The Transformation of ASEAN

Energy Security Implications

This paper focuses on the transformation of ASEAN and how the region perceives its own energy security. The transformation is premised on sustained growth and increasing economic productivity, both of which are not guaranteed. Key to the region’s future are the changes occurring within the largest member, Indonesia, and its ambitious plans to expand its energy sector. Other issues which will be prominent in shaping the future include: integration of energy networks, investment flows for energy infrastructure and technology deployment; managing energy subsidies; the nuclear option; maritime security and geopolitical forces.

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ASEAN’S TRANSFORMATION

Ang Beng Wah’s analysis of ASEAN energy security challenges remain as relevant in 2017 as when it was first published. While ASEAN countries still vary in terms of development and structure of economic production, the trajectory of these countries is key to understanding the region. It is this overall transformation of ASEAN economies, and energy systems, that frames this analysis and will have an impact beyond the region. This approach differs from commentary which places an emphasis on political and economic integration.

The ten ASEAN countries vary widely on numerous energy metrics. Differences between the 10 countries, shown in table 1, shows that any exercise trying to group ASEAN countries based on energy consumption, generation and domestic energy systems is a nearly impossible exercise. Energy reserves, priorities and options vary so much between nations that areas of common agreement or even agreed challenges appear limited.

The ASEAN approach of building consensus and principle of non-interference means that energy collaboration will naturally be limited. By its very nature, ASEAN energy cooperation precludes a centralised, top-down approach. Those expecting European-style energy integration and trans-national energy policy will be disappointed. When considering the ASEAN way of working together, it appears that there will be a fragmented, ad hoc and fluid approach to regional energy security issues. For example, Indonesia is the largest energy consumer in ASEAN and is the world’s largest coal exporter and a major LNG exporter. Compare this to the land-locked nation of Laos which consumes energy at approximately one percent of Indonesia’s level, but has ambitions to be a major hydro-exporter. The Philippines requires large imports of coal whereas Thailand’s heavy reliance on natural gas will be impacted by its declining local production. Such diversity and disparity will result in different forms of energy interaction, even before political structures are considered.

“THE COUNTRIES IN ASEAN ALSO VARY WIDELY IN THEIR SIZE AND INCOME….. GREAT DISPARITY ALSO EXISTS BETWEEN THESE COUNTRIES IN RESPECT OF THEIR STAGES OF DEVELOPMENT AND STRUCTURE OF PRODUCTION. THESE DIVERSITIES CONTRIBUTE TO THEIR INHOMOGENEITY IN THEIR ENERGY DEMAND PATTERNS, ALTHOUGH SOME SIMILARITIES EXIST. THROUGH A BETTER UNDERSTANDING OF THEIR HISTORICAL AND EXISTING PATTERNS OF ENERGY CONSUMPTION, WISER POLICIES FOR ENERGY USE AND CONSERVATION WILL EMERGE.”

– Ang Beng Wah¹, 1986

THE TRANSFORMATION OF ASEAN
Energy Security Implications

Table 1: Energy Consumption and Production – Country Breakdown

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Primary Energy Supply</th>
<th>Total Final Energy Consumption</th>
<th>Installed Capacity (GW)</th>
<th>Electricity Generation (GWh)</th>
<th>Overview of domestic energy system and main features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>3.91</td>
<td>1.49</td>
<td>0.92</td>
<td>4,506</td>
<td>Significant producer and exporter of oil and gas; gas is dominant fuel in electricity mix.</td>
</tr>
<tr>
<td>Cambodia</td>
<td>6.82</td>
<td>6</td>
<td>1.16</td>
<td>1,770</td>
<td>Low levels of energy access and low per-capita energy demand; potential for expanded oil and gas production.</td>
</tr>
<tr>
<td>Indonesia</td>
<td>220.56</td>
<td>167.78</td>
<td>53.07</td>
<td>225,565</td>
<td>Largest energy consumer in region, rising domestic needs has led it to shift some energy production to domestic market; world’s largest coal exporter and major LNG exporter.</td>
</tr>
<tr>
<td>Laos</td>
<td>2.47</td>
<td>2.41</td>
<td>3.23</td>
<td>-</td>
<td>Significant hydropower potential with ambition to export to neighbouring countries.</td>
</tr>
<tr>
<td>Malaysia</td>
<td>78.87</td>
<td>48.47</td>
<td>29.97</td>
<td>147,461</td>
<td>Third-largest energy consumer in region; world’s second-largest LNG exporter in 2014; oil exporter, but not a net producer.</td>
</tr>
<tr>
<td>Myanmar</td>
<td>16.46</td>
<td>9.4</td>
<td>4.15</td>
<td>-</td>
<td>Low levels of energy access and high reliance on biomass and hydropower; increasing domestic gas production.</td>
</tr>
<tr>
<td>Philippines</td>
<td>40.82</td>
<td>28.43</td>
<td>17.94</td>
<td>77,261</td>
<td>Heavily dependent on imports, especially coal; world’s second-largest geothermal power producer.</td>
</tr>
<tr>
<td>Singapore</td>
<td>28.02</td>
<td>17.35</td>
<td>12.92</td>
<td>49,380</td>
<td>Key global refining and petrochemical hub and developing gas-trading hub; almost entirely dependent on energy imports.</td>
</tr>
<tr>
<td>Thailand</td>
<td>134.55</td>
<td>82.33</td>
<td>34.97</td>
<td>174,467</td>
<td>Second-largest energy consumer in region; oil and gas producer, but increasingly dependent on imports; gas is primary fuel in electricity but local production is expected to decline.</td>
</tr>
<tr>
<td>Vietnam</td>
<td>59.57</td>
<td>50.6</td>
<td>30.66</td>
<td>127,329</td>
<td>Growing energy demand has led to increasing imports despite domestic production of fossil fuels.</td>
</tr>
</tbody>
</table>

Focusing on integration and common features, including for energy infrastructure, may be the wrong lens to look at ASEAN. When a history of ASEAN is written in 2047, just like 1986 and 2017, there will still be disparities and vastly different conditions across the region. However, an overall transformation could make it markedly different to what exists today. But this requires reframing our approach to energy security, especially for developing regions such as ASEAN.

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ENERGY SECURITY IN DEVELOPING REGIONS

Analysis of a country’s own energy security usually always takes place at the national level. At times, due to proximity, physical integration, historical development or cultural homogeneity, analysis can be conducted at a regional level, with two or more countries. In the field of energy economics and energy security, regional grouping tends to be focused on North America and Western Europe. In these Western, industrialised regions, internationally-linked energy systems have been long established and issues tend to focus on technical, as opposed to political, challenges. Disputes such as the building of Keystone XL between Canada and the United States, which was a proxy debate over climate change policy, are the exception rather than the norm.

Developing regions face different energy security dilemmas to developed nations. Using the same reference points and analytical framework as Western states can produce findings which diverge from reality. Even aggregating data and averages to the regional level may be problematic given that the constituent countries substantially vary from each other. Furthermore, developing nations face additional complexities that Western states do not. Developing states are also generally focused on alleviating poverty, consolidating the influence of the central state, creating employment opportunities and are often host to societies characterised by competing interests between ethnic and religious groups. This can be seen in eastern Indonesia and southern Philippines, where cultural, religious (Christian-Muslim) fault lines and a traditional maritime movement of people sometimes result in violent incidents and secessionist movements which terrorist groups exploit. On a broader level, the cultural mix on the Malay peninsula of Chinese, Indians and indigenous Malays, impact the politics and decisions of both Malaysia and Singapore. Energy security in these places has vastly different meanings to that dominating the literature and analysis.

Analysing energy security of a developing region, requires understanding local drivers and priorities. This can illuminate trends which are not clear at the country level and point to geopolitical shifts which are not immediately obvious. Furthermore, while each country and region are different, there are some common patterns which inform decision making about grand strategy and energy security. Typically, as nations grow their economies, there becomes a point where demand of energy exceeds internal production. Energy supply is elevated from a technical matter to one influencing national priorities and international engagements. The responses vary depending on the main type of energy used domestically, time-period and local resources. There is generally a series of tipping points which changes the approach to energy security. It appears that ASEAN is approaching this transition point.

Grand Strategy and Energy Security:
Most grand strategy definitions include a reference to managing, controlling and allocating natural resources. From a strategist’s perspective, the importance of natural resources or commodities derives from what they achieve rather than their physical attributes. In previous eras, strategic commodities included salt and whale oil. At present, it is energy in the form of oil. Endeavours to maintain adequate supplies of this commodity are generally termed “energy security”. For the purposes of this paper, energy security is defined more broadly. It is a sub-component of grand strategy which concerns itself with the management, control and allocation of energy resources and the associated technology and supply chains which facilitates their utilisation.
The Association of South-East Asian Nations (ASEAN) member countries

The Association of South-East Asian Nations or ASEAN, has a combined population of 622,250,200 people and a GDP of US$2,573,589 billion ($3,351,594 billion). Founded in 1967, this regional grouping initially comprised Indonesia, Malaysia, the Philippines, Singapore, and Thailand, and has since expanded to include Brunei, Cambodia, Laos, Myanmar, and Vietnam. All ten states are politically, ethnically and religiously diverse to one another, and include democracies, monarchies, socialist states and a junta.

The region is located at the fulcrum of the Asia-Pacific and is home to the Malacca Straits, critical global shipping lanes, particularly for energy resources. The region is bound by China to the north, US power projection to its east, an emerging India to its west and US-linked Australia to its south. Like European and Cold War power struggles in earlier periods, ASEAN is the site of contemporary geopolitical competition.

ASEAN ENERGY OUTLOOK

While industrialised nations have seen energy demand flatten and, in some cases, decline, the picture in ASEAN is very different. Unlike the industrial-led, export model of China and earlier expansion of Japan, ASEAN nations have not yet experienced this type of rapid growth. ASEAN’s growth in energy consumption over the medium- to long-term will be largely driven by three factors:

1. Population growth:
   It is estimated that ASEAN’s population growth will be 0.8 percent per year to 2040, meaning an additional 140 million people will live across ASEAN by 2040. *South-East Asia’s expanding base of consumers will increase energy requirements.*

2. Economic growth:
   ASEAN’s primary energy demand has risen by an average of 0.64 percent for every percent of gross domestic product (GDP) growth since 1971. *Even with a decline in correlation between GDP growth and energy demand, South-East Asia’s forecasted growth of 4.6 percent per year to 2040 will remain a large driver of energy demand. Meanwhile, per capita income, also considered a primary driver of energy demand, is forecast to rise from $10,000 (purchasing power parity) in 2013 to $27,000 in 2040.*

3. Increased grid connectivity
   (Urbanisation):
   ASEAN currently has a relatively low rate of population connected to an electrical grid. With urbanisation in South-East Asia set to rise from 45 percent in 2014 to 60 percent in 2040, demand for existing grids are expected to grow above the natural population rate.

Meanwhile, a fourth factor will become of increasing concern with the transformation and growth of the ASEAN region:

4. Environmental considerations:
   Whilst fossil fuels have led to great improvements in living standards, ASEAN, like the rest of the world, will consider the environmental impact of its future energy sources.

The International Energy Agency estimates that South-East Asia will see demand for its primary energy increase by 80 percent between 2015 and 2040. This equates to an average annual growth rate of 2.2 percent, twice as fast as the global average of 1.1 percent. To put this forecast growth in context, primary energy demand in ASEAN in 2040 will be over three times larger than Germany’s primary energy demand in 2014. Table 3 shows the major expansion in energy demand which is quite different to many other regions. While the use of coal and natural gas is expected to grow in absolute terms, table 2 shows that the proportion of coal in the energy mix will significantly increase. Even if growth is uneven, by mid-century ASEAN may emerge as an important global demand centre for energy and will start to adjust its foreign policies accordingly.

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*United Nations Development Programme and World Bank databases.
Table 2: South-East Asia Primary Energy Demand Mix and Outlook

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2013</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>8%</td>
<td>15%</td>
<td>28%</td>
</tr>
<tr>
<td>Oil</td>
<td>41%</td>
<td>36%</td>
<td>29%</td>
</tr>
<tr>
<td>Gas</td>
<td>19%</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>-</td>
<td>-</td>
<td>1%</td>
</tr>
<tr>
<td>Hydro</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>26%</td>
<td>21%</td>
<td>13%</td>
</tr>
<tr>
<td>Other Renewables</td>
<td>5%</td>
<td>4%</td>
<td>6%</td>
</tr>
</tbody>
</table>

2000 | 2013 | 2040

Table 3: South-East Asia Primary Energy Demand and Outlook (Million Tons of Oil Equivalent)

<table>
<thead>
<tr>
<th></th>
<th>1993</th>
<th>2013</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>13</td>
<td>91</td>
<td>309</td>
</tr>
<tr>
<td>Oil</td>
<td>89</td>
<td>213</td>
<td>309</td>
</tr>
<tr>
<td>Gas</td>
<td>30</td>
<td>133</td>
<td>220</td>
</tr>
<tr>
<td>Nuclear</td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>Hydro</td>
<td>2</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>93</td>
<td>122</td>
<td>134</td>
</tr>
<tr>
<td>Other Renewables</td>
<td>7</td>
<td>25</td>
<td>67</td>
</tr>
<tr>
<td>TOTAL</td>
<td>234</td>
<td>593</td>
<td>1,069</td>
</tr>
</tbody>
</table>

1993 | 2013 | 2040
THE TRANSFORMATION OF ASEAN
Energy Security Implications

ASEAN ENERGY SECURITY

ASEAN energy security is a largely overlooked topic. This is partly a product of the stage of development, politics, historical tensions, decolonisation processes and geography. While there are land borders, the maritime domain is important to ASEAN states. For example, Indonesia, Philippines, Malaysia, Vietnam and Brunei have long coastlines. The maritime legacy and trade mean that shipping has traditionally been an important mechanism to export and move goods within and between nations.

In recent history, ASEAN energy security issues were mainly associated with transit concerns of other states. This is associated with potential disruption of bulk oil carriers through the Straits of Malacca which is the shortest maritime route between African and Persian Gulf producers and East Asian consumers. Threats include piracy, terrorist threats and physical blockages caused by technical issues or accidents. This oceanic movement of energy and geopolitical anxieties relates to the assured access to energy sources, especially by Japan and now increasingly China. When the region was relatively undeveloped and fractured, this logic prevailed. However, this phase is ending. ASEAN growth and subsequent energy demand will mean it becomes a more important driver of energy markets. Change is expected in energy security perceptions, attitudes and policies, especially interaction with neighbours. The shift from being a transit zone of energy to a more important consumption zone could increase tensions, but may also lead to greater collaboration. For example, ensuring the movement and safety of energy through maritime routes may lead to common interest in dealing with maritime threats. However, it may bring ASEAN countries and East Asian nations into greater competition for Persian Gulf reserves.

In addition to China and Japan concerns about the east-west maritime movement of energy through the Straits of Malacca, there are several other countries with interests in the region. The US has been anchored in the broader Indo-Pacific region through a series of bilateral security alliances, including Japan, South Korea and Australia. Its presence helped facilitate the free movement of merchant ships, including those carrying energy. The tensions in the South China Sea, between China and the US, partly relate to the control over maritime zones. Energy shipments, especially for US-alliance partners are an important concern. To the south, Australia has similar concerns about the transit of energy through ASEAN region, but this is framed in terms of shipment of cargos to end markets.

In addition, Australia has to manage tensions between its main security partner (the US) and its main trade partner (China). Russia has a different set of interests in the region, including the potential for it to access East Asian energy markets and have an option to ship energy and goods from its Pacific ports.

Within ASEAN, energy security is a higher order policy priority. Energy demand growth shown in table 2 and 3; planned, large infrastructure projects; and demographic expansion requiring greater levels of imported energy are contributing factors. When this is overlaid with transit concerns and geo-political competition, the picture becomes more complex. This can be seen in the major expansion of external investment being directed into ASEAN energy and infrastructure projects and efforts to position national companies in a period of strong industrialisation and urbanisation. Chinese involvement through its policy banks, Belt Road Initiatives and bilateral relations are a well-known example. The dynamism and flux within the region is occurring at a speed and scale which is not fully understood. A doubling of energy demand in three decades and the Philippines rapid realignment towards China, are both cause and symptom of deep trends. Energy security is informing a wider range of developments across ASEAN.

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It is now time to consider ASEAN as a distinct region for energy security analysis. Ambitions to becoming an integrated regional community as per the ASEAN 2025: Forging Ahead Together statement are part of the reason. However, from a realpolitik perspective, an overlap of energy, commercial and strategic interests could see greater collaboration, especially at the bilateral level. This may not mean a uniform ASEAN energy policy and plan, or an integrated system. Technological change and new generation, transport and renewable technologies mean that energy solutions deployed in 2017 or 2027 will be vastly different to the areas where electrification and widespread use of liquid fossil fuels first emerged over a century ago.

This paper will focus on the transformation of ASEAN and how the region perceives its own energy security. The transformation is premised on sustained growth and increasing economic productivity, both of which are not guaranteed. Key to the region’s future are the changes occurring within the largest member, Indonesia, and its ambitious plans to expand its energy sector. Other issues which will be prominent in shaping the future include:

- Integration of Energy Networks
- Investment Flows for Energy Infrastructure and Technology Deployment
- Managing Energy Subsidies
- Fossil Fuel Requirements
- The Nuclear Option
- Maritime Security
- Geopolitical Forces

To strive for objectivity, this review of ASEAN energy security will attempt to avoid mirror imaging. This is a phenomenon described in intelligence analysis where analysts filter and review information through their own personal experiences and biases. In the case of ASEAN, Japanese requirements for oil imports and European expectations of renewable expansion may skew understandings of local priorities and concerns. Often overlooked is the fact that countries within ASEAN continue the electrification process. Fossil fuels will continue to be an important part of the energy mix. At present, on a cost basis, without a carbon cost, coal and natural gas are the best economic option for countries in the region. Indonesia’s emphasis on coal and natural gas in their ambitious plans, are an example of this cost-benefit calculation. However, batteries, micro-grids and distributed generation options will mean that the grid may not be deployed in a traditional manner. Also, transport fuel requirements are unclear especially if the next wave Uber businesses and autonomous vehicles start to impact the mass market by the early 2020s.

Evidence already suggests that ASEAN is starting to define energy security on its own terms. This includes the articulation of energy security priorities which consider local resources, stage of development and available technology, rather than emulating the pattern of European or even East Asian predecessors.

The clearest sign of the shift within official ASEAN structures is the self-defined 2015 “enhancement” of the ASEAN Centre for Energy which was established in 1999. The enhancement involved a clearer mandate, better dissemination of information and greater local input (building on previous assistance from external entities and organisations). Providing a central source of aggregated, regional data and entity serving as an “ASEAN Energy think tank” will elevate the fragmented and limited discussion on energy security. This entity will increasingly have an international focus as the traditional energy exporting region becomes a net energy importer.

The roundtable and subsequent author research and interviews identified eight key issues and trends which will influence ASEAN energy transition.

1. Implementation of Indonesia’s National Energy Plan
As the largest ASEAN economy, the speed and extent to which Indonesia successfully implements its ambitious 2014 National Energy Plan is perhaps the key driver of the transition occurring within ASEAN. It envisages doubling the use of natural gas and tripling coal use by 2025. If achieved, this plan will create a much larger energy system and alter import and export patterns. While liquid fuels are not an important part of the electricity sector and are mainly used in the transport sector, it is expected that Indonesia will become a net importer of oil.

Indonesia’s National Energy Plan focuses on re-establishing its energy independence by re-directing energy resources from export to the domestic market to rebalance the energy mix towards indigenous energy supplies. In practical terms, this translates into minimising oil consumption, increasing the exploitation and consumption of renewables and coal, and optimising gas production and consumption. As can be seen from publicly available information, it is evident that Indonesia is ambitious in energy security plans and views this issue as important to its development and independence. Comparing its energy security concerns to the US, China, Japan, Korea and the European Union, shows that Indonesia expects to have expanding regional interests and influence as its economy grows.

Ambitious energy plans in both industrialised and developing nations nearly always face the challenge of implementation. The announcement by President Joko Widodo, in November 2015, to procure 35 gigawatts of additional generation was viewed by energy and financial analysts as difficult to achieve. Delivering this mix of private and public-funded electricity generation would always be a challenge. While progress has been made, various bottlenecks and regulatory processes have held up the deployment. However, even at a lower rate of installation, adding 5 gigawatts per year (up from 2-3 gigawatts in the past), suggests some success. The experience of greater international investment in the sector and expansion of network and generation capacity will be important for the 2020s if electricity demand accelerates. At a minimum, the additional capacity will reduce the likelihood of shortages which will provide greater business confidence and encourage investment.

2. Integration of Energy Networks
Integrating energy networks into larger systems helps reduce physical losses, increase market size and provides operators greater flexibility. Most importantly, regional networks reduce the cost of energy and increases efficiency of the overall system. This trend is mature in industrialised countries. Interconnections now cover large sections of continents in North America and Europe, yet this has not occurred within ASEAN. ASEAN initiatives for gas and electricity networks have great promise, but have been difficult to achieve. Slow progress in two key initiatives, the ASEAN Power Grid and the Trans-ASEAN Gas Pipeline, which aim to physically connect energy producers and consumers via natural gas lines and electricity transmission lines, are frequently held up as evidence that ASEAN energy integration is faltering. However, that assessment is predicated on a more conventional approach to energy integration.

There are two reasons that this approach does not adequately reflect the unique challenges faced by ASEAN states. First, even within industrialised, Western nations, initial intra-national and then inter-national energy networks were slow to occur. Network connections only thickened and deepened as economies expanded and there was greater confidence with pooling energy infrastructure. In ASEAN, the domestic expansion and deployment of generation and transmission...
lines are significant. Also, inter-state electricity transmission appears to be expanding, albeit off a small base. For example, from 2015 to 2016, ASEAN Power Grid interconnection capacity grew from 3,489 megawatts to 5,212 megawatts.11 Interconnection also occurs in other forms. Thailand is also deepening its connections with neighbours, through independent power producers (IPP). In early 2016 a Thai-owned 1,653 megawatt coal lignite plant began operating in Laos. Over 89 percent of the power will be exported back into Thailand under a 25-year power purchase agreement. Similarly, there are plans by Thailand’s IPPs to build coal power plants in Cambodia.

The second problem with measuring integration by capacity of electricity transmission connections is the prevalence of islands and archipelagos means that physical linkages are more difficult and expensive than if they were crossing land borders. On this point, the intra-regional trade of coal from Indonesia to Philippines is a form of energy integration, even though not a direct physical connection. This also applies to Vietnam’s increasing coal import requirements. Furthermore, new technologies and economics may result in greater integration, even if physical networks are not built. For example, the French company Engie is developing a project for small-scale LNG in Indonesia.12 Referred to as a “milk run”, utilising small re-gasification plants with small electricity plants, means a large traditional footprint of interconnected infrastructure may not be required.

3. Investment Flows for Energy Infrastructure and Technology Deployment

The ability to access and deploy capital for energy infrastructure and related technology will be one of the key determinants of the transformation of ASEAN. Requirements of energy supply infrastructure investment vary, with the Japanese Institute of Energy Economics estimating this to be around $2-trillion. For instance, the rough cost of a megawatt of generation capacity or a kilometre of electricity transmission line is around one million dollars. With electricity capacity in the gigawatts (a gigawatt is a thousand megawatts) and tens of thousands of kilometres of transmission requirements, the scope becomes clear. This is well beyond the resources of local economies. It will require governments to look outwards to secure the necessary resources. For example, in early 2017, Korea Western Power Co announced an investment of US$1.85-billion to construct a 1,200MW coal-fired power plant in the central Vietnamese province of Quang Tri.13

For the foreseeable future, both the capital and technology will be sourced from outside ASEAN. Managing the expectations of external partners, while deploying new technologies which disrupt existing sectors and industries, is not a simple task. This applies to both private sector funds and for government linked banks. Accessing China’s One Belt One Road Initiative and funds from policy banks show the overlap between economic infrastructure and geo-politics. In the case of ASEAN energy infrastructure, the actions of China’s policy banks will be informative in the type of energy generation which is favoured and the main destination countries. A study found that these Chinese banks lent significant funds to emerging and middle income countries for power projects including fossil fuel extraction, large hydroelectric projects, and coal power plants.14 This has seen an increase in Chinese influence within these nations as Western countries and banks are limiting their involvement and financing to coal related projects. This trend is likely to continue with an estimated US$35–72 billion planned to finance new overseas coal projects.15

All nations face challenges over balancing ownership with control of their energy infrastructure and electricity generation assets. For ASEAN nations, the quantum of investment flows and technology deployment will be significant, especially as they enter high energy demand growth periods and transition towards

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middle income status. Whether it is Chinese-financed coal power plants or capital and technology from other institutions for network infrastructure, balancing national interest issues and public sentiment over environmental concerns will be a difficult task. Protests associated with a proposed 800-megawatt, Chinese-built coal generation plant in the Krabi coastal region of Thailand, magnified by the support and involvement of international environmental non-government organisations, will likely be played out across the region over the next few decades.

4. Managing Energy Subsidies

Maintaining public access to energy as well as subsidising the cost of energy delivery and consumption are common concerns of governments worldwide. In developing nations, the application of energy subsidies for cooking, heating or cooling applications can be extremely sensitive. Removal or adjustment of subsidies can result in riots, instability and can influence movements agitating for revolution. However, energy subsidies represent a major drain on public monies and distort consumption patterns. Addressing energy subsidies and shifting to markets is necessary to facilitate private investment and reduce pressures on public budgets.

Lower energy prices after 2014 enabled ASEAN governments to address energy subsidies which had accumulated over time. Indonesian President Joko Widodo took advantage of his early popularity and declining energy markets to remove local fuel subsidies. This helped free up money for other uses, but is a feature of the current energy price cycle. As energy markets tighten towards 2020, the extent to which ASEAN leaders allow international prices to flow through to their public will determine the level of distortion (and drain on treasuries) for the 2020s.
5. Fossil Fuel Requirements

While the global decarbonisation of the energy sector will accelerate during the century, fossil fuel use will continue for several decades. Some regions, including ASEAN, will continue to expand its use of fossil fuels, including oil, natural gas and especially coal, reserves of which ASEAN possesses. While indigenous coal reserves are significant, especially in Indonesia and Vietnam, ASEAN became a net importer of oil in the 1990s and will likely become a net importer of natural gas around 2030. The IEA forecasts ASEAN oil production to reach 2.5 million barrels a day by 2020, before declining to 1.6 million barrels a day in 2040; natural gas production to grow from 214 to 260 billion cubic metres between 2013 and 2040; and coal production increases reaching over 600-million tonnes of coal equivalent in 2040. It is worth noting that between 2000 to 2013, coal production increased five-fold from 83 to 450 million tonnes of coal equivalent.

As ASEAN starts to import larger supplies of energy, it will begin to have a greater influence over the direction of international markets as its demand and domestic shortfalls start to have a greater impact on price movements. It will also consider international maritime transport routes in terms of its own security of supply. While ASEAN states have been acutely aware of maritime security for energy transport for decades, there will be a trend towards the deployment of more modern and capable navies as well as energy supply chains reaching to the Persian Gulf. The timing in which broader energy security concerns will be determined by the speed ASEAN continues to expand its fossil fuel use and its approach towards imported energy.

From a strategic perspective, the large domestic reserves of coal make it an obvious energy source which can be expanded. Indonesia is already embarking on this path with a significant development of its coal production and is building coal generation plants. After Indonesia, Vietnam is the second largest coal producer in ASEAN. In 2015 it produced 41.5-million tonnes of coal, becoming a net importer of coal the same year. Its plan to add an additional 21.1 gigawatts of coal generation by 2020 and an additional 36.5 gigawatts by 2030 is viewed as overly ambitious, due to earlier plans failing to meet targets and the speed to which plants can be commissioned and built. However, even a partial expansion of its coal fired power sector will see Vietnam shift more to global markets. The transition from natural gas to coal also has a strategic dimension. Thailand and Malaysia have what is viewed as an overreliance on natural gas within their electricity systems, accounting for 67 percent and 55 percent respectively. Rebalancing the mix makes sense as gas production matures and prices favour largely Indonesian coal. Also, despite mixed signals within the Duterte administration in the Philippines, economics will prompt a gradual move to increase coal generation.

For some time, ASEAN has been a net global exporter of natural gas and a long-term participant in LNG markets. However, the 2020s will see a transition towards increasing reliance on imported energy sources and greater internal trade of coal. This issue may be a factor in the minds of energy planners who will be subject to global gas prices which will eventually recover and put pressure on prices.
6. The Nuclear Option

Nuclear technology has both energy and security considerations. There is a current trend in ASEAN away from nuclear power. However, the halting of nuclear programs may be a feature of sentiment after the Fukushima nuclear power plant disaster in Japan, as well as with the current phase of lower energy prices. The table below summarises the prevailing position in each ASEAN state towards nuclear power development.

### Table 4: Outlook in each ASEAN state towards nuclear power

<table>
<thead>
<tr>
<th>Country</th>
<th>Nuclear Outlook</th>
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<tbody>
<tr>
<td>Vietnam</td>
<td>In January 2015, the Vietnamese government planned the construction of two Russian and two Japanese supplied nuclear plants which were to be completed by 2019. These plants were each expected to produce 1,000 megawatts. In early 2016, the first unit was delayed for 6 years (from 2016 to 2022). The commissioning date was then deferred to 2028. Vietnam’s 2030 nuclear target was also reduced from 10.1 percent to 5.7 percent of the total energy mix. On 22 November 2016, Vietnam’s parliament voted to abandon nuclear power plant construction due to increased estimated costs from US$9-billion to US$18-billion.</td>
</tr>
<tr>
<td>Thailand</td>
<td>Thailand has a long interest in nuclear power, with its first research reactor operational in 1962. Feasibility studies and planning occurred in the late 1960s to prepare for an expanded generating capacity. However, major natural gas discoveries in the Gulf of Thailand deferred initial nuclear ambitions. Facing the prospect of declining natural gas supplies, Thailand’s National Power Development Plan in 2007 called for nuclear energy by 2020. The Electricity Generating Authority of Thailand intended to invest US$6-billion in a 4,000-megawatt nuclear power plant. Planning was halted due to public opposition after the Fukushima incident in Japan. The start date was initially deferred to 2023, but the date was postponed until 2035 in the May 2015 National Power Development Plan. This includes forecasts that two nuclear power plants will meet up to five percent of Thailand’s electricity requirements by 2036.</td>
</tr>
<tr>
<td>Indonesia</td>
<td>In 1990, the Indonesian government proposed the construction of twelve 600 megawatt nuclear power plants on the Muria Peninsula. This faced public opposition; there was a lack of political persistence and the location meant challenging geological conditions would be faced. Subsequently the proposal was dropped. In 2006, the Indonesian government planned to invest US$8-billion for four large nuclear plants [Muria, Banten, Bangka Island (West and South Bangka)], scheduled to commence operations in 2025. The plants, likely to be supplied by Russia, were expected to create 6 gigawatts in total however, were scrapped in December 2015. Attention has now shifted to planning a small 10 megawatt reactor at Serpong, near Jakarta to be built by Russia.</td>
</tr>
<tr>
<td>Philippines</td>
<td>The OPEC oil crisis in 1973, prompted the Philippines government to plan the Bataan nuclear plant on the Bataan Peninsula. It was completed, but never fuelled due to negative sentiment surrounding nuclear energy after the Chernobyl nuclear disaster in 1986. In 2008, plans to revive the plant were proposed by the government however, high projected costs and public backlash resulted in the proposal being deferred.</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Due to high energy prices in 2008, the Malaysian government commissioned a study to assess the feasibility of nuclear power use. In 2010, US$7-billion was budgeted for a new reactor to be built. A target date of 2023 was set. The government is presently developing plans and undertaking feasibility, site selection and regulatory studies regarding potential plants. The earliest date to construct the first nuclear plant has been identified as 2030. Two 1,000 megawatt plants have been proposed. These will likely be constructed by Russia.</td>
</tr>
<tr>
<td>Laos</td>
<td>Does not possess financial capacity, infrastructure or manpower to explore nuclear technologies.</td>
</tr>
<tr>
<td>Cambodia</td>
<td>Does not possess financial capacity, infrastructure or manpower to explore nuclear technologies.</td>
</tr>
<tr>
<td>Singapore</td>
<td>Will not explore nuclear, due to limited landmass and environmental concerns.</td>
</tr>
<tr>
<td>Myanmar</td>
<td>Has shown interest in building a domestic nuclear capacity and relies mainly on Russian assistance. Burma’s nuclear ambitions are believed to have included a clandestine weapon program.</td>
</tr>
</tbody>
</table>
Notwithstanding the current negative indicators, it is possible that as the century progresses, nuclear power will become part of the energy mix across ASEAN. Unlike Western nations, where carbon pricing is viewed as a driver for encouraging nuclear power plants, the depletion of indigenous natural gas reserves is important in ASEAN. This trend is most evident in Thailand, where in 2014, natural gas represented 64 percent of power generation. Its 2015 National Power Development Plan aims to reduce this to 30–40 percent. While coal, hydropower and renewable energy sources will contribute to this reduction, nuclear will be an attractive baseload option.

Aside from limited domestic energy sources and higher energy prices, there are security considerations for nuclear power. Apart from Myanmar’s earlier interest in building a nuclear capability for a weapons program, it appears that most ASEAN nuclear plans are focused on domestic power supply. However, there remains potential for an eventual (and long-term) shift towards an indigenous nuclear military program. This may be accelerated if there is a nuclear arms race in north Asia. The establishment of viable domestic nuclear power industries would simplify this step, although it is not an immediate issue. A long-term issue with the building and commissioning of nuclear power plants in ASEAN relates to the capacity to create and staff the requisite regulatory, safety and training agencies. Even with foreign support, it can take decades to create. The current stop-start approach to nuclear planning has the effect of hollowing out expertise and reducing the domestic nuclear skill set.
7. Maritime Security

In energy security discussions about ASEAN, maritime issues will often focus on the Straits of Malacca. Connecting the Indian Ocean to the South China Sea and the Pacific Ocean, the Straits of Malacca is a globally important strategic chokepoint. Around 15 million barrels transit through this narrow waterway each day. This predominantly Middle-Eastern energy heads towards China, Japan and increasingly Indonesia. While Indonesia and other ASEAN oil importing nations have a direct interest in this issue, it is mainly external powers which define maritime security concerns.

Within ASEAN, there is an important internal movement of energy. An overlooked, but important maritime trade is the Philippines reliance on imported Indonesian coal. In 2015, over 70 percent of the coal used by the Philippines was from Indonesia. This equated to 15 million tonnes and was a key input into the Philippines domestic electricity system. In mid-2016, in response to kidnappings of Indonesian crew members, robberies and other attacks on coal barges heading to the Philippines, Indonesian Foreign Minister Retno Marsudi extended the moratorium on coal shipments to the Philippines “until there is a guarantee for security from the Philippine government.”

While the Philippines has other coal import options, and the issue appeared to be focused on the Celebes and Sulu seas, this type of intra-ASEAN energy maritime trade and movement will expand as the century progresses. The development of a need to protect internal ASEAN waters for domestic energy security concerns, will result in a different dynamic to external powers seeking assurances about the Straits of Malacca. With natural gas imports arriving from out of the region; internal natural gas trade via LNG; and increasing movement of seaborne coal within the region, maritime security will become increasingly important for ASEAN nations. This may prompt greater cooperation, at least on the bilateral level where export revenues and energy security concerns overlap.

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8. Geopolitical Forces

While ASEAN may eventually be home to nations which can project power beyond the immediate region, in the immediate future it will be shaped by global and geopolitical forces. One of the most important contemporary issues is the emergence of China and its challenge to the existing US defined global order. For ASEAN, this is playing out in the South China Sea which is home to overlapping claims and is an area which China is seeking to expand its influence. The lack of ASEAN Code of Conduct in the South China Sea and the ability of China to limit the consensus required for such an agreement is an example of the challenges of ASEAN diplomacy.

Tensions within the South China Sea are not new, but now take on more urgency. Discovery of offshore energy reserves and the geopolitical implications were concerns raised from the 1970s. Corazon Morales Siddayao’s 1981 *The Off-Shore Petroleum Resources of South-East Asia: Potential Conflict Situations and Related Economic Considerations* was remarkably prescient. Siddayao identified jurisdictional issues concerning the Law of the Sea and contrasting national perceptions of these issues; challenges associated with territorial disputes in the South China Sea; and potential conflicts arising from geological and environmental factors. In 2014, China’s CNOOC (China National Offshore Oil Corporation) moved its HD-981 oil rig into a contested area of the South China Sea, which Vietnam considers as its exclusive economic zone. Vietnam protested Chinese drilling in the area by sending coast-guard vessels to confront the rig. Dozens of Chinese and Vietnamese maritime vessels converged near the disputed rig and there were anti-Chinese riots in Vietnam resulting in five deaths. While offshore energy reserves exacerbate tensions, they are not the only driver for disputes but appear to increase the stakes. Broader security concerns may be one reason why Vietnam has been moving closer towards the US, while the Philippines, under President Rodrigo Duterte, has appeared to realign abruptly to China.

Beyond geopolitical tensions beyond US–China rivalry, other important factors include South Korean and Japanese responses to greater uncertainty; Russia’s traditional Pacific interests and; India’s expansion and blue-water navy plan. While Robert Kaplan refers to the South China Sea as “Asia’s Cauldron”, it would be fair to say that ASEAN is the Indo-Pacific’s cauldron. ASEAN nations will make energy decisions with a keen eye on geopolitical forces which may trump economic and environmental considerations.

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This will result in traditional export patterns shifting to imports. There is already a transition to imported oil. Furthermore, the region is expected to become a net importer of natural gas around 2030. As these changes occur, energy security will rise as a priority.

The continued reliance and expansion of fossil fuels by ASEAN states may cause disagreements with international organisations and especially the European Union which prioritises decarbonisation. Tensions may arise from attempts to impose energy choices, although quiet disengagement will be a likely outcome. The World Bank’s decision to limit coal fired power plants from 2013 will result in a shift to institutions, such as China’s policy banks for funding and technology. In this context, the debates over the funding coal projects through the China-led Asian Infrastructure Investment Bank (AIIB), is a proxy debate over domestic climate change issues. Regardless of AIIB policies, China can and will fund coal projects aboard.

It will be informative to see the transformation of ASEAN approaches towards natural gas use. Thailand’s traditional heavy reliance on natural gas (and to a lesser degree Malaysia’s similar reliance) has been long identified as an energy security issue. On this matter, the pending decline in production will focus the minds of planners and decision makers. With natural gas demand expected to expand, there will be a greater reliance on imported LNG, firstly from within ASEAN and then from further abroad. Building of regasification capacity and storage facilities as well as LNG receiving terminals will reinforce maritime and littoral security requirements. The many islands, and mini-gas and mini-LNG solutions, may accelerate the need for coastguard and naval assets, especially after an attack on LNG assets such as LNG carriers or receiveal plants. With some governments reconsidering nuclear plans after the Fukushima disaster, an attack on any LNG facility, even outside the region, will have important reverberations.

In terms of geopolitical drivers, ASEAN will continue to be subject to international forces such as China’s expansion, US moves maintain its presence in the region and an increasingly assertive India. The shift to becoming a major energy importer will change the relations with East Asian nations as they increasingly compete for international energy sources and ASEAN’s geopolitical interests will start expanding. Indonesia’s discussions with Iran to import crude oil for an expanding refining sector and internal demand is a case in point. A December 2016 meeting between Indonesian President Joko Widodo met with Iranian President Hassan Rouhani focused on increased cooperation in oil and gas, oil field management and the electricity. The official Indonesian statement following the meeting noted that Iran has one of the world’s largest energy reserves and diversifying energy cooperation will be very important for national energy resilience. Over time, Indonesian-Iran relations may deepen, especially if US President Trump reverses the thaw in Iranian-US relations.

As individual ASEAN countries start to share common concerns about energy imports, greater network interconnections and collaboration on energy will occur. Slowly expanding physical networks and a temporary shift away from nuclear power may be viewed as an aberration of the 2010s. There is no reason why both will not be accelerated during the 2020s.

As affluence increases and urban smog becomes a concern there is potential for more active environmental groups in ASEAN states to start shifting energy policies. This could be a real challenge for leaders as urban elites begin to expect world-class environmental standards, but many in the countryside and remote islands simply seek reliable power. The response of pollution and haze in the Beijing-Tianjin-Hebei region of China may be a harbinger for large ASEAN cities. While China thus far channels protests WeChat and Weibo, China’s most popular social media, demands in ASEAN cities may be less manageable. Cheap, reliable renewable energy sources are a wildcard, but until the transition to middle income is mature, cost will probably be a key determinant of energy choices.

Energy security will come sharply into focus during the 2020s as energy markets return to balance and there is upward
pressure on energy prices. This may occur in stages before 2020, as tightening oil, natural gas, and coal markets will put pressure on ASEAN leaders to reintroduce subsidies (or expand existing programs) and will intensify competition over discovered, but undeveloped energy reserves. Should higher energy prices coincide with high economic growth rates and rapidly increasing energy demands, trade-offs will need to occur. The Gulf of Thailand and the western areas of the South China Sea will likely be sites of continued interest for oil and gas production and tensions.

IMPLICATIONS FOR AUSTRALIA AND WESTERN AUSTRALIA

The transformation of ASEAN, and the prospects of a powerful Indonesia on Australia’s doorstep, has long preoccupied Australia’s strategic planners. The energy security dimensions of a larger ASEAN, which imports some of its energy, brings with it both challenges and threats. As countries become reliant on seaborne, imported commodities, they have focused on expanding their naval capacity and have changed their defence doctrine accordingly. The modernisation and expansion of ASEAN navies is not driven by energy concerns, but it will likely increasingly feature in deliberations. With this expansion, there is potential for more maritime security cooperation against piracy and joint activities with their Australian counterparts.

Like other nations outside of ASEAN, Australia has a keen interest in the maritime routes through this region. This applies to energy and resources exports to north Asia, but also for Australia’s increasing reliance on imported oil and refined fuel, including from Singapore. With regards to markets, Australia has traditionally been a competitor of ASEAN for thermal coal and LNG markets. In the case of Western Australia, which does not have major coal reserves, market competition traditionally is focused on LNG. Over the longer term, as ASEAN becomes a net importer of natural gas, there will be a transition from competitor to potential customer. There are already signs of this transformation with Western Australian-based Woodside signing an agreement to supply around 0.5-1.0 million-tonnes of LNG per year from 2019 for 15-20 years to Indonesia’s Pertamina. While the agreement is conditional, this may be the beginning of a new phase of the Western Australian-Indonesian relationship.
CONCLUSION
This paper began with a quote from Singapore-based Ang Beng Wah in 1986 reflecting on ASEAN energy security and outlook. Some three decades later, the basic premise of his analysis of significant diversity with some similarities still holds true. Looking three decades into the future towards 2050, the picture will be quite different. Many parts of ASEAN will have shed their “developing” status and officials in Jakarta, Kuala Lumpur and Bangkok may be involved in Middle-East stabilisation efforts to protect oil resources and be considering ultra-deep gas fields in yet to be discovered offshore basins. There is little evidence of awareness of this new reality, with energy security analysis focusing on the current big thing (China) and projecting energy security perceptions onto ASEAN. This state of affairs will not continue. There will be some tipping point or event in which ASEAN becomes the centre of attention. As energy security becomes more important within ASEAN, a key turning point will be as ASEAN and its constituent nations lead and define these discussions.

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PERTH USASIA INDO-PACIFIC ENERGY SECURITY PROGRAM

With rapid changes in energy demand and consumption patterns in the Indo-Pacific region, concerns over security of supply are a growing issue for national governments. Policy responses are broadly described as measures to improve “energy security”. Attempts to enhance energy security influence geopolitics, accentuate existing tensions and could even provoke conflict. By bringing together energy sector leaders from across the region for a series of roundtables this program aims to better understand the tensions between market and security concerns and creates a forum for in-depth policy discussions on this capricious issue.

PUBLICATIONS PRODUCED AS PART OF THIS PROGRAM INCLUDE:

- Andrew Pickford and Michael Petric, Industry Consolidation in the Age of Gas: Strategic Implications for Australia, Perth, Perth USAsia Centre, 2015.
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