

# PERSPECTIVE

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## **The Intractable Challenges Facing Energy Trade in Southeast Asia**

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*Electricity power transmission lines in Petaling Jaya, near Kuala Lumpur, Malaysia. Picture taken on 21 August 2021 by Mohd RASFAN, AFP.*

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**EXECUTIVE SUMMARY**

- A cross-border power grid offers Southeast Asian countries the potential of greater energy security, affordability and sustainability, while also reducing greenhouse gas emissions through a more efficient network for distributing energy.
- The benefits of the grid could be fully realised via a robust multilateral energy trade system with harmonised grid codes, ironed-out wheeling charges, and a regional coordinator.
- However, to overcome these long-standing technical and institutional challenges, countries in the Greater Mekong Subregion should also look towards the benefits to be gained from cooperation. They should resort to cold calculations on the energy production costs that they each could save.
- In addition, solar energy supply via undersea cables may reduce the extent to which powerful energy buyers now depend on existing ASEAN grids. This would create healthy competition between energy providers.
- A deeper involvement of the Asian Development Bank in providing technical expertise in engineering and economics can complement ASEAN's institutional coordination role.

## INTRODUCTION

ASEAN is expected to grow collectively by over 5 percent per year to become the world's fourth-largest economy by 2030.<sup>1</sup> At the same time, the ASEAN Centre of Energy has predicted that energy demand in the region will increase by more than 70 per cent between 2020 and 2040.<sup>2</sup> In meeting that demand, energy in the region will also have to be secure, accessible and affordable. Arguably, the most substantive measure to be undertaken in the region is the ASEAN Plan of Action for Energy Cooperation (APAEC) which involves the upgrading of the electricity grid and development of a multilateral electricity trading platform. These activities may contribute to the target of reducing energy intensity<sup>3</sup> by 32% by 2025.<sup>4</sup> Energy cooperation is presently managed through consensus among national energy authorities under the authority of energy ministers in Southeast Asia. ASEAN Energy committees deliberate and decide on technical issues regarding the energy grid upgrade in multiple layers, including the Heads of ASEAN Power Utilities/Authorities (HAPUA), the ASEAN Power Grid Consultative Committee (APGCC), the ASEAN Ministers on Energy Meeting (AMEM), and the ASEAN Senior Officials Meeting on Energy (SOME).

The ASEAN Power Grid programme aims to 'enhance connectivity, energy security and sustainability'. Countries like Lao PDR are likely to produce energy in surplus, while middle income and advanced economies like Malaysia and Singapore would seek to buy electricity as part of their energy diversification and greening strategy. This trade structure can be achieved by connecting the individual national grids and agreeing on the pricing mechanism. Given present constraints, it is all the more important for existing sources of energy to be utilised more efficiently and in ways that reduce carbon emissions. This is where multilateral trading of energy will become relevant, and surpluses from one country can be sold to another through the power grid.

The ASEAN Power Grid (APG) is one way that can allow for greater cross-border energy trade. It has the basic infrastructure to facilitate a more inter-connected ASEAN, which will make large-scale renewable energy investments viable with excess energy produced in one country being sold to another through the grid, reaping economies of scale.<sup>5</sup> Trading in renewable energy through the APG could be one means for countries individually and for ASEAN collectively, to reduce carbon emissions. The APG includes improvements both to the physical infrastructure and to procedures and mechanisms for the trading of power.<sup>6</sup>

The question is whether Southeast Asian countries see clearly enough the opportunities that can be found in harmonising energy grids and selling surplus energy. While the economic incentives should be obvious, countries with greater purchasing power and production capacity are likely to maximise their own interests while the weak suffer what they must. The brutality of trade negotiations exists even in legally mature institutions like the European Union. Putting political rivalry and technical capability aside, ASEAN further faces a greater challenge. The institution abides by the foundational principle of non-interference in the affairs of other countries. While this has brought peace, it has at the same time steered Southeast Asian actors to shy away from any open conflict, including agendas critical to the long-term viability of the region. This has been exemplified in the financial

collapse of 1998, in the transboundary air pollution which was stalled and only ratified by Indonesia on 16 September 2014 after the other nine member countries had ratified much earlier in 2010, and with the military coup in Myanmar. Is the issue of trading for energy across borders in the too-hard basket as well, given that there are sovereignty issues involved in the role national energy providers of each ASEAN member country play?

## **SECURING ENERGY VIA TRADE**

The APAEC has successfully articulated the need for regional energy integration but failed to obtain buy-in from member countries to realise the concept. It is anticipated that the electricity grid can draw from renewable energy plants such as the solar farms in Vietnam, hydropower facilities in Laos, and offshore wind turbines in Thailand. Diversifying the sources locked into the electricity grid will provide opportunities for the trading of surplus renewable energy, especially when other sources of renewable generation dips or fossil fuel products experience price spikes, as was evident in the 2021 global energy crisis and that has stretched into 2022.

The technical upgrade of the electricity grid is relatively straightforward. The Herculean task lies in the establishment of sufficiently appealing trade terms for member countries. While they understand that only multilateral trade will leverage the economies of scale, the only existing arrangements so far have been bilateral.

Southeast Asian countries are in general insular in their policy thinking. Therefore, it takes strong political will for them to look beyond national borders and immediate needs. Under the common understanding of regional energy trade for long-term security, national governments can exchange information and align activities.<sup>7</sup> A cooperative culture will facilitate the harmonisation of grid codes and wheeling charge. Countries will also agree on who has access to the grids, what data and information can be shared, and how average clearing prices are set. The region is not short of good ideas for making these possible.

## **SKETCHING TRADE MODELS**

Three trade models can be examined more closely.<sup>8</sup> The first involves ASEAN developing a harmonised bilateral trade model. The harmonisation will require standardising bilateral contract templates and a common wheeling charge methodology. The latter allows an intermediary country to facilitate power transmission. An international institution is needed to act as the regional coordinator for managing transactions. An ASEAN country can enter into bilateral agreements with any other country even if they do not share a border.

The second model proposes the development of a regional power market that is separate from national market operations. To overcome information asymmetry across market systems, a central clearing party and a regional market operator must collect and share information on the supply and demand of electricity. The information is critical for ensuring efficient market response to shocks such as economic crises, infrastructure failures and natural disasters. The central clearing party can also facilitate fund transfers between countries.

The final and most ambitious model replaces the national markets with a fully integrated regional market. The role of the institutions is essentially the same, but their overall responsibilities will increase significantly. A fully integrated market is then facilitated by the regional grid infrastructure, technical institutions, harmonised grid codes, and a regional market coordinator.

## **TESTING THE WATER**

None of these models are like rocket science in difficulty. In fact, bilateral energy trade agreements already exist in the region; Singapore imports electricity from Malaysia, for example. Undersea cables have connected electricity grids between Singapore and Malaysia since the 1980s.<sup>9</sup> This initiative has not been driven by profit interests alone but also by security interests. Both countries help each other manage grid stability and address intermittency issues. Another case is Thailand's import of electricity from Laos.

As a starting point of multilateral trading, the Lao PDR–Thailand–Malaysia–Singapore Power Integration Project (LTMS-PIP) serves as a “pathfinder” project for multilateral trading.<sup>10</sup> Malaysia purchases power from Laos under set terms on price and quantity, and Thailand acts as a wheeling country that allows the use of its energy grid for transmission between Malaysia and Laos. This project has shown that energy trading among Southeast Asian countries is possible but can be expanded to be multidirectional and to involve more than three countries. The LTMS-PIP already includes a wheeling charge methodology that is applicable for a harmonised regional model. Over the last 15 years, trade has increased fivefold, and power exports from Laos to Thailand have contributed a share in trade of about 79 percent in 2019. At present, most electricity trade within the APG occurs bilaterally.<sup>11</sup> Singapore joined the LTMS-PIP two years after its inception,<sup>12</sup> and in September 2021, Laos, Thailand, Malaysia and Singapore reaffirmed their commitment towards advancing multilateral cross-border trade in ASEAN, with a modest cross-border power trade of up to 100 MW from Laos to Singapore via Thailand and Malaysia using existing interconnections starting in 2022.<sup>13</sup> To provide some perspective, Singapore's total electricity supply capacity was estimated at 10,280MW in 2021.<sup>14</sup> The arrangement allows Singapore to tap into renewable energy from Laos.

In 2018, Malaysia began buying electricity from Laos. Singapore joined in 2020 and was expected to start purchasing low-carbon electricity from Laos in 2021. The option of importing renewable energy from other sources in the future can be made available when the grid is harmonised across the countries. Being strategically located between Peninsular Malaysia and Sumatra, Singapore is well-placed for when multilateral trading starts progressing across the region. Existing transmission cables from Malaysia will also need to be upgraded, and the technical and regulatory framework will have to be streamlined by the utility boards of both Singapore and Malaysia. However, on 23 October 2021,<sup>15</sup> Malaysia announced that it would only allow non-renewable exports to Singapore.<sup>16</sup>

## **DOING IT THE ASEAN WAY**

In April 2017, the ASEAN Power Grid Consultative Committee (APGCC) agreed on the principles that are to underpin increased power integration in the region.<sup>17</sup> These are as follows.<sup>18</sup> First, trading should be stepwise and voluntary. Second, power trade should focus on gaps and excesses and not require the utilisation of all domestic generation plants in the regional market. It should also not interfere with the operation of national power systems. Third, national regulations should be complemented by regional coordination. Multilateral power trading can be achieved in incremental rather than transformational steps. Fourth, multilateral trading should be supported by expanding the regional (cross-border) power system infrastructure with a master plan developed with multilateral trading in mind. Fifth, a regional wheeling price model should be established. Lastly, sustainable power systems should be in place to increase the deployment of variable renewable resources.

By 2020, seven of the 16 power interconnection projects in ASEAN had been completed.<sup>19</sup> The upgrade of power grids is projected to cost US\$1.2 trillion up till 2040. After that, rapid grid expansion may be necessary to cope with the fast economic growth and high energy demand in the region. Datafication of grid operations will enable targeted control of the processes of generation, transmission, storage and usage. All of these would cost the governments a fortune. Naturally, private investment is required. However, the most intractable challenge is not technical according to well-known energy analyst Philip Andrews-Speed. In pursuing multilateral energy trade frameworks, national governments would keep their domestic vested interests so close to their chests that negotiations would stall very quickly. Moreover, national energy authorities are not ready to resource the long-drawn negotiation and coordination process. After all, there has not been many successful cases of sustained collaboration between Laos, Thailand, Cambodia, Malaysia and Singapore. They are at vastly different levels of economic development, and this is reflected in a mismatch in institutional capacities for international trade.

## **TRADING WITH RENEWABLES**

The ASEAN grid in the Greater Mekong Subregion can only offer a glimmer of hope and no certainty at the moment. Countries that are looking to reduce carbon emissions through electricity generation may not want to place all its eggs in one basket. Singapore, for instance, has looked elsewhere for energy supply. For example, the idea of transmitting solar energy from Australia to Singapore via an undersea cable was floated already in 2014. Since then, the Northern Territory Government in Australia has crafted regulatory and incentive frameworks to welcome investment in solar farms to be situated in the most consistently sunny place on earth. A Singaporean company, Sun Cable, took up the opportunity after years of negotiation.<sup>20</sup>

Other possible links to Australia have been subject to changes in policy. For example, in July 2021, the Australian Federal Government placed the Asian Renewable Energy Hub in the Northern Territory on the back burner due to concerns about the Hub's impact on migratory birds and wetlands.<sup>21</sup> This was quickly overturned when both levels of government in Australia granted the solar precinct Major Project status, so the project is still

underway.<sup>22</sup> Singapore's diversification effort extends into the construction of the world's largest floating solar panel system in Batam, Indonesia. A large portion of the generated electricity will be transmitted to Singapore.<sup>23</sup>

Singapore's energy diversification strategy may trigger healthy competition among energy providers within the region. It may maintain the momentum of this pro-trade and pro-climate vision if ASEAN supported such a development in its regional energy plan – APAEC. A further step would be a discussion of this emerging energy trade model in the region during the 40<sup>th</sup> ASEAN Ministers on Energy Meeting, ending with an explicit acknowledgement in the associated Joint Ministerial Statement. This is the least that ASEAN, which has aspired to create a vibrant single market in the region, can do in the interim. In addition, ASEAN needs to concentrate economic analytical capability from international organisations to present a much stronger case of cost-savings through multilateral energy trade to its member nations.

### **BETTING ON THE NEW KID**

The lack of urgency in sharing energy to achieve long-term security across the region is palpable. According to energy insiders, APAEC had been abandoned by national energy officials for a while before it was revived for the recent drafting of the next iteration of the plan.<sup>24</sup> The fear is that the main policy actors may be merely rearranging chairs on the deck of a sinking Titanic.

The Asian Development Bank has been a long-standing advisor to all three power grid regions. It provides expertise spanning across economic evaluation, geographical mapping, power grid engineering, and environmental and social impact assessment. Environmental issues related to land ownership, permit application and biodiversity threat have been raised,<sup>25</sup> demonstrating its sensitivity to green standards in large-scale infrastructure planning in the region.

In taking the power grid projects to the next level, ADB proposes the alignment of its objectives with those of ASEAN. The ADB's Greater Mekong Subregion Masterplan adds to the ASEAN Interconnection Masterplan Study, and the ASEAN Catalytic Green Financing Facility complements the APAEC. ADB could provide advice on financial and technical planning to the ASEAN Power Grid Consultative Committee. ADB can even support the ASEAN Centre for Energy in implementing pro-trading strategies such as open access proposals, wheeling charges, bilateral measures, and balancing mechanisms. Therefore, the Bank has recognised the need to keep engaging with the energy sector while establishing connections with other sectors. Drawing regulators from finance, trade and investment into the planning process will resolve the two primary issues of the power grid: slow investment in expanding connections, and poor trading capacity between countries.

### **SHOCKING POLITICAL ECONOMY**

Equally important to examine is the political aspect that explains why actors have not been able to overcome the finance and trade issues after all these years. The clash of interests

between countries is a function of economically powerful countries dominating weaker countries. Thailand and Vietnam are two potential large buyers of renewable energy from Laos. Poor communication and trust between these countries have prevented the formalisation of energy trade relations. Therefore, private deals were made instead without involving the public sector in Laos. The very first energy trade agreement was between Cambodia and Laos but cracks showed quickly when Laos could not meet the demand.<sup>26</sup> Adding to the struggle is the ambition of China to export energy to Greater Mekong. Laos has so little room to manoeuvre given that China owns the Laotian high voltage network and that the countries in the subregion do not see Laos as a trustworthy trading partner.<sup>27</sup>

For the whole multilateral energy trade system to lift off, one of three scenarios has to eventuate: voluntary unity, neutral benefactor and regional coordination. In the potential scenario of voluntary unity, Thailand and Vietnam would abandon their short-term calculations based on economic self-interest. They would show leadership in strengthening the sovereignty of Greater Mekong subregion and guarding against the growing influence of China in a sector as critical as energy supply. Under this framework, the trade mechanism and infrastructure development in Laos would be prioritised for investment.

The second scenario calls for a capable benefactor. Perhaps the most capable country is Singapore but it has opted for ‘additive regionalism’, preferencing its major trading partners rather than geographical neighbours. A neutral benefactor is unlikely to emerge due to the strong national interests found in the region, and the vastly different economic capabilities. The third scenario involves a regional coordinator like ASEAN to present pathways out of the institutional fragmentation. ASEAN has not had a stellar track record of resolving conflicts in the region. It has limited power and finance to sway things at the negotiation table. The recent involvement of the ADB, which has the expertise, legitimacy and finance needed, may change the game. Even so, we are not particularly optimistic as their relatively successful Eastern project in Kalimantan has been mired in political rivalry. The United States has formalised an energy cooperation with ASEAN by supporting capacities for energy storage and grid optimisation;<sup>28</sup> the focus is on technical infrastructure rather than trade mechanisms. The US is unlikely to lead mainland ASEAN out of this energy trade maze.

It may take an energy crisis to break the gridlock. The volatility of coal and natural gas prices in late 2021 should have sent chills down the spine of Southeast Asian countries. The temporary ban on coal export from Indonesia to other Asian countries was partially lifted after barely a month. These events do not seem to accelerate the negotiation of energy trade, possibly due to Southeast Asia being relatively sheltered from the shocks. Triggered by natural disaster or resource shortage, an extended power outage that incurs dire economic costs and social instability may get countries in the region to face their collective vulnerability. While Greenpeace has warned against continued dependence on fossil fuel imports, not all dependencies are risky. In fact, a high functioning multilateral energy trade system will facilitate the kind of dependency between Southeast Asian countries that promotes greater uptake of renewables, energy cost savings, and access to energy backup on rainy days.



<sup>1</sup> See ASEAN. Joint ministerial statement of the 38<sup>th</sup> ASEAN ministers on energy meeting. 2020. Available from: [https://asean.org/wp-content/uploads/JMS-of-the-38th-AMEM-Final\\_Clean.pdf](https://asean.org/wp-content/uploads/JMS-of-the-38th-AMEM-Final_Clean.pdf).

<sup>2</sup> “Asean energy demand to grow 70% between 2020 and 2040”, *The Business Times*, 26 October 2020, <https://www.businesstimes.com.sg/asean-business/asean-energy-demand-to-grow-70-between-2020-and-2040>. Accessed 7 December 2021.

<sup>3</sup> Energy intensity measures an economy’s energy efficiency and shows how much energy is needed to produce a unit of gross domestic product (GDP).

<sup>4</sup> Energy intensity as a climate target can be problematic. Lower energy intensity represents greater efficiency in electricity generation. It is possible for the region to achieve an energy intensity similar to the European Union but emit much greater carbon emissions.

<sup>5</sup> *Ibid.*, p. 25.

<sup>6</sup> *Ibid.*, p. 92.

<sup>7</sup> See ASEAN. Joint ministerial statement of the 38<sup>th</sup> ASEAN ministers on energy meeting. 2020 at [https://asean.org/wp-content/uploads/JMS-of-the-38th-AMEM-Final\\_Clean.pdf](https://asean.org/wp-content/uploads/JMS-of-the-38th-AMEM-Final_Clean.pdf).

<sup>8</sup> International Energy Agency (IEA). *Establishing Multilateral Power Trade in ASEAN*. France: IEA, September 2019. p. 5.

<sup>9</sup> Philip Andrews-Speed, “Importing electricity from Malaysia is a good thing”, *CNA*. <https://www.channelnewsasia.com/commentary/malaysia-electricity-asean-grid-renewable-energy-climate-change-1305451>. Accessed 4 April 2021.

<sup>10</sup> See International Energy Agency (IEA). *Op. cit.*

<sup>11</sup> ACE, *The 6<sup>th</sup> ASEAN Energy Outlook (AEO6)*. *Op. cit.*, pp. 93-94.

<sup>12</sup> Philip Andrews-Speed, *Op. cit.*

<sup>13</sup> Second Minister for Trade and Industry Dr See Leng at the 39<sup>th</sup> ASEAN Minister on Energy Meeting, Brunei Darussalam, 15 to 16 September 2021, Annexe C: Second Joint Statement of the LTMS-PIP. <https://www.mti.gov.sg/-/media/MTI/Newsroom/Press-Releases/2021/09/Second-Minister-for-Trade-and-Industry-Dr-Tan-See-Leng-at-the-39th-AMEM.pdf>. Accessed 20 September 2021.

<sup>14</sup> “Singapore looks to grow power generation capacity”, *The Straits Times*, 29 March 2021, <https://www.straitstimes.com/singapore/singapore-looks-to-grow-power-generation-capacity>. Accessed 30 March 2021.

<sup>15</sup> “Malaysia’s Energy Ministry to limit renewable energy exports to Singapore”, *The Straits Times*, 23 October 2021, <https://www.straitstimes.com/asia/se-asia/malysias-energy-ministry-to-limit-renewable-energy-exports-to-singapore>. Accessed 23 October 2021.

<sup>16</sup> East Malaysian Sarawak Energy Bhd has however offered to sell its excess renewable energy to Singapore and to any other country in ASEAN. The sale of energy is an autonomous matter to be decided by the Sarawak and not the Federal government in Malaysia. See “Sarawak can be an exporter of renewable energy to Singapore, says senator”, *The Star*, 29 October 2021. <https://www.thestar.com.my/news/nation/2021/10/29/sarawak-can-be-an-exporter-of-renewable-energy-to-singapore-says-senator>. Accessed 1 December 2021.

<sup>17</sup> International Energy Agency (IEA). *Establishing Multilateral Power Trade in ASEAN*. *Op. cit.*, p. 5.

<sup>18</sup> *Ibid.*

<sup>19</sup> ACE, *The 6<sup>th</sup> ASEAN Energy Outlook (AEO6)*. *Op. cit.*, pp. 93-94.

<sup>20</sup> James Guild, “Australia’s big plans for clean energy exports” *The Diplomat*, 17 March 2021. Available from: <https://thediplomat.com/2021/03/australias-big-plans-for-clean-energy-exports/>. Accessed 15 November 2021.

<sup>21</sup> “Australia rejects \$48.5 billion wind, solar, hydrogen project”, *The Straits Times*, 21 June 2021, <https://www.straitstimes.com/asia/australianz/australia-rejects-485-billion-wind-solar-hydrogen-project>. Accessed 15 November 2021.

<sup>22</sup> L. Blain, “World’s biggest clean energy project to power Singapore from Australia”, *New Atlas*, 28 September 2021, <https://newatlas.com/energy/sun-cable-australia-singapore-solar-undersea-powerlink/>. Accessed 15 November 2021.

<sup>23</sup> R. W., Yuniar, “Singapore’s solar power link from Australia spurs call for Indonesia to press on with green goals”, *South China Morning Post*, 15 October 2021, <https://www.scmp.com/week-asia/economics/article/3152373/singapores-solar-power-link-australia-spurs-call-indonesia>. Accessed 15 November 2021.

<sup>24</sup> Ryan Wong, “Don’t miss the turning point of ASEAN’s energy plan” *Fulcrum*, 11 August 2021, <https://fulcrum.sg/dont-miss-the-turning-point-of-aseans-energy-plan/>. Accessed 15 November 2021.

<sup>25</sup> Asian Development Bank. An evaluation of the prospects for interconnections among the Borneo and Mindanao power systems. November 2014. <https://www.adb.org/sites/default/files/project-document/176609/ino-borneo-mindanao-power-systems.pdf>. Accessed 15 November 2021.

<sup>26</sup> Personal communication, 23 August 2021.

<sup>27</sup> Sebastian Strangio, “Laos Grants 25-Year Power Grid Concession to Chinese-Majority Firm”, *The Diplomat*, 17 March 2021, <https://thediplomat.com/2021/03/laos-grants-25-year-power-grid-concession-to-chinese-majority-firm/>. Accessed 15 November 2021.

<sup>28</sup> See ASEAN. Joint ministerial statement of the 38th ASEAN ministers on energy meeting. 2020. Available from: [https://asean.org/wp-content/uploads/JMS-of-the-38th-AMEM-Final\\_Clean.pdf](https://asean.org/wp-content/uploads/JMS-of-the-38th-AMEM-Final_Clean.pdf).

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