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For Sustainable
Energy





Acknowledgement

“Outlook on ASEAN Energy 2023” is a study that provides key insights into Southeast Asia’s energy situation in 2023. The report was written by internal staff at the ASEAN Centre for Energy (ACE).

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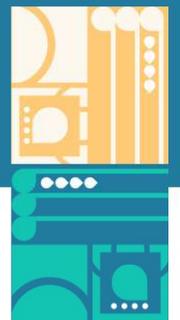
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2. ASEAN’s Global Commitments to Energy Transition = Rika Safrina
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Impacts of the Global Energy Crisis

The current global energy crisis has impacted the economy worldwide, particularly in emerging and developing countries in Europe and Central Asia. The World Bank projected that Ukraine would face a -45.1% economic loss in 2022. Similarly, the Russian economy is expected to fall into recession and decrease to -11.2% in 2022 due to unprecedented sanctions. Moreover, the negative economic growth will spread to global economies, particularly in Europe and Central Asia. The GDP growth of these regions is projected to fall by -4.1% in 2022. Among the countries in the Central Asia region, Kyrgyz Republic, Moldova, and Tajikistan are predicted to suffer from recession due to their strong financial and economic interconnections with the Russian Federation [1].

The impacts of the global energy crisis also spill over into the Foreign Direct Investment (FDI) inflows in most emerging and developing countries in Europe and Central Asia. In 2020, about 69% of the total FDI inflow to Russia came from the EU. Moreover, the financial sector of major countries in Central Asia has also experienced a significant decrease. The effects also spread into the bilateral trade between Russia and Ukraine with countries in Central Asia and Europe.

Russia and Ukraine play important roles in the global supply chain of agricultural and energy goods. Russia and Ukraine's production and export of agricultural goods, namely wheat, corn, barley, sunflower seeds, and sunflower oil, account for the largest share of total global production and exports of these products. In 2019, **Russia,**

combined with Ukraine, accounted for about a quarter of global agricultural export [1]. Russia's export of wheat and fertiliser accounted for 16% and 14%, respectively, of total global export. At the same time, Ukraine's export of sunflower seed oil accounted for 35% of the total global sunflower seed oil export [1].

Russia is also a key producer and exporter in the global supply chain of fossil fuels, particularly crude oil, petroleum products, and natural gas. The shortage of Russian energy export into the global supply has **caused negative consequences for importing countries.** Moreover, the lack of fossil fuels and agricultural commodities **caused a global price surge** that affected producer and consumer prices. As the fossil-fuels are key intermediate inputs for most commodities, the surge in the world price of fossil fuels also significantly affects other key commodities' prices (spill-over effects).

In 2019, Russian accounted for 14% and 13% of the world's export of coal briquettes and crude petroleum, respectively. In 2022, Russian petroleum production is estimated to be 10.8 million barrels per day. Moreover, the total petroleum reserve of the Organization of the Petroleum Exporting Countries (OPEC) accounts for 45% of Russian production. In other words, the shortage of the Russian supply of petroleum to the world market will be covered by the petroleum reserve of OPEC for 45% of it [2].

The high dependencies of most Asian countries on Russia are on oil and natural gas, which exceeds more than 5% of their total GDP.

Among them, Cambodia and Singapore's oil imports from Russia account for the two largest shares of 8.5% and 6.4% of their GDP, respectively. In addition, Brunei Darussalam and Malaysia's combined oil and natural gas exports account for 35% and 5.2% of their total GDP [2].

The CGE modelling analysis resulted that the shortage of Russian and Ukraine export of agricultural and fossil fuels commodities caused **decreasing global export value by 1%**, more than the developed countries' case (-1%) [1]. Moreover, **the export price of the global agriculture and energy market increased by 7% and 1.9%, respectively**. This caused other major exporter countries to increase their export to fill the gap from the shortage of export from Russia and Ukraine. For instance, countries in Eastern Europe and Central Asian Countries (ECA region) and the Middle East and North America

(MENA) had trade gains of 1.5% and 1.2%, respectively. The highest dependencies on Ukraine products among European countries are Poland and the Czech Republic. Most Central Asia and European countries highly depend on Russia are on the imported fossil fuels, fertilisers, and manufacturing sectors (Table 1). Among IEA members, Lithuania is the most dependent country on Russian fossil fuels (oil, coal, and natural gas). In 2021, Lithuania will depend on 98% of fossil fuels imported from Russia. **Coal imports increased as a temporary substitution for the lack of supply of oil and natural gas from Russia** (Figure 1).

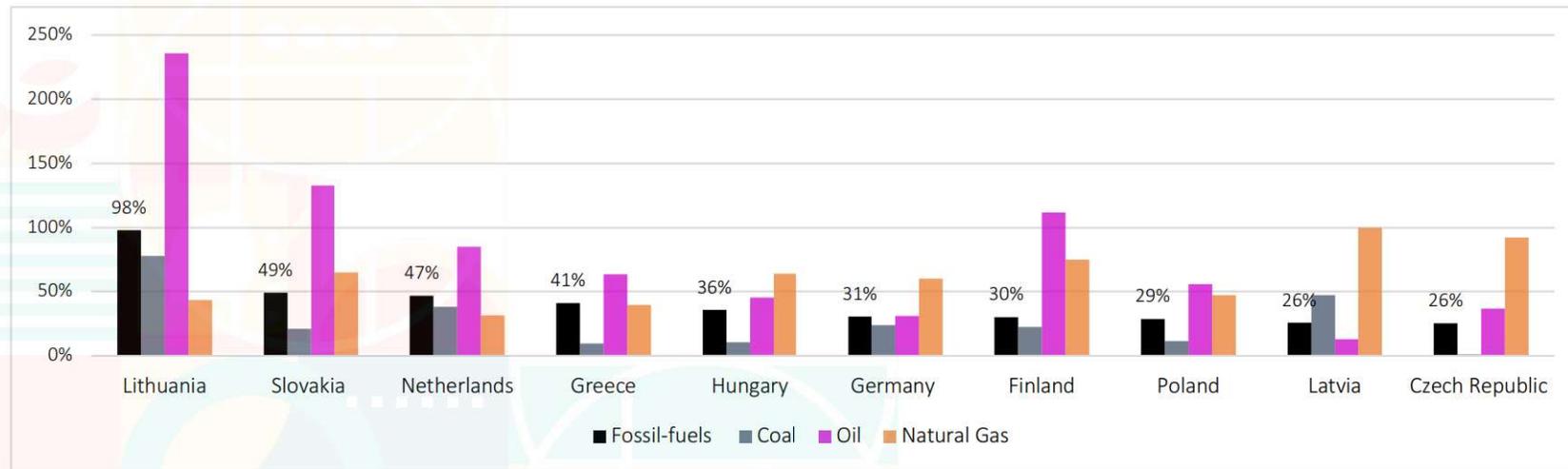
The negative impacts of the lack of supply of fossil-fuels imports were not only the surge in the price of fossil fuels but also affected other intermediate sectors (key-end users) of those countries, such as transport, manufacturing, and other services.

Table 1 - Most Dependent Countries of Russian Imports

No	Countries	Imported goods from Russia
1	Mongolia	Crude oil, petroleum products, fertilisers
2	Belarus	Crude oil, petroleum products, natural gas, iron and steel, cooper aluminium, nickel, fertilisers, cell phones, receivers, metal auto parts
3	Slovakia	Crude oil, natural gas
4	Estonia	Crude oil, natural gas, transport and business services
5	Kazakhstan	Crude oil, petroleum products, iron and steel, cooper aluminium, fertilisers, cell phones, receivers, etc
6	Kyrgyzstan	Petroleum products, iron and steel
7	Tajikistan	Petroleum products, cell phones, receivers, etc
8	Latvia	Natural gas, nickel, metal auto parts, transport and business service
9	Serbia	Natural gas
10	Canada	Palladium

Source: Adopted from The World Bank [1]

Figure 1 – Key Dependence Countries for Fossil-Fuels Import from Russia, 2021



Note: Some countries' total may exceed 100% due to stock, re-export, and potential double counting. Source: Reproduced by authors from IEA [3]

ASEAN Position in Global Market of Fossil-Fuels

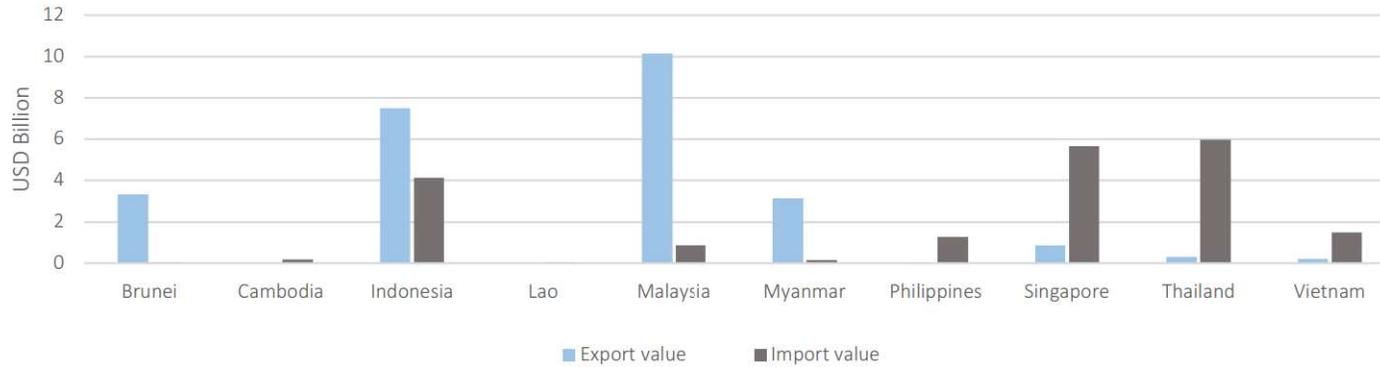
ASEAN has a significant share of the world market of fossil fuels. In the trade of natural gas, ASEAN exported natural gas to the world market USD 25.5 Billion in 2021, with Malaysia and Indonesia accounting for 79% share of the total export. In addition to natural gas export, ASEAN has also imported a larger amount of natural gas from the world market. In 2021, ASEAN's import of natural gas in the world market was USD 19.8 Billion, with Thailand and Singapore accounting for 59% share of the total import [4]. Although ASEAN imported a large amount of natural gas, ASEAN had a trade surplus of natural gas of USD 5.7 Billion in 2021. Malaysia, Indonesia, Brunei Darussalam, and Myanmar had trade surpluses and were positioned as the large natural gas exporter to the world market. Malaysia has the best position among other ASEAN countries in the global supply chain of natural gas. The country had a trade surplus of USD 9.3 Billion in 2021, while Indonesia, Brunei Darussalam, and Myanmar recorded USD 3.4 billion, USD 3.3 billion, and USD 3 billion, respectively. Although Brunei Darussalam and Myanmar had a similar trade surplus, they had a better position compared to Indonesia due to a small share of imports. In other words, Indonesia's position is riskier in the global supply chain of natural gas.

Thailand and Singapore account for 30% and 29%, respectively, of total ASEAN imports of natural gas in 2021. Thailand is the largest natural gas importer among ASEAN countries. The remaining imports are from Vietnam (8%), the Philippines (6%), and Cambodia (1%). Although Indonesia has a significant import share of the total

ASEAN natural gas import, significant remittances of Indonesia's export cover the import. **In terms of global supply chain risk, Thailand, Singapore and Vietnam are more vulnerable to potential risks from the global supply chain of natural gas due to their high import dependence on natural gas** (Figure 2). Indonesia and Brunei Darussalam are also potentially affected by the global supply chain risk of natural gas due to their significant amount of export.

In 2021, Thailand's major supplier countries for natural gas were Myanmar, Qatar, Australia, and Malaysia. The total natural gas supply from these four countries accounted for 75% of Thailand's natural gas imports in 2021. Others are supplied from the USA, Nigeria, and the United Arab Emirates. Singapore provides a small portion of Thailand's total import of natural gas (1%). The major suppliers of Thailand imports are most closely geographically located in Thailand. Similarly, the primary supplier countries of Singapore's natural gas import in 2021 are Indonesia, Australia, and Malaysia (85% of the total Singapore natural gas import). The dependency of Thailand and Singapore is high on other ASEAN countries (Myanmar, Malaysia, and Indonesia) (Figure 3). In 2021, the major destination countries for Malaysia and Indonesia's natural gas export mainly were Asia. Thailand and China accounted for almost 100% of total Malaysian natural gas export to the world market in 2021. Additionally, Singapore, China, and Japan accounted for 79% of the total Indonesian export of natural gas to the world market.

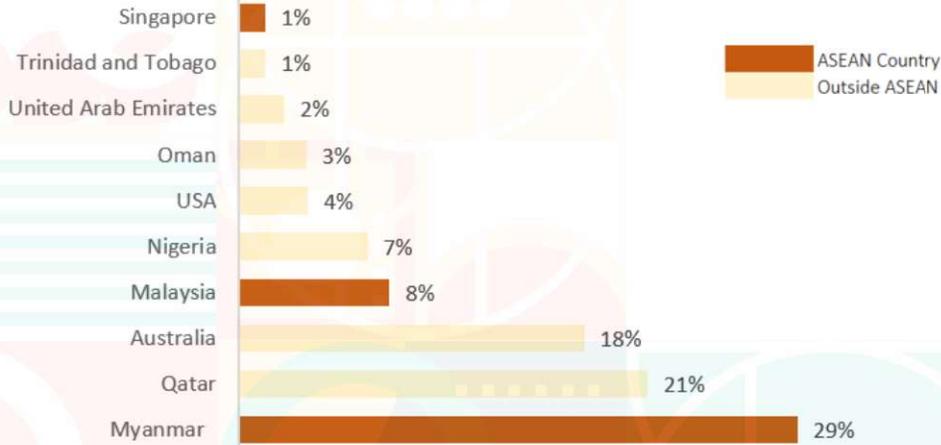
Figure 2 - ASEAN Trade Balance of Natural Gas, 2021



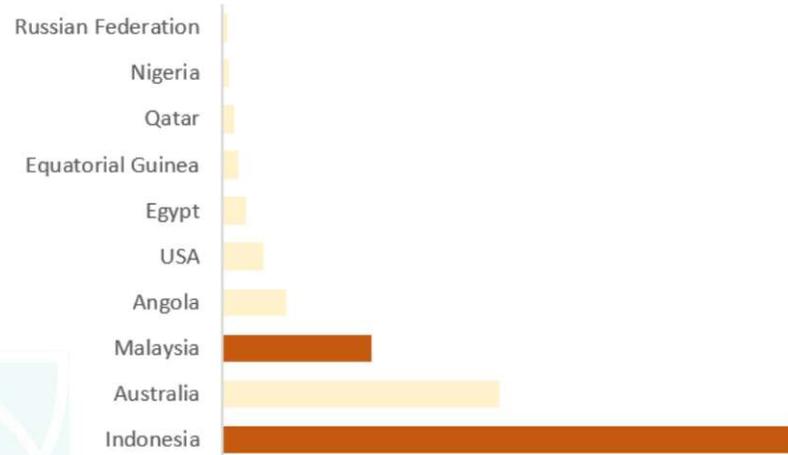
Source: Authors' calculation based on data from UN Comtrade [4]

Figure 3 – Natural Gas Supplier Countries for Thailand and Singapore, 2021

Supplier Countries for Thailand Gas Import in 2021



Supplier Countries for Singapore Gas Import in 2021



Source: Authors' calculation based on data from the UN Comtrade [4]

In the global oil supply chain, ASEAN was positioned as a net oil importer in 2021. ASEAN's oil export to the world market in 2021 was USD 91.4 billion. However, the imported amount of oil of ASEAN from the world market in 2021 was double its export amount (USD 188.7 billion). In other words, ASEAN has a trade deficit of oil. ASEAN has a higher risk in the global supply chain of oil due to its importing position. Among ASEAN countries, only Malaysia has a trade surplus of oil in 2021 (USD 2.3 billion). Singapore, Malaysia, and Thailand export of oil accounted for 86% of total ASEAN oil export to the world market. On the other hand, Singapore, Thailand, Malaysia, and Indonesia were major oil-importing ASEAN countries, accounting for 77.4% of the total oil import of ASEAN in 2021.

Singapore was in position as both highest exporter and importer among ASEAN. However, Singapore' imported amount of oil was 60% higher than its oil export in 2021. As a result, Singapore faced a significant trade deficit (USD -26 Billion). Meanwhile, Vietnam imports oil from the world market 6.5 times of its export to the world market. As a result, Vietnam also had a trade deficit USD -18 Billion in 2021 (Figure 4).

From the global supply chain perspective, Singapore, Thailand, and Vietnam have highest risk due to strong dependency on global oil supply. Malaysia and Indonesia supplied for 34% of total Singapore oil import from the world market. Other major suppliers of Singapore oil are from Australia, China, and USA.

In the global supply chain of coal, ASEAN has better position compared to natural gas and oil. In 2021, ASEAN had a trade surplus of coal by exporting coal for 62% more than coal imported from the

world market. Indonesia contributed the largest share of the total coal export of ASEAN to the world market in 2021 (89%). Although Indonesia's share of total ASEAN coal imports accounted for 24% (the second largest coal importer in ASEAN), Indonesia had a better position than other ASEAN countries in the global supply chain of coal. In 2021, Indonesia had a trade surplus of coal of USD 29.6 Billion. **Malaysia, the Philippines, and Thailand are highly dependent on the global coal supply compared to other ASEAN countries,** accounting for 70% of total ASEAN coal imports from the world market (Figure 5). In 2021, Malaysia and the Philippines had a trade deficit of coal of USD -4.1 billion and USD -2.3 billion, respectively. Surprisingly, Singapore has a trade surplus of coal in 2021 due to a more considerable amount of export than its import.

Indonesia supplied coal to China, India, and Japan, accounting for 66% of its total coal export to the world market in 2021. Moreover, about 14% of its export goes to Malaysia and the Philippines. **Malaysia was highly dependent on Indonesia and Australia, which supplied 78% of total Malaysia coal imports from the world market in 2021.** Other major coal suppliers to Malaysia are from Russia, China, and Singapore, with 6%, 5%, and 2%, respectively. Similarly, the **Philippines is highly dependent on Indonesia, which supplied 95% of total Philippine coal imports from the world market in 2021.** The remaining shares were from Australia (1%), Vietnam (1%), and Russia (0.6%) of the total Philippines' coal import in 2021. Thailand's coal import is also majorly supplied by Indonesia (54%) and Australia (30%). Other major supplier countries of Thailand imports are the USA (9%), Russia (2%), and Singapore (1%).

Figure 4 - ASEAN Export Import of Oil, 2021

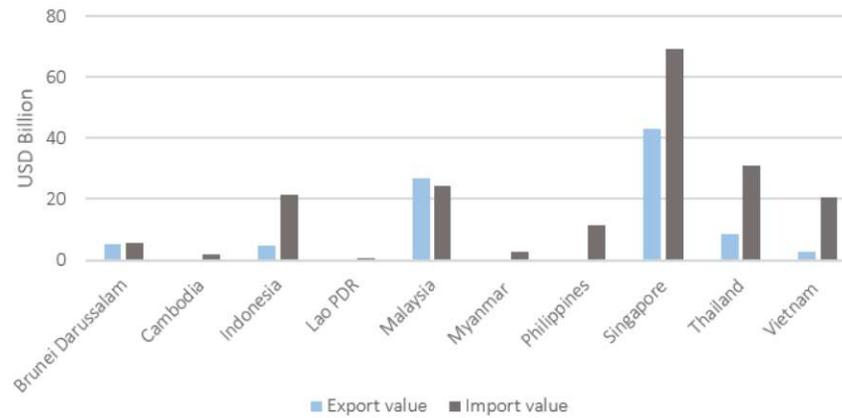
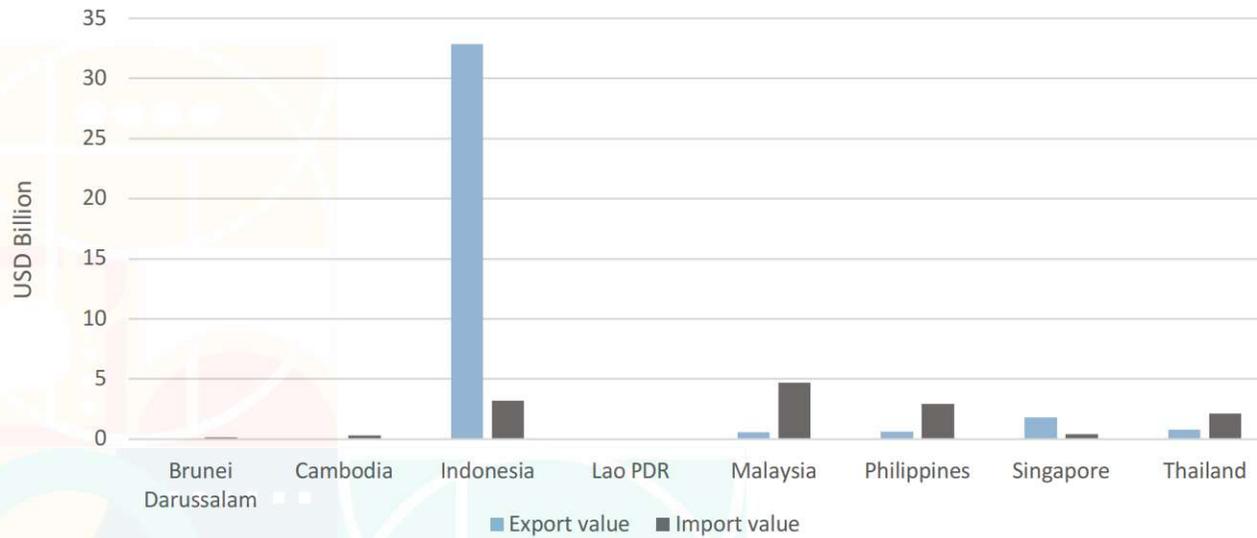


Figure 5 – Export Import of Coal in Selected ASEAN Countries, 2021



Source: Authors' calculation based on data from the UN Comtrade [4]



Redesigning the ASEAN Energy Security

The current global energy crisis is found to have little impact on the ASEAN economy. The average ASEAN GDP in 2023 is projected to grow at 5.2%, which is larger than the growth in 2022 (4.9%) [5]. It indicates that the recovery progress after COVID-19 is still on track for the ASEAN and not be affected significantly by the global energy crisis. However, **Singapore is predicted to have decreasing GDP growth in 2023 at -1.1% compared to the previous year. Similarly, the GDP growths of Cambodia and Malaysia are also found to reduce by -0.6% from the prior year.** As discussed in the previous section, Singapore and Malaysia have a higher dependency on imported oil and coal, respectively, from the global supply chain.

Brunei Darussalam, which is also expected to have a trade deficit in oil, has an increasing GDP growth of 0.3% from the previous year. However, **the inflation rate of Brunei in 2023 will increase by 1% from the prior year [5].** It indicates that Brunei Darussalam's export revenue from natural gas is not adequate to cover the inflation rate partly. On the other hand, other ASEAN countries, such as Myanmar and Cambodia, have increasing GDP growth rates of 2.9% and 1.2%, respectively. Indonesia has a minor increase in GDP growth of 0.2% increase from the previous year. The GDP growth of Indonesia is smaller than the 2023 inflation rate (2.1%). Meanwhile, Thailand has an increasing GDP growth higher than Indonesia (1.5%).

ASEAN had a high dependency on coal and gas during 2005-2020. In 2021, ASEAN's import of oil, gas, and coal from the world market was USD -189 billion, USD -19.8 billion, and USD -14 billion, respectively

[4]. **In 2020, ASEAN's dependency on coal and gas was -81% and -23%, respectively [6].** The ASEAN dependence on imported coal has increased continuously since 2005 (-113%). The coal share in the total primary energy supply (TPES) in 2020 was 37% and is projected to decrease to 22% in 2050. The dependency on imported gas is the second highest one. The ASEAN dependency on imported gas in 2005 was -28%. The share of gas in the ASEAN TPES in 2020 was 21% and is projected to increase to 23% in 2050 [6]. In addition, the share of oil in the 2020 ASEAN TPES was 35% and will increase to 43% in 2050.

Currently, ASEAN is strengthening its cooperation under ASEAN Power Grid (APG), Trans-ASEAN Gas Pipeline (TAGP), and ASEAN Petroleum Security Agreement (APSA) for securing energy in ASEAN. The position of each country of ASEAN in the global supply chain of fossil fuels influences designing energy security strategy for the long-term of each country and ASEAN. The imported dependency on fossil fuels on the worldwide supply chain will significantly affect domestic energy security in ASEAN. Similarly, the position of ASEAN as an exporter in the global supply chain of fossil fuels has a minor degree of impact on domestic energy security. However, redesigning the energy security of ASEAN depends not only on ASEAN's position on the global supply chain of fossil fuels but also on the trade characteristics of each fossil fuel. **Diversification of the energy trade flow of ASEAN in the global supply chain of fossil fuels needs to be prioritised. Moreover, the spill-over impacts of fossil fuels trade on the interconnected sectors also need to be considered.**



Insight 2 – ASEAN’s Global Commitments to Energy Transition

Looking at the climate action plans and strategising international public supports

Written by Rika Safrina



From COP27: Updated Climate Agenda of ASEAN Member States

As agreed in the 26th United Nations Climate Change Conference of the Parties (COP26), all parties needed to revisit and strengthen their climate plans to meet the Paris Agreement temperature goal [7]. However, only four out of ten AMS submitted their updated nationally determined contributions (NDCs) in 2022, before and during COP27 convened in Egypt. In these latest submissions, Indonesia, Singapore, Thailand, and Vietnam raised their emissions reduction target by 2030.

Table 2 – Changes in 2022 NDC: Emission Reduction Target of Several ASEAN Countries by 2030

ASEAN Country	Unconditional		Conditional		Submission Date
	Previous NDC	Updated NDC	Previous NDC	Updated NDC	
Indonesia [8]	29%	31.89%	41%	43.20%	23 September 2022
Singapore [9]	Peak at 65 MtCO ₂ eq	Peak at 60 MtCO ₂ eq	N/A	N/A	4 November 2022
Thailand [10]	20%	30%	25%	40%	2 November 2022
Vietnam [11]	9%	15.8%	27%	43.5%	8 November 2022

Source: Author's compilation from the official AMS' NDCs

In its Enhanced NDC, **Indonesia** raised its emission reduction target by taking into consideration the recent development of related national policies, including 100% utilisation of biodiesel B40 (40% biodiesel content) and the Battery Electric Vehicle (BEV) program acceleration for road transportation – 750,000 units of 4-wheel BEV and 2,450,000 units of 2-wheel BEV – all by 2030.

Not only NDC, but **Singapore** also communicated an addendum to its long-term low-emission development strategies (LT-LEDS) on 3 November 2022 [12]. While previous LEDS pledged to halve emissions from the 2030 peak to 33 MtCO₂eq by 2050 with a view to achieving net zero emissions as soon as viable in the second half of the century,

Singapore's updated LEDS aims to achieve net zero emissions by 2050 [13].

Thailand also revised its LT-LEDS in November 2022 [14]. The country sets its vision to achieve carbon neutrality by 2050 and a net-zero emission by 2065, compared to the previous LT-LEDS, which targeted carbon neutrality by 2065 [15].

Vietnam's updated NDC incorporated the country's commitment to the Global Methane Pledge (30% methane emissions reduction by 2030 compared to 2020 levels) and net zero emission (by 2050) [16]. The country also lowered the emissions peak target of its electricity system from 280 MtCO₂eq down to 240 MtCO₂eq by 2035.

The Emissions Targets of ASEAN Member States

ASEAN Country	Emissions Reduction Target		Carbon Neutrality / Net Zero Target
	Unconditional	Conditional	
Brunei Darussalam	<ul style="list-style-type: none"> 20% GHG emissions reduction by 2030 compared to Business as Usual (BAU) At least 10% GHG emissions reduction by 2035 through better supply and demand management of electricity consumption 	N/A	Net zero emissions by 2050
Cambodia	N/A	42% GHG emissions reduction or 64.5 MtCO ₂ eq by 2030 compared to BAU	Carbon neutrality by 2050
Indonesia	31.89% GHG emissions reduction by 2030 compared to BAU	43.2% GHG emissions reduction by 2030 compared to BAU	Net zero emissions by 2060 or sooner
Lao PDR	60% GHG emission reduction compared to the Baseline Scenario, or around 62 MtCO ₂ eq in absolute terms	N/A	Net zero emissions by 2050 conditionally
Malaysia	Economy-wide carbon intensity (against GDP) reduction of 45% in 2030 compared to the 2005 level	N/A	Carbon neutrality by 2050
Myanmar	244.52 MtCO ₂ eq emissions reduction by 2030	414.75 MtCO ₂ eq emissions reduction by 2030	Carbon neutrality by 2050
Philippines	2.71% GHG emissions reduction by 2030 compared to BAU	72.29% GHG emissions reduction by 2030 compared to BAU	N/A
Singapore	Achieve peak emissions at 60 MtCO ₂ eq around 2030	N/A	Net zero emissions by 2050
Thailand	30% GHG emissions reduction by 2030 compared to BAU	40% GHG emissions reduction by 2030 compared to BAU	Carbon neutrality by 2050 and net zero emissions by 2065
Vietnam	15.8% GHG emissions reduction by 2030 compared to BAU	43.5% GHG emissions reduction by 2030 compared to BAU	Net zero emissions by 2050

Source: Authors' compilation from the official AMS' NDCs and LT-LEDS

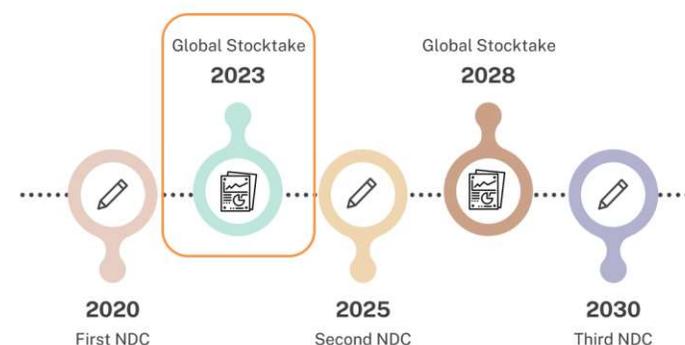
Gearing up Towards COP28

COP28 will convene from 30 November to 12 December 2023 in the United Arab Emirates. Hosted by one of the largest oil producers in the world, COP28 will be interesting to showcase the role of fossil fuels sectors in the climate agenda. ASEAN is home to many oil productions, especially in Brunei Darussalam, but collectively the imports outweigh the exports. The region has been a net importer of oil since before 2005 and is expected to be gas and coal net importers by 2025 and 2039, respectively, without any policy interventions, due to dwindling reserves and surging demands. Even in the most ambitious scenario encompassing national and regional policies stated in APAEC, the region could prolong natural gas imports by only one year. With this urgent energy security risk, ASEAN will need to step up its energy-climate mitigation actions.

Table 3 – ASEAN Net Importer Status (Source: The 7th ASEAN Energy Outlook[6])

Scenario		Oil	Gas	Coal
Baseline	Start Year	Pre-2005	2025	2039
	2050 (Mtoe)	-1,289	-577	-143
AMS Target Scenario (ATS)	Start Year	Pre-2005	2025	Post-2050
	2050 (Mtoe)	-947	-479	53
APAEC Target Scenario (APS)	Start Year	Pre-2005	2026	Post-2050
	2050 (Mtoe)	-847	-402	138
Least-Cost Optimisation (LCO)	Start Year	Pre-2005	2035	Post-2050
	2050 (Mtoe)	-846	-309	79

The 2023 climate summit will also mark the first Global Stocktake (GST), an essential feature of the Paris Agreement. It is a regular official check-up on the Parties' NDC in all areas to report and review what progress has been made, the gaps, challenges, and opportunities. It aims to strengthen individual and collective efforts for the second NDC, which is scheduled for 2025 (five years after the first one).



Source: Author's own elaboration

All parties, including AMS, need to ensure the accuracy, accountability, and transparency of GST by enhancing their own capacity to track emissions inventory in both top-down and bottom-up approaches. The outcomes of GST later might require the Member States to update and strengthen their next version of NDC, and this could be the lesson learned for them to develop and improve their own monitoring and evaluation systems.



Energy Transition Mechanism

Coal plays a prominent role in the ASEAN economy and energy mix. In 2020, the total coal imports reached 237 Mtoe, about three times the 2005 level [17]. Meanwhile, coal in the ASEAN Total Primary Energy Supply (TPES) was lower than the value of its imports in the same year, which was 176 Mtoe and made up about 22% share [6]. With the aggressive national and regional energy policies in place (APS), its stake in TPES is projected to decrease to 7.5% by 2050.

The Southeast Asia Energy Transition Mechanism (ETM) Partnership, launched in COP26 by the Asian Development Bank (ADB), has progressed significantly in 2022. The partnership aimed for the transition in Indonesia and the Philippines as the pilot countries, both are heavily reliant on coal among ASEAN countries. In November 2022, ADB signed a Memorandum of Understanding with Cirebon Electric Power (CEP), the state-owned electricity company (PLN), and Indonesia Investment Authority to accelerate the termination of CEP's 660 MW coal-fired power plant (CFPP) Cirebon-1, by providing senior debt [18]. This model can be applied to other independent power producers (IPP) in Indonesia and the Asia Pacific.

Building on this momentum, Indonesia also launched its own ETM Country Platform during the 2022 G20 Summit in Bali [19]. It will be the tool to collect investments from public and private sectors, mobilise funding, and channel fiscal support for climate action. The platform has allocated a total fund of USD 500 million and circulated over USD 4 billion to close 2 GW CFPPs. It is expected to reduce emissions by 50 MtCO₂eq in 2030 or 160 MtCO₂eq in 2040.

“ETM is an innovative model which would use blended finance to accelerate the retirement of coal power plants and develop green, renewable energy to replace it” - ADB

In the Philippines, a feasibility study has been conducted to prepare for an Accelerating Coal Transition (ACT) program by Climate Investment Funds [20]. As one of the ACT pilot countries, the Philippines can receive up to USD 500 million in financing for program implementation [21]. An official investment plan under this program is much anticipated and hopefully can be enacted in 2023.

Although not part of ADB's ETM, the Philippines energy company ACEN has made a bold energy transition move by divesting its coal stock from a private 246 MW South Luzon Thermal Energy Corporation, which will support the thermal plant's early retirement in 2040 – 15 years shorter than its expected lifetime [22]. The deal will help ACEN to redirect its investment into RE and cleaner technologies. This ETM transaction could be a business model for other countries in the region to follow. Another leaders' declaration related to energy transition was made by several AMS joining the Asia-Pacific Economic Cooperation (APEC). The APEC Summit 2022 launched Bangkok Goals on Bio-Circular-Green Economy, with one of the statements recalling countries' commitment to rationalise and phase out inefficient fossil fuel subsidies [23].



Just Energy Transition Partnership

In 2022, two AMS agreed on an ambitious Just Energy Transition Partnership (JETP) with a group of developed countries under the International Partners Group (IPG)¹ for coal to clean transition in a just manner. It ensures all of society can benefit from a green transition, especially for the most affected community. The partnerships will improve the regulatory framework to attract public and private investments in the two countries.

Indonesia [24]

- Launched on 15 November 2022 during G20 Summit in Indonesia
- To mobilise USD 20 billion over the next 3-5 years for transitions in the power sector, including USD 10 billion by the IPG members and USD 10 billion in private finance by the Glasgow Financial Alliance for Net Zero (GFANZ) Working Group
- Aims to develop a JETP Investment and Policy Plan with the following targets:
 - Peaking power sector emissions by 2030 at an absolute value of no more than 290 MtCO₂eq (down from a 2030 baseline value of 357 MtCO₂eq)
 - Net zero emissions in the power sector by 2050
 - 34% RE share in power generation by 2030

Vietnam [25]

- Published on 14 December 2022 during EU-ASEAN Commemorative Summit
- To mobilise USD 15.5 billion over the next 3-5 years, including USD 7.75 billion by the IPG members and USD 7.75 billion in private finance by the GFANZ Working Group
- Aims to develop and publish a JETP Resource Mobilisation Plan by November 2023 to identify the new investment requirements and opportunities to support the following targets:
 - Peaking no more than 170 MtCO₂eq emissions from electricity generation by 2030
 - Reduce Viet Nam's project pipeline for coal-fired generation from a planned capacity peak of 37 GW towards a peak of 30.2 GW
 - 47% RE share in power generation by 2030

¹ IPG includes Canada, the European Union, Denmark, France, Germany, Italy, Japan, Norway, the United Kingdom, and the United States

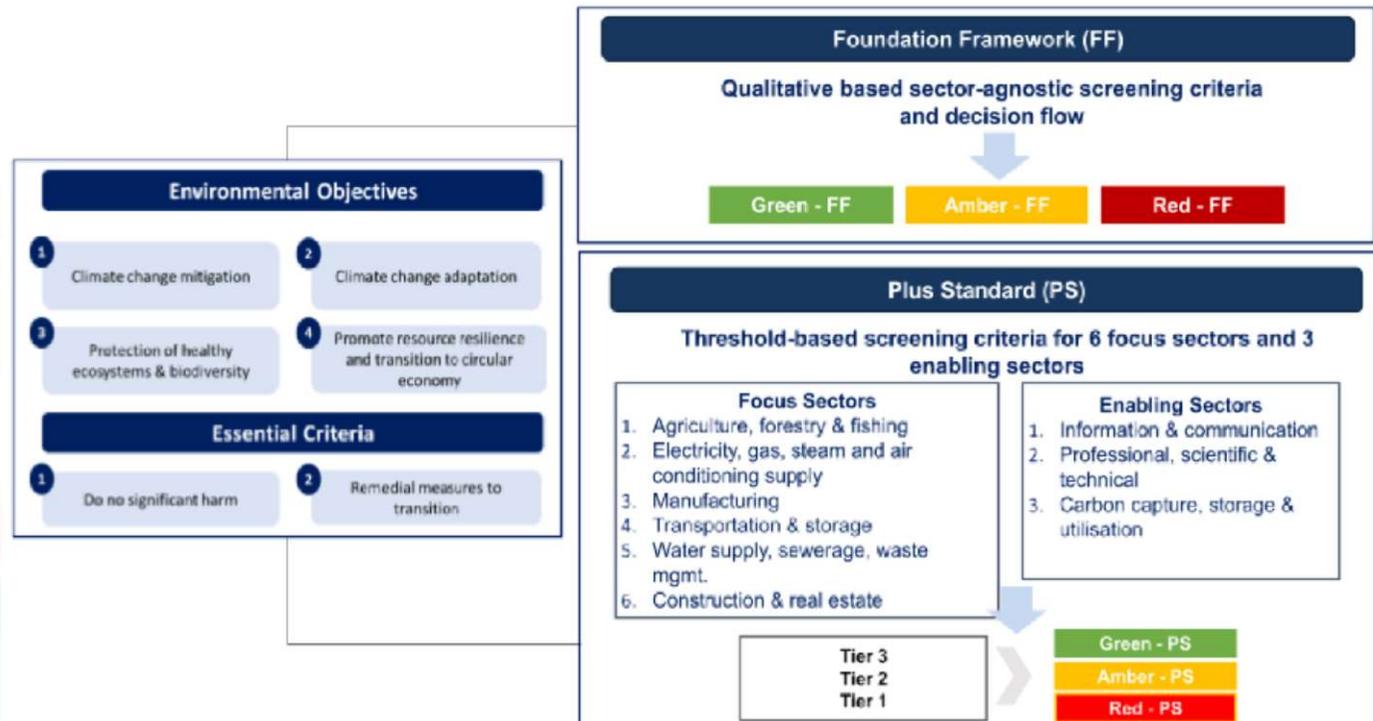
Utilising the Overarching Benefits of ASEAN Sustainable Finance Taxonomy

The ASEAN Taxonomy for Sustainable Finance, which was launched in 2021, is designed as an inclusive and credible system to classify all sustainable economic activities in the region [26]. Based on four environmental objectives and two essential criteria, the taxonomy lays a general Foundation Framework and an activity-level Plus Standard to assess economic activities in six focus and three enabling sectors. Following the regional effort, several AMS published their national green taxonomy, until the beginning of 2023. Even though the existing regional and national taxonomies still need improvements and are far from perfect, AMS should utilise them to promote the transition to a low-carbon economy.

Indonesia published its first version of taxonomy in order to have a common understanding of sustainable business performance [27]. Identical to the regional standards, the classification adopted the traffic light system: (1) green (do no significant harm, apply minimum safeguard, provide a positive impact to the environment and align with the environmental objective of the taxonomy), (2) yellow (do no significant harm), and (3) red (harmful activities).

Thailand has released the draft of its sustainable finance taxonomy that omits natural gas from the green category [28].

Singapore is now discussing the second version of its own taxonomy by adding more activity-level and thresholds for three focus sectors, namely energy, transport, and building [29].



Source: ASEAN Sustainable Finance Taxonomy [26]



Insight 3 – Tracking ASEAN Energy Targets and Policies

Monitoring the energy transition while
maintaining energy adequacy

Written by **Silvira Ayu Rosalia, Rika Safrina**



ASEAN Energy Supply Landscape

- The overall projection shows ASEAN will supply more energy around 5-10% in 2023 compared to 2020 (Figure 6) [6].
- In 2020, the primary energy mix remained dominated by fossil fuel, with a 14.2% share for renewables.
- With implementation of energy efficiency measure and the Member States' policies in 2023, the share of renewables is forecast to be increased by 113 Mtoe for ATS.
- In the APS, by stronger policies to meet regional target, such as fuel economy improvement and energy-efficient appliances, will contribute the highest fossil fuel reduction pathway. In 2023, coal lead the reduction by 159 Mtoe (-10%), while renewables will increase 51% from 2020 level (Figure 7).
- The strong efforts are enacted to pursue the 2025 regional target for the renewables share in energy supply. Policies in end-use are deemed necessary, such as electrification in transportation and energy-efficient appliances in residential.

Figure 6 – ASEAN Energy Supply Projection

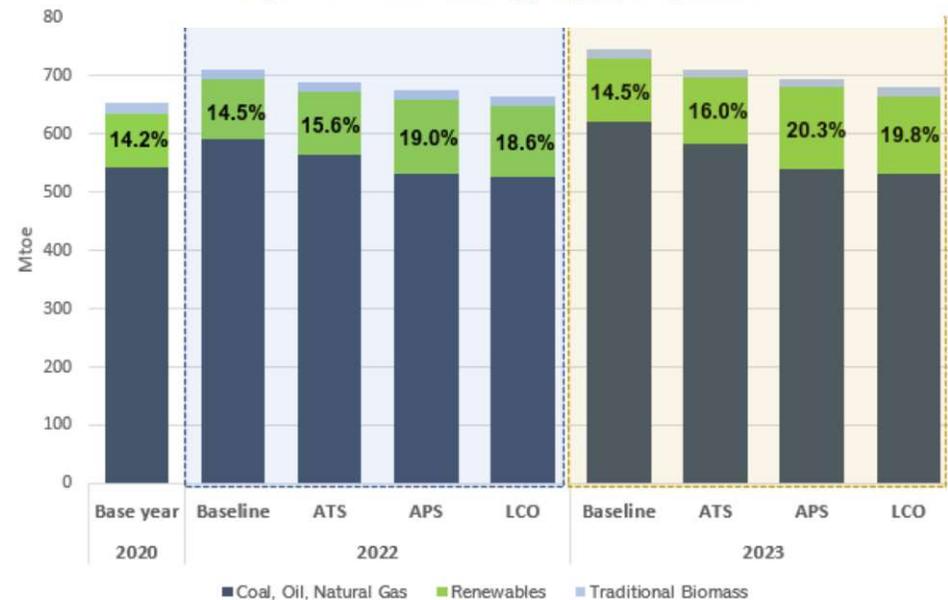
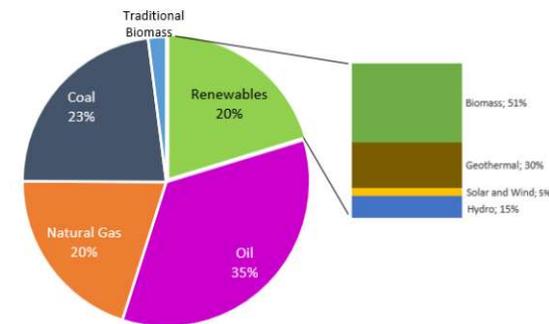


Figure 7 – ASEAN Energy Supply 2023 APS Projection



ASEAN Energy Demand Landscape

Figure 8 – ASEAN Energy Demand 2023 Projection by Fuel

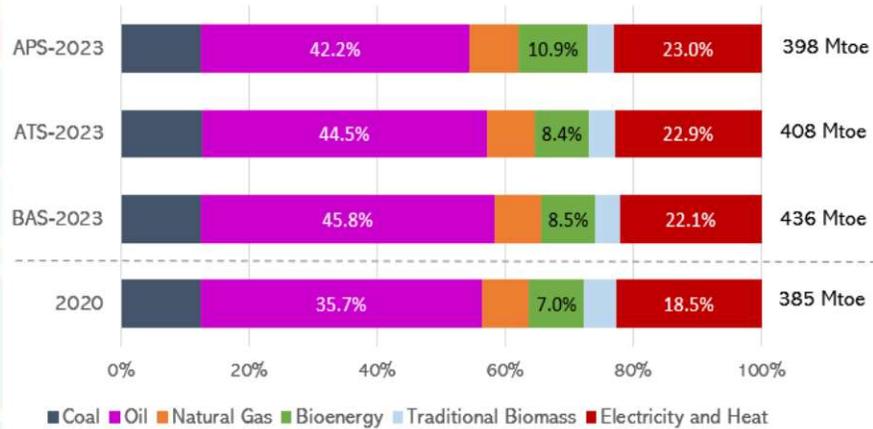
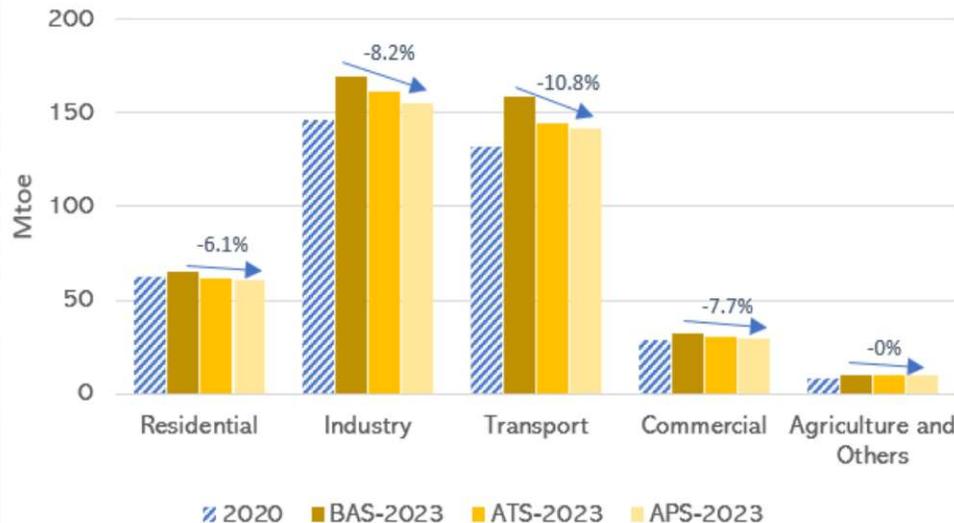


Figure 9 – ASEAN Energy Demand 2023 Projection by Sector



- In 2022 and 2023, ASEAN’s GDP growth forecasted to be 5.2%. Economic activities have returned to pre-pandemic levels, however entering 2023 with a host of evolving economic pressures, some of which will also affect growth globally.
- Sectoral analysis shows that all end-use sectors see an increase in energy consumption driven by population and economic growth. Regional energy demand is expected to increase 13% by 2023 from 2020 level with no policy intervention. Fossil fuels are projected to continue to dominate the energy sector, with oil still contributes the largest share of 36.5% of energy consumption.
- Fuel shifting policies in ATS will slightly raise the shares of electricity and bioenergy in ASEAN energy demand by 4% and 7% in 2023 respectively, resulting from electrification of cooking, and more stringent EV deployment and biofuel mandates in several AMS (Figure 8).
- The use of more efficient technologies throughout all end-user sectors, will significantly reduce the fossil fuel portion. With stronger regional efforts in APS, avoided energy consumption could reach 8.6% in 2023, as compared to the Baseline Scenario.
- The avoided energy consumption under APS will be the greatest in the transportation and industrial sectors in 2023, with 17.1 Mtoe and 13.9 Mtoe, respectively. Stronger energy-saving measures in national policies are required across the final energy sectors, to achieve the regional targets under APS (Figure 9).

The Power Sector Resilience

- The power sector has a prominent contribution in the energy transition as well as maintaining energy security, particularly in terms of the stability of electricity supply.
- ASEAN power capacity depends on fossil fuel, which its share will remain the largest at 76.7% in 2020 dominated by coal and natural gas. By 2023, the power capacity is projected to increase by around 19% - 22% in Baseline Scenario, ATS, and APS (Figure 10).
- In the ATS, where AMS is projected to implement its policies based on the Power Development Plan (PDP), share of renewables in 2023 will increase by 36.2% from 2020 level.
- The renewables share will 2.5% greater in APS if AMS accelerate deployment of RE capacity' based on country's potential. The high share of renewables in 2023 is still dominating by hydropower (14.9%) and solar (2.7%).
- In terms of power generation, the projections show that AMS will need to generate 1,228 TWh in 2023. While ATS running 2% less than Baseline Scenario (Figure 11).
- With concerted efforts to reduce fossil fuel usage by 85 TWh, whilst adding 136 TWh of RE-based power from 2020 level, ASEAN will have 1,176 TWh of electricity generation in 2023 APS.
- The renewables in 2023 will still be dominated by hydropower with a growth of 28% compared to 2020. While geothermal, solar, and wind will also contribute to the mix, reaching power generation of 48 TWh, 61 TWh and 6 TWh, respectively.

Figure 10 – ASEAN Installed Capacity 2023 Projection

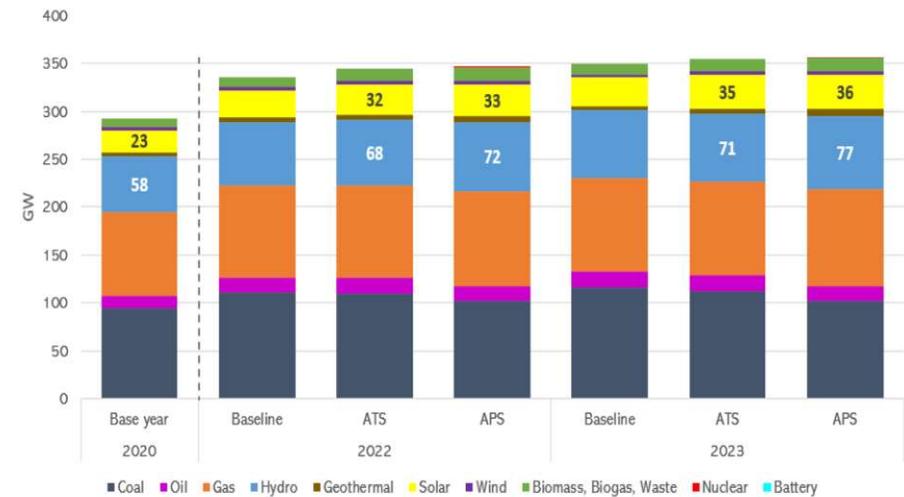
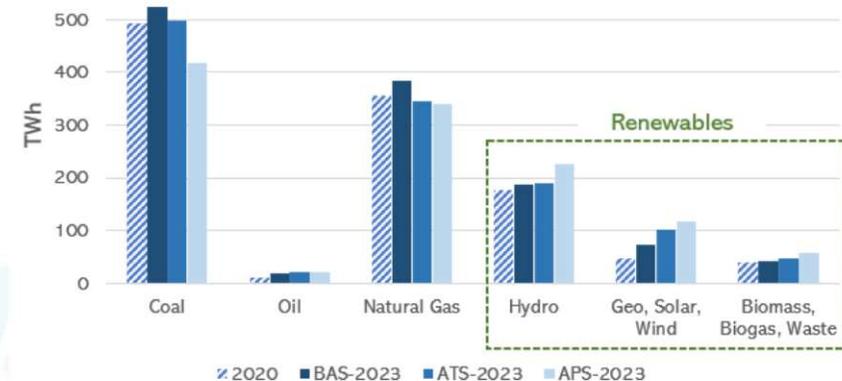


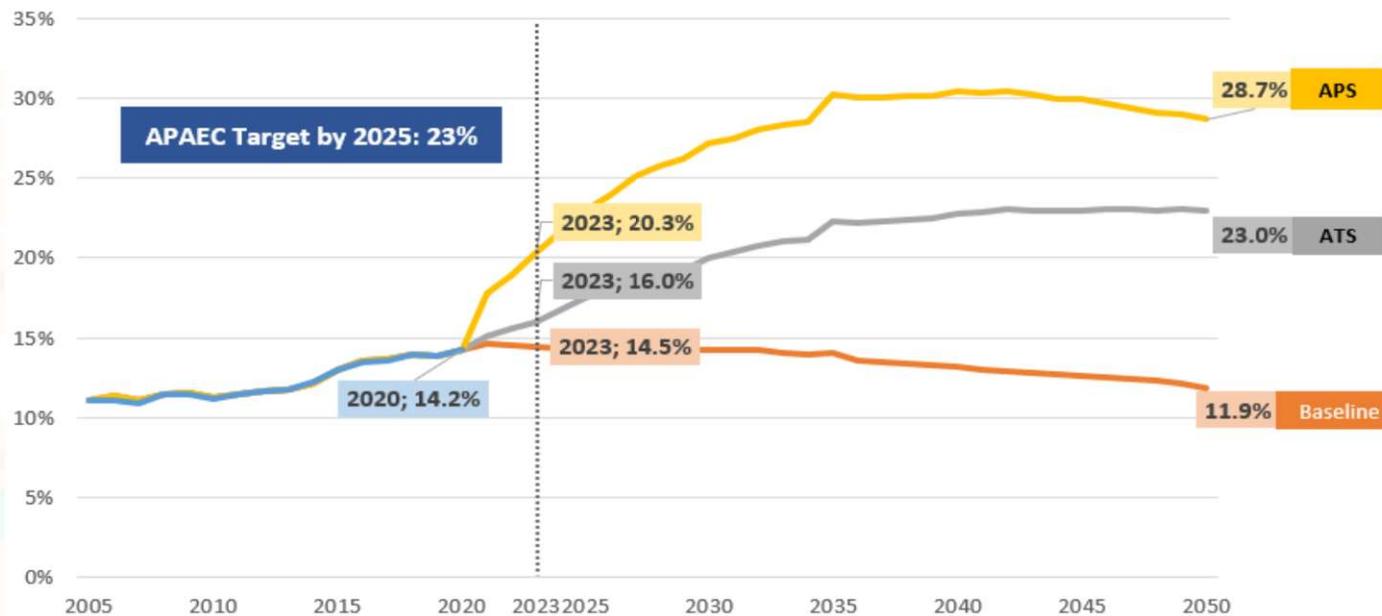
Figure 11 – ASEAN Power Generation 2023 Projection



Renewable Energy Target Assessment in 2023

Based on regional targets, AMS have set out to achieve **23% of TPES from renewable sources by 2025**, and 2023 will be a decisive milestone towards this target. In 2020, the RE share in TPES reached 14.2%, an increase of 0.4% from 2019. The projection shows a slight change in the Baseline Scenario, and continuous growth in the other scenarios. This demonstrates that RE development is resilient in challenging times, and with concerted effort, it is possible to achieve 23% by 2025. The improvement in national renewables policies, which is reflected in ATS, will affect the growth of RE share by 16%. However, this effort needs to be strengthened by raising individual Member States' targets to meet the aspirational target in APS. The RE share is predicted to reach 20.3% in 2023 APS, with further coal and oil reduction. To fill the gaps toward regional targets by 2025, Member States have the opportunity to strengthen efforts by adding the minimum renewables of 28 Mtoe in the primary energy supply. Each AMS has its strategy, depending on the availability of the potential resource. For example, Singapore promotes innovative measures to increase solar rooftops, whilst Vietnam is pushing offshore wind generation and floating solar.

Figure 12 – Renewables Share in TPES (2005-2050)



- Another regional target is monitoring **the renewables shares in installed power capacity**, where ASEAN is on track to achieve the regional target of 35% RE share in installed power capacity by 2025, under various trends. Renewables in the 2020 power capacity amounted to 97.5 GW, equivalent to 33.3%.
- In 2023, the RE installed capacity in the Baseline Scenario will reach 34%. The projections noted that the regional target will be exceeded to 36.2% (+1.2%) if AMS implemented national policies based on PDP, and 38.6% (+3.6%) by strong regional collaboration in APS to accelerate deployment of RE capacity based on each country's potential.

Figure 13 – Renewables Share in Installed Capacity (2005-2050)

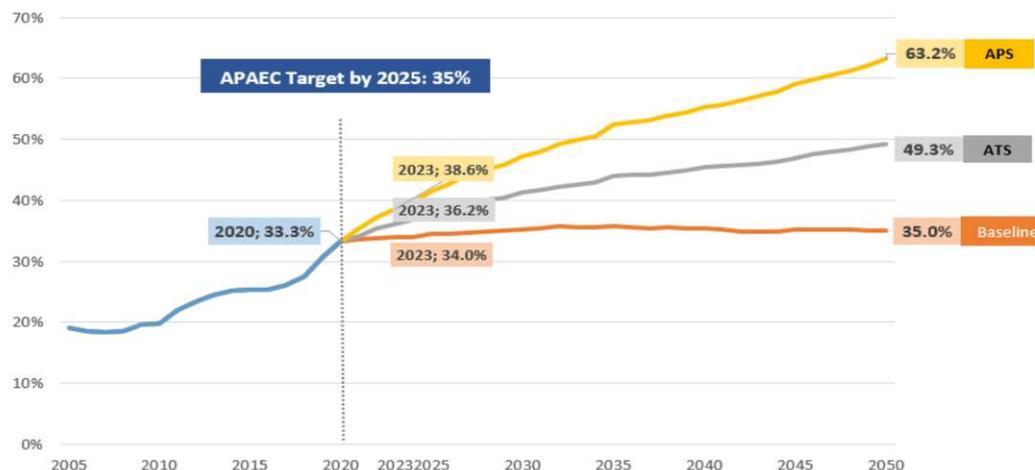
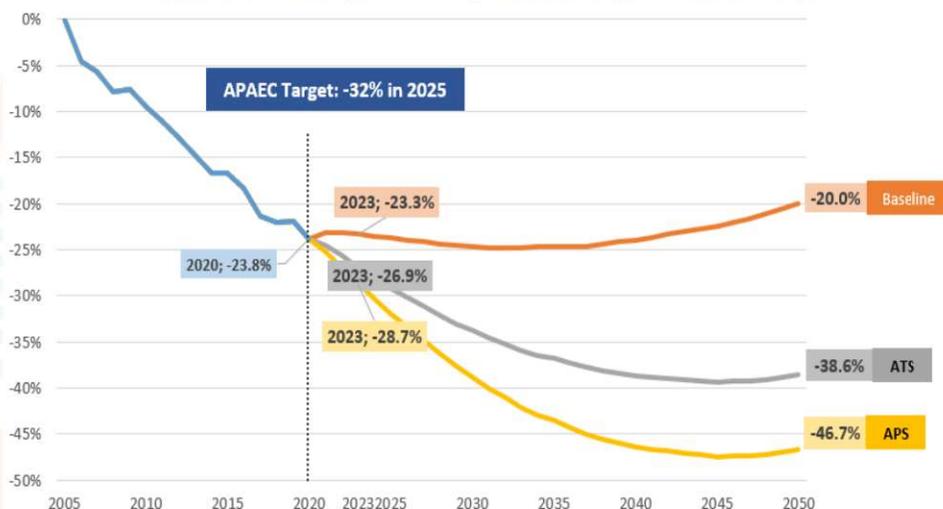


Figure 14 - Energy Intensity Reduction from 2005 Level



- The measurable regional target for demand is to **reduce energy intensity (EI) by 32% by 2025**, from 2005 levels, as measured by the ratio of TPES to GDP. EI reduction in 2020 experienced a resilient pandemic effect of a 1.9% increase, as compared to the previous year of 23.8%
- Based on the projection, if the AMS achieve national targets (ATS), ASEAN will substantially progress in reducing EI by 26.9% in 2023.
- Closing the gap by enhancing existing national efforts is the focus of the APS. With few remaining years before 2025, it is crucial to accelerate EE measures in line with economic recovery, by attempting an additional reduction of 3.3% in 2023 along with continuous monitoring to improve EE measures.

New Energy Policies in 2022

Several AMS launched energy-related policies and enabling regulations in 2022 as an attempt to accelerate energy transition and decarbonisation by encouraging more renewables in the energy mix.

Indonesia

In July 2022, Indonesia published the decision of the Minister of Energy and Mineral Resources No. 135 of 2022 concerning the Minimum Energy Performance Standard (MEPS) and Energy Saving Label for Light Emitting Diode Lights (LED) [30]. It marks a significant milestone for Indonesia's ADLIGHT, Advancing Indonesia's Lighting Market to High Efficient Technologies project, which aims to reduce electricity demand and related greenhouse gas (GHG) emissions by promoting increased use of high-efficiency lighting technologies through the transformation of the national market.

This decision is subordinate legislation of the Regulation of the Minister of Energy and Mineral Resources No. 14 of 2021 on Application of Minimum Energy Performance Standards to Energy Consuming Equipment [31], [32]. The regulations consist of five tiers or star levels, with efficiency increasing with the number of stars. The decree also includes details of the information that must be included on the energy label, the energy efficiency levels, performance testing requirements and procedures, permitted exemptions from energy saving certification obligations, and the acceptable levels of tolerance for the conformance testing.

The three main types of LED lighting to be regulated are (1) self-ballasted LED lighting, (2) self-ballasted straight tube LED lighting, and (3) LED floodlights.

In addition, to fulfil the country's target of 23% RE share by 2025, Indonesia issued the long-awaited regulation that maps out the road towards cleaner power generation and the acceleration of RE development, in line with the country's international climate-change commitments. The regulation, Presidential Regulation No. 112 of 2022, was launched on 13 September 2022 [33]. In brief, the steps taken by the government in this regulation to increase the RE portion in Indonesia's energy mix consist of the following:

- a ban on the development of new coal power plants;
- reducing the number of coal power plants by authorising the Ministry of Energy and Mineral Resources to accelerate the termination of CFPP operated by PLN and/or IPP;
- replacing the basis of RE tariff from the average electricity generation basic cost to ceiling price based on the type of energy sources and locations;
- streamlining the procurement process of RE projects through a direct appointment and selection, and providing a time limit to conclude the entire process; and
- providing incentives for geothermal energy power plants.

Malaysia

National Energy Policy (NEP) 2022 – 2040 launched on 19 September 2022 as a new narrative for energy transition and the underlying premise for the economic development of the country [34]. The NEP aims to improve financial resilience and ensure energy recovery while achieving equality and universal access as well as ensuring environmental sustainability. This includes energy-based hydrocarbons and renewable energy sources. The NEP is also concurrent with managing the country's energy sector, which

considers the balance of the trilemma of energy sources. The NEP is enacted for:

- streamlining and harmonising various existing policies, some related to energy;
- ensuring a coordinated energy sector response and keeping in line with national aspirations and agendas;
- creating a long-term vision and response plan which is coordinated across various parties interested; and
- providing the latest direction of the energy sector and forward-looking.



Upcoming Policies in 2023

Several AMS are currently preparing new or updated energy regulations that are expected to launch by 2023.

Cambodia plans to roll out a new National Energy Efficiency Policy in an effort to slow the energy demand growth rate from 2014-2035 by at least 20% by the end of the period. Initiated in 2021 with the support of ADB, the national policy introduces similar sector-specific targets, such as 25% for the industry as well as the building sub-sector, and 15% for the transportation sector [35]. In addition, the country will launch power development plan 2021-2040 to address high power costs and energy shortages [36]. The new master plan is aimed not only at supplying sufficient and steady electricity and providing better prices, but also developing clean energy sources and the role of energy service companies.

Indonesia's commitment to pursue energy transition through the implementation of the ambitious JTEP and ETM will give a sign to investors. The government will strive to finish a comprehensive investment plan within six months after JTEP is signed, which will be in May 2023 [37]. Once the plan is established, investors will be able to clearly see business opportunities to contribute to the 2030 target of 34% RE and the net zero emissions target.

Malaysia's National Energy Efficiency Plan presents a strategy for a well-coordinated and cost-effective implementation of energy efficiency measures in the industrial, commercial and residential sectors, which will lead to reduced energy consumption and

economic savings for the consumers and the nation [38]. The country is currently drafting the Energy Efficiency and Conservation Act (EECA), which is expected to be approved by 2023. It will introduce a new section of registration for training institutions in addition to registration for energy managers and auditors to Energy Commission.

Singapore's energy regulator will introduce new emissions standards for new and repowered fossil fuel-fired power generation units in 2023 [39]. The new rules are part of implementing a law the city-state passed last year that allowed the authority to set GHG standards. The action comes after the country announced plans to reduce its emission target for 2030. Singapore would also increase the effectiveness of its power plants by mandating all new generations to adopt green technology.

Vietnam's Power Development Plan VIII (PDP8) is the primary power planning instrument for the period 2021-2030, with a vision towards 2050 [40]. It was initially scheduled to be released in 2020 but remains pending. The latest draft proposal submitted by the Ministry of Industry and Trade in November 2022 is seeing the CFPPs reduction and the stagnant development of solar, but maximising Vietnam's potential on wind, hydropower, and biomass. After 2030, most CFPPs will burn biomass starting from 20% and gradually increasing to 100%, while gas will be switched to hydrogen.





Insight 4 – ASEAN Energy Priorities 2022-2023

Trailing ASEAN Chairmanship's achievements
and priorities

Written by **Amira Bilqis**





Revisiting Achievements of Cambodia's Chairmanship 2022

Cambodia received the baton of ASEAN Chairmanship from Brunei Darussalam in 2022, taking the theme **“ASEAN A.C.T.: Addressing Challenges Together”** with priorities in respective three pillars in ASEAN: 1) Political and Security, 2) Economic, and 3) Socio-cultural which underlines togetherness and encourage action-oriented collaboration [41].

Under the economic pillar, Cambodia's Chairmanship focuses on three priorities, namely:

- Realise an Inclusive, Sustainable and Resilient Post-COVID-19 ASEAN Community
- Strengthen ASEAN's Competitiveness and Regional Integration
- Future-Proof ASEAN's Growth and Prosperity

It has been noted that Priority Economic Deliverables (PEDs) under Cambodia's 2022 ASEAN Chairmanship did not specifically list energy-related priorities. Nevertheless, there are seven energy Annual Priorities (APs) listed and some have been completed, such as i) the flagship publication of the 7th ASEAN Energy Outlook (AEO7), which marks the first ASEAN took full leadership in each processes and in collaboration with national experts from ASEAN Member States (AMS), ii) organised the 2022 High-Level Policy Dialogue on Coal and Clean Coal Technologies (CCT) and iii) Deep-Dive Workshop on the Energy Efficiency and Conservation (EE&C) in Power Sector the while the remaining APs are developing progressively.

What's New: The 40th ASEAN Minister on Energy Meeting

The 40th ASEAN Minister on Energy Meeting (AMEM) was hosted virtually by Cambodia on 15 September 2022 with the opening by H.E Hun Sen, Prime Minister of the Kingdom of Cambodia, who called for strengthening: [42]

1. the ASEAN Power Grid (APG) and Trans-ASEAN Gas Pipelines (TAGP) by accelerating remaining important works and achieving regional connectivity;
2. policies, laws and regulations on clean energy, environmental protection and energy resource management to contribute to climate change mitigation and move towards future carbon neutrality;
3. international cooperation to increase electricity trading, enhance mixed and complementary energy sources, exchange experiences and share new technologies, and increase access to financing; and
4. active participation in achieving the ASEAN Plan of Action for Energy Cooperation (APAEC) 2021-2025.

The Joint Ministerial Statement (JMS) of the 40th AMEM reported the progress of the annual milestones of the seven programme areas under APAEC, namely, the APG, TAGP, CCT, EE&C, Renewable Energy, Regional Energy Policy and Planning, and Civilian Nuclear Energy. The JMS also highlighted the commencement of the Lao PDR-Thailand-Malaysia-Singapore Power Integration Project on cross-border power trade of up to 100 MW of hydropower using existing interconnections. This achievement undoubtedly serves as a pathfinder of regional renewable multilateral power trading [42].



Welcoming Indonesia's ASEAN Chairmanship 2023

This year, Indonesia holds its 5th round as the Chair of ASEAN right after hosting its first presidency of G20. During the handover at ASEAN Summit Closing on 13 November 2022, Joko Widodo – President of Indonesia – announced the theme “**ASEAN Matters: Epicentrum of Growth**”, intending to ensure ASEAN's unity, centrality, and resiliency to continue its role as the anchor of regional peace, prosperity, and capable of facing rippled global challenges [43].

Figure 15 – Indonesia's ASEAN Chairmanship Logo



The annual press statement from the Minister of Foreign Affairs of the Republic of Indonesia revealed the three pillars under the theme: i) ASEAN Matters, ii) Epicentrum of Growth, and iii) ASEAN Outlook on the Indo-Pacific followed by four main priorities:

1. Food Security
2. **Energy Security**
3. Health Infrastructure
4. Financial Stability

All of the above are translated into three strategic thrusts in the economic sector, namely i) Recovery and Rebuilding, ii) Digital

Economy, and iii) Sustainability with 16 PEDs. Development of the Electric Vehicle (EV) Ecosystem and Declaration on Sustainable Energy Security through Interconnectivity and Market Integration are among the key focus under the PEDs of 2023.

As the prominent producer and consumer of energy within the region due to its size, as well as considering the disrupted global energy supply chain as an effect of the ongoing war and the energy crisis in developed nations, Indonesia flexes its adroit by putting forward energy security instead being drawn by the global renewable fever. At the same time, the country establishes momentum of new market opportunities from EV in the face of projected recession this year and bringing back ASEAN centrality under the economic pillar.

In addition, interconnectivity and market integration also align with Indonesia's overarching big agendas to progress cooperation in the Indo-Pacific region in an attempt to realise the areas of cooperation, one of which focuses on connectivity related to the APG and TAGP.

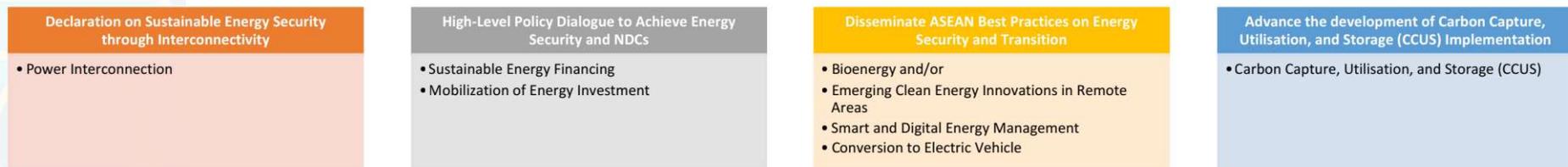
Three-consecutive big agendas for Indonesia 2022 (G20), 2023 (ASEAN Chairmanship), and 2024 (General Elections) provide a strategic position to walk the talk of its international agenda, including energy security, whose efforts remain lukewarm. Therefore, anticipating the election year, ASEAN policymaking processes have been set earlier than most chairmanships.



Realising Indonesia’s Energy Priorities

The PEDs concerning energy in 2023 is projected to advance the existing programme areas in APAEC 2021–2025 and priorities listed by Indonesia on energy security. The two priorities from the strategic thrust (Development of the EV Ecosystem and Declaration on Sustainable Energy Security through Interconnectivity and Market Integration) are translated into proposed annual priorities.

Figure 16 – Energy Annual Priorities for Indonesia’s ASEAN Chairmanship 2023²



Source: Author’s compilation

The two priorities were also recognised in the Press Statement by the Chair of the 32nd ASEAN Coordinating Council Meeting and ASEAN Foreign Ministers’ Retreat on 3-4 February in Jakarta, which evidently mentioned and welcomed to be prioritised this year.

The strategic position of Indonesia can be expected to push for robust progress on interconnectivity as the country has not yet connected to the regional Multilateral Power Trading (MPT) scheme. As the energy giant, Indonesia can play a crucial role in influencing ASEAN’s ambition to be interconnected and gain traction for investors to accelerate the long-standing ASEAN interconnectivity agenda since 1997. The AEO7 also projected, based on its LCO

scenario, the high preferences for several priority projects, including the connection of the Brunei Darussalam–Indonesia–Malaysia–Philippines Power Integration Project (BIMP-PIP) to be operational as early as 2025 [6]. If Indonesia could kickstart the BIMP-PIP in parallel with what exists now, the LTMS-PIP, the progress, and the future of APG would be immense. It also signals that APG will be most likely to be future-proof both for security and transition agenda.

In addition, exploration of economic-scale Carbon Capture Utilisation and Storage, conversion to EVs, bioenergy utilisation, and smart energy management remain vibrant for the security agenda.

² Subject to change





References

- [1] The World Bank, 'Russian Invasion to Shrink Ukraine Economy by 45 Percent this Year', *Press Release*, 2022. <https://www.worldbank.org/en/news/press-release/2022/04/10/russian-invasion-to-shrink-ukraine-economy-by-45-percent-this-year>.
- [2] Asian Development Bank (ADB), 'Asian Development Outlook (ADO) 2022 Special Topic: Russia's invasion of Ukraine: Implications for developing Asia'. 2022, [Online]. Available: <https://data.adb.org/dataset/asian-development-outlook-ado-2022-special-topic-russias-invasion-ukraine-implications>.
- [3] International Energy Agency (IEA), 'National Reliance on Russian Fossil Fuel Imports', Paris, 2022. [Online]. Available: <https://www.iea.org/reports/national-reliance-on-russian-fossil-fuel-imports>.
- [4] United Nations Statistics, 'UN Comtrade Database'. 2021, [Online]. Available: <https://comtrade.un.org/data>.
- [5] Asian Development Bank (ADB), 'GDP Growth in Asia and the Pacific, Asian Development Outlook (ADO)'. Philippines, 2022, [Online]. Available: <https://data.adb.org/dataset/gdp-growth-asia-and-pacific-asian-development-outlook>.
- [6] ASEAN Centre for Energy (ACE), 'The 7th ASEAN Energy Outlook', Jakarta, 2022. [Online]. Available: <https://aseanenergy.org/work/the-7th-asean-energy-outlook/>.
- [7] COP26, 'COP26 Keeps 1.5C Alive and Finalises Paris Agreement', 2021. <https://ukcop26.org/cop26-keeps-1-5c-alive-and-finalises-paris-agreement/> (accessed Jan. 23, 2023).
- [8] Indonesia, 'Enhanced Nationally Determined Contribution (ENDC) Republic of Indonesia', 2022. [Online]. Available: [https://unfccc.int/sites/default/files/NDC/2022-09/ENDC Indonesia.pdf](https://unfccc.int/sites/default/files/NDC/2022-09/ENDC%20Indonesia.pdf).
- [9] Singapore, 'Singapore's Second Update of Its First Nationally Determined Contribution (NDC) and Accompanying Information', 2022. [Online]. Available: [https://unfccc.int/sites/default/files/NDC/2022-11/Singapore Second Update of First NDC.pdf](https://unfccc.int/sites/default/files/NDC/2022-11/Singapore%20Second%20Update%20of%20First%20NDC.pdf).
- [10] Thailand, 'Thailand's 2nd Updated Nationally Determined Contribution', 2022. [Online]. Available: [https://unfccc.int/sites/default/files/NDC/2022-11/Thailand 2nd Updated NDC.pdf](https://unfccc.int/sites/default/files/NDC/2022-11/Thailand%202nd%20Updated%20NDC.pdf).
- [11] Viet Nam, 'Nationally Determined Contribution (NDC) Updated in 2022', 2022. [Online]. Available: [https://unfccc.int/sites/default/files/NDC/2022-11/Viet Nam NDC 2022 Update.pdf](https://unfccc.int/sites/default/files/NDC/2022-11/Viet%20Nam%20NDC%202022%20Update.pdf).



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- 
- [12] Singapore, 'Addendum to Singapore's Long-Term Low-Emission Development Strategies', 2022. [Online]. Available: [https://unfccc.int/sites/default/files/resource/Addendum to Singapore%27s Long-Term Low-Emissions Development Strategy.pdf](https://unfccc.int/sites/default/files/resource/Addendum%20to%20Singapore%27s%20Long-Term%20Low-Emissions%20Development%20Strategy.pdf).
- [13] Singapore, 'Singapore Longterm Low Emission Development Strategy', 2020. [Online]. Available: <https://unfccc.int/sites/default/files/resource/SingaporeLongtermLowEmissionsDevelopmentStrategy.pdf>.
- [14] Thailand, 'Thailand's Long-term Low Greenhouse Gas Emission Development Strategy', 2021. [Online]. Available: https://unfccc.int/sites/default/files/resource/Thailand_LTS1.pdf?download.
- [15] Thailand, 'Thailand's Long-Term Low Greenhouse Gas Emission Development Strategy (Revised Version)', 2022. [Online]. Available: [https://unfccc.int/sites/default/files/resource/Thailand LT-LEDS %28Revised Version%29_08Nov2022.pdf](https://unfccc.int/sites/default/files/resource/Thailand%20LT-LEDS%20Revised%20Version%29_08Nov2022.pdf).
- [16] Climate and Clean Air Coalition, 'Global Methane Pledge'. <https://www.globalmethanepledge.org/> (accessed Jan. 24, 2023).
- [17] ACE, 'ASEAN Energy Database System (AEDS)'. <https://aeds.aseanenergy.org/> (accessed Oct. 13, 2021).
- [18] Asian Development Bank (ADB), 'ADB dan Mitra Indonesia Tanda Tangan MOU Bersejarah Rencana Percepatan Pengakhiran Masa Operasional Pembangkit Listrik Batu Bara Pertama di Bawah Mekanisme Transisi Energi', *Press Release*, 2022. <https://www.adb.org/id/news/adb-indonesia-partners-sign-landmark-mou-early-retirement-plan-first-coal-power-plant-etm>.
- [19] Ministry of Energy and Mineral Resources (MEMR) Republic of Indonesia, 'ETM Country Platform, Upaya Akselerasi Transisi Energi', *Press Release*, 2022. <https://www.esdm.go.id/en/media-center/news-archives/etm-country-platform-upaya-akselerasi-transisi-energi>.
- [20] Asian Development Bank (ADB), 'ADB Energy Transition Mechanism Marks Significant Milestones', *Press Release*, 2022. <https://www.adb.org/news/adb-energy-transition-mechanism-marks-significant-milestones>.
- [21] 'Climate Investment Funds - Philippines'. <https://www.cif.org/country/philippines>.
- [22] ACEN, 'ACEN completes the world's first Energy Transition Mechanism transaction for the 246-MW SLTEC coal plant', 2022. <https://www.acenrenewables.com/2022/11/acen-completes-worlds-first-energy-transition-mechanism-etm-transaction-246-mw-sltec-coal-plant/>.
- [23] Asia-Pacific Economic Cooperation, 'Bangkok Goals on Bio-Circular-Green (BCG) Economy', 2022. [https://www.apec.org/meeting-papers/leaders-declarations/2022/2022-leaders-declaration/bangkok-goals-on-bio-circular-green-\(bcg\)-economy](https://www.apec.org/meeting-papers/leaders-declarations/2022/2022-leaders-declaration/bangkok-goals-on-bio-circular-green-(bcg)-economy).
- [24] European Commission, 'Joint Statement by the Government of the Republic of Indonesia and International Partners Group members on
- 

- the Indonesia Just Energy Transition Plan', 2022. https://ec.europa.eu/commission/presscorner/detail/en/statement_22_6892.
- [25] 'Political declaration on establishing the Just Energy Transition Partnership with Viet Nam', 2022. <https://www.gov.uk/government/publications/vietnams-just-energy-transition-partnership-political-declaration/political-declaration-on-establishing-the-just-energy-transition-partnership-with-viet-nam>.
- [26] ASEAN Taxonomy Board, 'ASEAN Taxonomy for Sustainable Finance', Jakarta, 2021. [Online]. Available: <https://asean.org/book/asean-taxonomy-for-sustainable-finance/>.
- [27] Sustainable Finance Indonesia, 'Indonesia Green Taxonomy Edition 1.0 - 2022', 2022. [Online]. Available: <https://www.ojk.go.id/keuanganberkelanjutan/en/publication/detailslibrary/2352/taksonomi-hijau-indonesia-edisi-1-0-2022>.
- [28] K. Azizuddin, 'Thai regulators exclude gas from green category in draft taxonomy', *Responsible Investor*, Jan. 03, 2022.
- [29] M. Uhryuk, S. J. Harris, and J. C. Y. Lee, 'Singapore Publishes Second Version of Green Taxonomy for Financial Institutions', *Eye on ESG*, 2022. <https://www.eyonesg.com/2022/05/singapore-publishes-second-version-of-green-taxonomy-for-financial-institutions/> (accessed Feb. 03, 2023).
- [30] Minister of Energy and Mineral Resources (MEMR) Republic of Indonesia, *Decree of the Minister of Energy and Mineral Resources Republic of Indonesia No. 134.K/EK.07/DJE/2022 on Minimum Energy Performance Standard and Sign Labels Save Energy for Energy Using Equipment Lights - Emitting Diodes (LED)*. 2022.
- [31] Minister of Energy and Mineral Resources Republic of Indonesia, *Regulation of the Minister of Energy and Mineral Resources No. 14/2021 on Application of Minimum Energy Performance Standards to Energy Consuming Equipment*. 2021.
- [32] A. Kenji, 'Indonesia renews energy efficiency labels and MEPS for energy consuming equipment', *Envilience ASIA*, 2021. https://envilience.com/regions/southeast-asia/id/report_4234.
- [33] Ministry of Energy and Mineral Resources (MEMR) Republic of Indonesia, 'Perpres 112 Tahun 2022 Diteken, Era Pembangkit Listrik Rendah Emisi Dimulai', 2022. <https://www.esdm.go.id/id/media-center/arsip-berita/perpres-112-tahun-2022-diteken-era-pembangkit-listrik-rendah-emisi-dimulai>.
- [34] Malaysia, 'National Energy Policy 2022-2040', 2022. [Online]. Available: https://www.epu.gov.my/sites/default/files/2022-09/National_Energy_Policy_2022_2040.pdf.

- [35] H. Phanet, 'Energy efficiency policy due end-2022', *The Phnom Penh Post*, Phnom Penh, Jun. 28, 2022.
- [36] K. Sothear, 'Master plan to address high power cost', *Khmer Times*, May 16, 2022.
- [37] Institute for Essential Services Reform, 'Indonesia Energy Transition Outlook (IETO) 2023', Jakarta, 2023. [Online]. Available: <https://iesr.or.id/en/pustaka/indonesia-energy-transition-outlook-ieto-2023>.
- [38] Ministry of Energy Green Technology and Water Malaysia, 'National Energy Efficiency Action Plan', 2019. <https://www.pmo.gov.my/ms/2019/07/pelan-tindakan-kecekapan-tenaga-negara/>.
- [39] 'Singapore To Regulate Fossil-Fuel Power Station Pollution', *Power Info Today*, 2023.
- [40] 'Newest draft of Power Development Plan VIII comes with several highlights', *Vietnam Investment Review*, Nov. 16, 2022.
- [41] Ministry of Foreign Affairs and International Cooperation of Cambodia, 'Cambodia's ASEAN Chairmanship', 2022. <https://asean2022.mfaic.gov.kh/> (accessed Jan. 03, 2023).
- [42] 'Joint Ministerial Statement of the 40th ASEAN Ministers on Energy Meeting'. 2022, [Online]. Available: <https://asean.org/joint-ministerial-statement-of-the-40th-asean-ministers-on-energy-meeting/>.
- [43] Ministry of Foreign Affairs Republic of Indonesia, 'Press Briefing Serah Terima Keketuaan ASEAN', 2022. https://kemlu.go.id/portal/id/read/4194/siaran_pers/press-briefing-serah-terima-keketuaan-asean (accessed Jan. 11, 2023).



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