018/ACE Publications/NRPAS - Pre-Feasibility Study on the Establishment of Nuclear Power Plant in ASEAN-Final \(May 2018\).pdf&parent=/PublicationLibrary/2018/ACE Publications&p=true&slrid=b0d8b79e-0049-8000-99c3-ca85182c9acb](https://aseanenergy.sharepoint.com/PublicationLibrary/Forms/AllItems.aspx?id=/PublicationLibrary/2018/ACE%20Publications/NRPAS%20-%20Pre-Feasibility%20Study%20on%20the%20Establishment%20of%20Nuclear%20Power%20Plant%20in%20ASEAN-Final%20(May%202018).pdf&parent=/PublicationLibrary/2018/ACE%20Publications&p=true&slrid=b0d8b79e-0049-8000-99c3-ca85182c9acb)
19. Luqman, N. (2017, July 08). Is ASEAN Consensus A Blessing or Curse – or Both? Retrieved from <http://www.aseannews.net/asean-consensus-blessing-curse/>
20. Razzouk, A. (2018, July 6). Southeast Asia is the global laggard in renewables, but for how much longer? Retrieved from <https://www.eco-business.com/opinion/southeast-asia-is-the-global-laggard-in-renewables-but-for-how-much-longer/>
21. Y., A., A. S., Wahid, L. M., & A. (Eds.). (2018). Outlook Energi Indonesia 2018. Retrieved from [https://d1io3yog0oux5.cloudfront.net/_ade37ec3f94db1428dc189f527dac2fb/contentalenergy/db/337/2200/pdf/BPPT Outlook Energi Indonesia 2018](https://d1io3yog0oux5.cloudfront.net/_ade37ec3f94db1428dc189f527dac2fb/contentalenergy/db/337/2200/pdf/BPPT%20Outlook%20Energi%20Indonesia%202018)



BIBLIOGRAPHY

22. Tharakan, P. (2015, December). SUMMARY OF INDONESIA'S ENERGY SECTOR ASSESSMENT. Retrieved from <https://www.adb.org/sites/default/files/publication/178039/ino-paper-09-2015.pdf>
23. Thailand energy report 2015. (2016, May 13). Retrieved from <http://www.eppo.go.th/index.php/en/energy-information-services/report-2015>
24. Ariffin, E. (2018, October 30). Thailand paves the way for renewables. Retrieved from <https://theaseanpost.com/article/thailand-paves-way-renewables>
25. Renewable Energy Outlook: Thailand. (2017). Retrieved from https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Nov/IRENA_Outlook_Thailand_2017.pdf
26. Boyland, M. (2018, September 21). Thailand's energy transition might be inevitable, but equality and justice are not. Retrieved from <https://www.sei.org/perspectives/thailands-energy-transition/>
27. The Philippines pursues renewable energy expansion. (2017, April 3). Retrieved from http://www.climateaction.org/news/the_philippines_pursues_renewable_energy_expansion
28. Singapore's Approach to Alternative Energy. (n.d.). Retrieved from <https://www.nccs.gov.sg/climate-change-and-singapore/national-circumstances/singapores-approach-to-alternative-energy>
29. Brent, T. (2018, August 03). Laos gambles on becoming 'battery of Southeast Asia'. Retrieved from <http://sea-globe.com/laos-gambles-on-becoming-battery-of-southeast-asia/>
30. U-Wen, L. (2018, November 13). Spirit of sharing and helping in ASEAN. Retrieved from <https://www.businesstimes.com.sg/hub/asean-singapore-2018/spirit-of-sharing-and-helping-in-asean>



INTRODUCTION

THE QUESTION OF ENERGY CONNECTIVITY

Centred on the primary objective of accelerating economic growth and social progress through joint endeavours in the region, Association of Southeast Asian Nations (ASEAN) member states continue to work in tandem to ensure cooperation in many areas. Guided by the ASEAN motto “One Vision, One Identity, One Community”, the ASEAN Ministers on Energy Meeting (AMEM) was inaugurated in light of the shared objective of the development of a regional energy network. Till this day and age, energy, an input to nearly every good and service in the economy, remains indispensable to every industry in today’s society. For this reason, stable and reasonable energy prices made possible by energy partnership agreements among member states are fundamental to the reigniting, sustaining and expanding of ASEAN’s economic growth. As such, by enacting an energy network, an uninterrupted and continuous supply of energy to ASEAN will be ensured, paving the way for sustained economic growth.

While the blueprint of a regional energy network has yet to be formally defined, it can be thought of as a common and shared system among ASEAN member states to allow for the easy access to energy, including but not limited to the forms of coal, natural gas and oil. Through the establishment of such a common network, neighbouring countries can easily purchase or sell energy resources, mainly in the form of coal and natural gas. The individual countries can then meet the needs of their energy sector, considering the fact that it constitutes a relatively modest share of GDP in most countries. In an attempt to ensure energy connectivity within the region, key actors and stakeholders such as the governments of ASEAN nations have proposed and implemented certain measures under the ASEAN Plan of Action for Energy Cooperation (APAEC), which delegates should seek to examine.

Indeed, these measures have been moderately successful in satisfying individual countries’ needs and even attaining some form of economic growth via allowing for increased mechanization by utilizing technology to increase workers’ productivity or simply reducing the cost for energy-intensive equipment. However, limited success was observed as the regional energy network has yet to encompass every member state of ASEAN. As a result of the inadequacy of such collaboration, these measures ultimately fall short due to a myriad of factors, some of which play a more vital role compared to others. Conflicting inter-governmental financial interests, the lack of trust and political will between governments and the differences in technical capabilities and legal and regulatory frameworks, are merely some of the fundamental problems that delegates should be aware of and address when tackling this issue.

Through this council, the chairs wish to see that a consensus on how to apportion energy fairly and equally through this regional energy network will be reached. Thus, it is imperative that all delegates understand the rationale behind the establishment of a regional energy network and how inhibiting factors impede the progress of inter-country collaborations, resulting in the stagnation of the network as a whole.



DEFINITIONS

AMEM: The ASEAN Ministers on Energy Meeting is a convention for political leaders of member states of ASEAN to gather, deliberate and hopefully come to a consensus on how to provide greater accessibility, stability and security of energy supply in the region.

ACE: The ASEAN Centre of Energy is the governing body in charge of all energy-related matters in ASEAN, which collaborates with energy authorities/ministries of member states to implement measures and policies.

APAEC: The ASEAN Plan of Action for Energy Cooperation is an overarching master plan comprising numerous programmes to promote multilateral energy partnerships and boost energy connectivity within the region.

APG: The ASEAN Power Grid is one of the most prominent measures under the APAEC focusing heavily on infrastructure for energy interconnection between member states and within the region.

Energy connectivity: Energy connectivity is an important aspect of seamless regional connectivity. It is also a means of meeting the growing energy demand and enhancing energy security within ASEAN. Energy connectivity can be achieved via investment in infrastructure such as power grids as well as gas and oil pipelines.

Energy requirements: Varies from country to country due to a myriad of factors such as population size and economic activities in order to achieve the following functions, such as improved quality of life, economic growth etc.

SDGs: Sustainable Development Goals, otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. There are seventeen of them currently.

TAGP: Another notable measure under the APAEC is the Trans-ASEAN Gas Pipeline, which formulates action plans to allow for the transportation of natural gas and liquified natural gas in the region.

HISTORICAL PROGRESS

To set the context of the issue, the flowchart (seen in Figure 1.1), in particular the committees under ACE, aptly depicts the situation of energy connectivity in ASEAN.

Regional energy cooperation is key to the realisation of the ASEAN Economic Community (AEC), which calls for a well-connected ASEAN to drive an integrated, competitive and resilient region. Over the past decade or so, the AMEM has convened numerous meetings for leaders of member states to deliberate on their vision for the energy landscape in ASEAN. After much discourse, the leaders finally came to a consensus and put forth strategies such as the ASEAN Power Grid, Trans-ASEAN Gas Pipeline, coal trading through the ASEAN Forum on Coal (AFOC), and the Energy Supply Security Planning Program (ESSPA), to mention a few.

In the grand scheme of things, under the APAEC, the notion of energy connectivity has gained widespread awareness and attention from member states of ASEAN, translating into the manifestation of the above-mentioned strategies.

ASEAN Plan of Action for Energy Cooperation (APAEC)

Since its inception in 1999, the APAEC has played a pivotal role in the development of various strategies related to energy connectivity. With the help of such a comprehensive action plan which encapsulates numerous broad-based measures, member states can take concrete steps to collaborate to achieve energy connectivity. Till this date, significant progress has been observed in the aspects seen below.

Currently, the APAEC is in its fourth edition which will be implemented in two phases: Phase I covers the period 2016-2020 and consists of short to medium-term measures such as the ASEAN Power Grid, Trans-ASEAN Gas Pipeline, Coal and Clean Coal Technology to enhance energy security and to take further steps towards connectivity and integration while Phase II covers the period 2021-2025 and will be developed based on the progress of the implementation of Phase I.

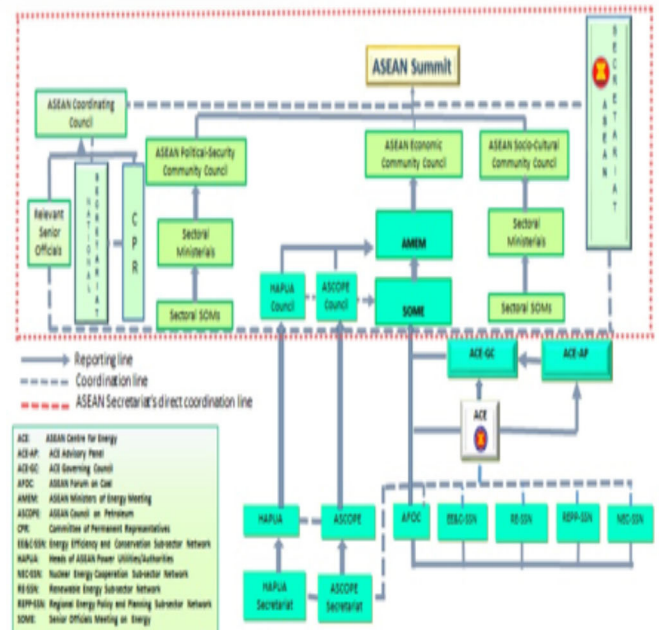


Figure 1.1: Flowchart to depict the structure of the ASEAN Energy Sector

HISTORICAL PROGRESS

ASEAN Power Grid (APG)

Endowed with extensive reserves of energy resources such as oil (22 billion barrels), gas (227 trillion cubic feet), hydropower (234 GW), coal (46 billion tons), and geothermal energy (20 GW), a borderless electricity industry where member states jointly collaborate has allowed for the development of the APG. Through the APG, multilateral electricity trade in other countries is initiated, wherein the enhancement of electricity trade across borders provides benefits to meet rising electricity demand and improves access to energy services in the region.

As one of the six main areas in the 1999-2004 APAEC, the APG which initially started off as a bilateral project has expanded its control to a sub-regional one. Eventually, in the near future, it hopes to grow into a fully integrated regional network. In this present day, six out of 16 power interconnection projects have been completed, linking Singapore and Peninsula Malaysia, as well as Thailand and Peninsula Malaysia, contributing to a total of 3,489 MW in power exchanges.

Trans-ASEAN Gas Pipeline (TAGP)

Agreed upon in 2002, the TAGP is another salient facet of the APAEC which aims to enhance connectivity for energy security and accessibility via pipelines and regasification terminals seen above (Figure 1.2).

Similar to that of the APG, the TAGP was also one of the primary focuses of the 1999-2004 APAEC. What was initially meant to interconnect existing and planned gas pipeline infrastructure within ASEAN underwent structural changes in 2008 as LNG was included in the masterplan. As a means to further connect the ASEAN nations, as well as to provide strategic buffer management in the region, this measure has been highly successful in creating a regional energy network. The results can be ascertained by the 3,673 km of pipelines installed and the total capacity of the four operational RGTs amounting to 17.8 million tonnes per annum in 2015.

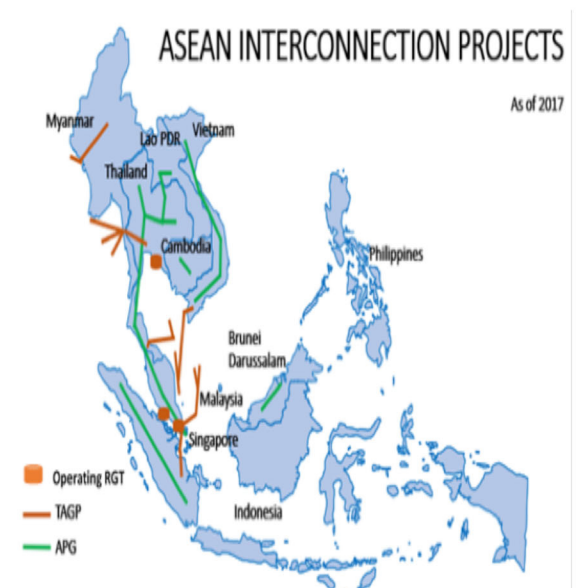


Figure 1.2: Map to outline TAGP & APG projects in ASEAN



HISTORICAL PROGRESS

ASEAN Forum on Coal (AFOC)

Known previously as the ASEAN Coal Sub-Sector Network, the ASEAN Forum on Coal (AFOC) was inaugurated in 1999 to advance ASEAN cooperation in the coal sector and intra-ASEAN business opportunities on coal. With the resurgence of coal in the global energy landscape, this is a centralized platform where member states can discourse on the procedure of the sale of coal in the region.

Under the AFOC, a directory of coal specifications, producers and consumers in ASEAN has been established. This will organize a network of coal laboratories in ASEAN to improve standards of coal analysis. Additionally, the AFOC will conduct research on current and future coal trade in the region. The studies to be conducted will focus on the coal trade flow and show how the coal commodity market can be organized and established in the future.

Energy Supply Security Planning Program (ESSPA)

While physical infrastructure forms the fundamentals of energy connectivity, the outline of energy flow, exports and supply within the region cannot be entirely excluded from the process. In this program, there are several critical features – capacity building in energy policy planning, supply security assessment, and the strengthening of cooperation among national and regional institutions in energy policy and planning – which allow for greater energy connectivity within the region.

Through capacity building, increased efficiency of the regional energy network can be achieved in terms of the improvement to the existing infrastructure. As a result, member states will enjoy greater ease of delivery of energy and/or resources from one country to another. Concurrently, the strengthening of partnerships across member states will also foster the expansion of energy nodal network, invariably increasing connectivity within the region.



SCOPE OF DEBATE

In 2003, the AMEM called for intensified cooperation in the development and exploitation of the energy resource potential in Southeast Asia, as well as in the attraction of private sector participation and investment in the ASEAN energy sector. Nevertheless, a multitude of factors, some of them listed below, continue to impede the supply, distribution and transportation of energy resources in the region.

Inability to harmonize legal and regulatory frameworks relating to power interconnection

This particular conundrum is borne out of mistrust between political leaders and their lack of willingness to canvass about the methodology to resolve issues related to energy security. This may be due to the lack of consensus in crafting a comprehensive model of integration that can take into account the interests of the whole region. Member states cannot come to a consensus with regards to the matter of regulatory and legal policies entailed in these measures. Ultimately, there is a lack of a regional multilateral institutional mechanism to facilitate cooperation among member states. This results in the inability to come up with an agreeable and feasible proposal for the distribution and supply of energy.

Hiccups in contractual arrangements of energy distribution for cross-border trade

The mechanics required for the energy network to thrive include the intricacies of distribution, the appropriate pricing of energy, along with the appropriate taxation and transmission tariffs imposed under the network. However, national impediments to the promotion of power trade still persist due to differing national policies that impede the progress of such contracts. As a result, the transaction turns into a gridlock, a cul-de-sac, being unable to proceed to fruition. In essence, a successful energy network can only be created through the joint cooperation of ASEAN countries with regards to the details of the supply and distribution of energy.

Uneven technical and infrastructural expertise amongst member states impeding distribution

Variations in technical and infrastructural expertise exist between member states where some may be able unable to fully support the demands of the energy network connectivity programme. The energy infrastructure which ensures the distribution and transportation of energy within a country comprises many components, such as the physical network of pipes for the transportation of oil and natural gas across borders, electricity transmission lines and other tools to transport energy to consumers. Some countries do not have sufficiently developed energy infrastructure. Myanmar, for instance, has electrification rates of as low as 32%. The supply of energy to the region is thus curtailed and the distribution of energy within a country is further restricted. In the end, these countries cannot be plugged into the regional network causing the masterplan of having a successful regional energy network to be marred.

While measures have been taken to address these concerns, as seen in the case of Heads of ASEAN Power Utilities Authorities (HAPUA) successfully cooperating with the Asian Development Bank (ADB) to harmonize technical codes and guidelines in the area of system operation and maintenance for the ASEAN Power Grid, they have yet to extend this fully to all member states within ASEAN. While progress had been observed, the resulting outcome is still far from satisfactory.



SCOPE OF DEBATE

Sustainability of energy supply in the regional network after implementation

The unsustainability of the supply of resources poses a challenge to the smooth execution of the APAEC. To date, some projects have been deemed no longer feasible, primarily due to energy resource constraints. For instance, natural gas reserves within ASEAN are depleting quickly, resulting in the supply of energy between member states under the TAGP being disrupted in the long run. To make matters worse, this problem is further accentuated by the fact that Southeast Asia's existing gas consumption is also increasing. Considering the fact that in 2016, natural gas accounted for 24% of ASEAN energy mix and is the second largest source of energy after oil, the decreasing supply of natural gas is bound to cause uneasiness and tension within the region. Should no actions be taken to ensure the reliability of energy supply under the TAGP, this would adversely impact the supply of energy to the different nations reliant on this energy source.

Environmental Degradation

Another crucial area to consider is the damage that the energy network may inflict on the environment. Currently, strong growth in fossil-fuel consumption has already led to a 75% increase in energy-related carbon dioxide (CO₂) emissions. Extraction and distribution of energy cause plenty of harmful side effects, including energy-related air and water pollution, as well as presenting major risks to public health. Coupled with the negative impacts of such energy extraction, the rising carbon-dioxide emissions run contrary to the objectives of Programme Area 4 of the APAEC: energy efficiency and conservation.

Additionally, when pipelines are built, mass land clearing occurs and the natural environment is greatly harmed. Not only does the wildlife and geology present in that area suffer, but more energy resources are also required to construct these pipelines and any other associated infrastructure such as regasification terminals present in the TAGP.



KEY STAKEHOLDERS

ASEAN Centre of Energy

Acting as the overall regulatory body which, inter alia, controls and coordinates all energy-associated measures, ACE assumes a consequential role in enhancing energy connectivity within the ASEAN region. By partnering with member states, ACE can have a better grasp of ongoing projects and determine follow-up actions to be taken after the implementation of these projects such as those to ensure the sustainability of the environment.

Most notably, the APAEC, which serves as a blueprint for better cooperation towards enhancing energy, was legislated by ACE, allowing member states in the region to embark on interconnectivity projects such as the APG and TAGP. Under the leadership of ACE, there have been several attempts to foster closer ties amongst member states alluding to increased energy interconnectivity in the region.

Kingdom of Thailand

Thailand is a member of the Northern Sub-System of ASEAN and has extensive energy infrastructure. Hence, Thailand's active participation in strategies like the AGP and TAGP is integral to ensuring energy connectivity in ASEAN.

Thailand is one of the most interconnected countries when it comes to energy connectivity in ASEAN, as seen by the links it has with several neighbouring countries such as Myanmar, Malaysia and Laos. Through engaging in interconnection projects with its neighbouring partners, Thailand can effectively carry out energy dealings. Besides, Thailand is also home to a regasification terminal (RGT) which enables liquefied natural gas to be stored before being transported over long distances. As such, Thailand doubles up as a major checkpoint, allowing energy from other countries to pass through its existing transmission grid.

Malaysia

Malaysia is a major exporter and importer of energy resources from her ASEAN neighbours and plays a pivotal role in energy connectivity in the region. As of 2014, Malaysia consumed more than 48,640 kilotonnes of oil equivalent of energy and generated nearly 147,4300 GWh of energy, making her one of the largest consumers of energy in ASEAN.

In order to meet the needs of energy consumption, Malaysia has since embarked on countless energy-related projects with other countries to ease cross-border energy trade.

Under the TAGP and APG, pipelines have been built to connect Malaysia to the rest of the ASEAN region. Amongst all others, the LTMS-Power Integration Project Initiative is one of the most prominent regional projects to boost energy connectivity in the region. These pipelines linked Malaysia, Thailand, Laos and Singapore, allowing for the goal of multilateral energy trade to materialise. Through these pipelines, not only can countries like Singapore purchase energy from Malaysia, but Malaysia can also achieve her intended outcome of increased energy supply as seen in the Laos-Malaysia hydropower deal, which was signed in September 2017.



PROPOSED SOLUTIONS

The lack of energy connectivity or rather, the sluggish progress of measures proposed are long-standing problems which have yet to be resolved till this date. In order to resolve these issues, delegates could consider the following solutions to either improve existing gaps within the measures or perhaps, devise new strategies to alleviate the situation in the long run. To address the various contentious issues brought up within the scope of debate, the following solutions proposed can act as general guidelines for delegates to consider.

Short-Term Measures

On the issue of the inability to harmonize legal and regulatory frameworks relating to power interconnections, member states should actively voice out their opinions and concerns during forums or meetings should they disagree. This provides a centralized platform for the member states to deliberate over the rigidity of these frameworks within ASEAN. It is high time that the governments of ASEAN member states become more coordinated in implementing proper regulatory structures.

Riding on the ASEAN motto of “One Vision, One Identity and One Community”, countries can consider coming to a common ground and compromising with the terms laid out by other nations in relation to the aspect of contractual arrangements for cross-border trade. This can take place in the form of moderated bilateral discussions between involved states. Apart from that, a standardized guideline delineating taxation and sales prices of energy resources can be drawn up by the AMEM to ensure no single country can sell energy at exorbitantly high prices.

While these solutions may possibly solve the above-mentioned problems, delegates should acknowledge that these solutions are not a silver bullet. Instead, delegates should be able to understand the nuances behind the issue and ponder about the extent to which various solutions can solve the problem of the inability to achieve energy connectivity.



PROPOSED SOLUTIONS

Long-Term Measures

Although short-term solutions can tackle the most pressing problems, long-term measures better help to ensure the sustainability of the network as a whole. The perception of a problem by the delegate, should not only be to seek to solve the current problem in its immediacy. Instead, delegates should endeavour to think of how they can tweak and refine the current measures to make them long term solutions.

With this in mind, ASEAN may lead the way by designing public-private partnerships aimed at reducing some of the involved financial risks and also to provide funding should certain countries be unable to fork out large sums of money. This may be executed by taking on large-scale development ventures, such as renewable energy production and sustainable land management. Moreover, the creation of markets for more corporate sustainability bonds to attract long-term financial support for projects and companies can thus spur continual sustainable growth and development of the energy network within the region.

By taking into consideration the uneven technical expertise between member states, delegates should discern the crux of this issue - varying levels of development amongst member states. While it is nigh impossible for every country to be equally developed, moving forward, a forum or meeting can be convened by countries such as Singapore, which have more expertise and are more proficient when it comes to technical skills. This not only serves as a platform for such member states to carry out technology sharing and capacity development but also acts as a milestone check to ensure the level of expertise of engineers in different member states are unified and that everyone is on the same page.



KEY GUIDING QUESTIONS

- 1) Despite the AMEM's best efforts and the resources invested into creating a regional energy network, what are other plausible underlying reasons which led to the inefficacy of the network with regards to the supply of energy?
- 2) Given the ever-increasing energy demands within ASEAN, how can member states regulate the inter-state competition for energy resources as well as inter-state resource distribution under the APAEC?
- 3) How will overlapping claims in disputed areas within the South China Sea region, more particularly the core Spratly Islands, pose a threat to unimpeded cross-border energy supply?
- 4) In the event that governments are unable to come to a consensus and discussions have reached a standstill, how can further discussions be structured to leave room for the improvement of existing agreements?
- 5) In light of the growing demand for energy resources and the rapidly depleting reserves, where is the fine line that countries should draw between the prioritization of energy connectivity in the region and ensuring self-sufficiency?
- 6) To what extent should we allow external parties such as neighbouring countries surrounding ASEAN, dialogue partners and non-governmental organizations like the United Nations to step in and participate in energy-related dealings?
- 7) Considering the extent of environmental degradation brought about by the implementation of a regional energy network, what are potential solutions to minimize its negative effects?



BIBLIOGRAPHY

1. ACE in the ASEAN Energy Sector. (n.d.). Retrieved March 11, 2019, from <http://www.aseanenergy.org/about-ace/ace-in-the-asean-structure/>
2. Analysis: Trans-ASEAN Gas Projects Losing Relevance Amid The Fast-Paced LNG Growth. (2018, November 07). Retrieved March 11, 2019, from <https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/110718-analysis-trans-asean-gas-projects-losing-relevance-amid-the-fast-paced-lng-growth>
3. AMEM Opening Ceremony Remarks. (2018, October 29). Retrieved March 11, 2019, from https://www.gov.sg/~/sgpcmedia/media_releases/mti/speech/S-20181029-1/attachment/AMEM%20Opening%20Ceremony%20Remarks.pdf
4. ASEAN Energy Ministers Endorse Key Outcomes. (18, October 8). Retrieved March 11, 2019, from http://www.xinhuanet.com/english/asiapacific/2018-10/29/c_137567163.htm
5. ASEAN Ministers on Energy Meeting (AMEM). (n.d.). Retrieved March 11, 2019, from <https://asean.org/asean-economic-community/asean-ministers-on-energy-meeting-a-mem/>
6. ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025. (n.d.). Retrieved March 11, 2019, from <http://www.aseanenergy.org/wp-content/uploads/2015/12/HighRes-APAEC-online-version-final.pdf>
7. ASEAN Power Grid. (n.d.). Retrieved March 11, 2019, from <http://www.aseanenergy.org/programme-area/apg/>
8. ASEAN Steps Up Cooperation To Ensure Energy Security. (2018, October 30). Retrieved March 11, 2019, from <https://english.vov.vn/politics/asean-steps-up-cooperation-to-ensure-energy-security-386206.vov>

BIBLIOGRAPHY

9. Building ASEAN's power grid. (2018, May 30). Retrieved March 11, 2019, from <https://theaseanpost.com/article/building-aseans-power-grid>

10. Connecting ASEAN Through The Power Grid: Next Steps. (2016, February 17). Retrieved March 11, 2019, from <http://esi.nus.edu.sg/docs/default-source/doc/esi-policy-brief-11---connecting-asean-trough-the-power-grid-next-steps.pdf?sfvrsn=0>

11. Energy Demand. (18, February 2). Retrieved March 11, 2019, from <https://corporate.exxonmobil.com/energy-and-environment/energy-resources/outlook-for-energy/energy-demand>

12. Expert Working Group On Energy Connectivity. (17, December 13). Retrieved March 11, 2019, from <https://www.unescap.org/events/expert-working-group-energy-connectivity>

13. International Collaboration Key To Driving ASEAN's Clean Energy Ambitions Forward. (19, February 8). Retrieved March 11, 2019, from <https://www.siew.sg/newsroom/articles/detail/2019/02/08/international-collaboration-key-to-driving-asean-s-clean-energy-ambitions-forward>

14. Memorandum Of Understanding Between ASEAN And The International Renewable Energy Agency. (n.d.). Retrieved March 11, 2019, from <https://www.mti.gov.sg/-/media/MTI/Newsroom/Press-Releases/2018/10/ASEAN-Energy-Ministers-Reaffirm-Commitment-To-Enhance-Energy-Resilience-And-Innovation/Annex-A--E.pdf>

15. Overview. (n.d.). Retrieved March 11, 2019, from <https://asean.org/asean-economic-community/asean-ministers-on-energy-meeting-ameem/overview/>

16. Special Focus On Electricity: WEO 2018. (n.d.). Retrieved March 11, 2019, from <https://www.iea.org/weo2018/electricity/>
Southeast Asia Energy Outlook 2017: Key Findings. (17, October 24). Retrieved March 11, 2019, from <https://www.iea.org/southeastasia/>

17. Status And Challenges Towards Regional Energy Connectivity (17, October 31). Retrieved March 11, 2019, from <http://www.aseanenergy.org/blog/status-and-challenges-towards-regional-energy-connectivity/>



BIBLIOGRAPHY

18. Taking stock of ASEAN's progress in energy. (18, October 29). Retrieved March 11, 2019, from

<https://www.siew.sg/newsroom/articles/detail/2019/02/08/international-collaboration-key-to-driving-asean-s-clean-energy-ambitions-forward>

19. Trans-ASEAN Gas Pipeline. (n.d.). Retrieved March 11, 2019, from

<http://www.aseanenergy.org/programme-area/tagp/>

20. WEO 2017: Key Findings. (17, November 14). Retrieved March 11, 2019, from

<https://www.iea.org/weo2017/>