ASEAN Energy in 2024

Key Insights about ASEAN Energy Landscape and Predictions in 2024

ASEAN Centre for Energy

Published by:
ASEAN Centre for Energy
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Acknowledgement

“ASEAN Energy in 2024” is a report by the ASEAN Centre for Energy (ACE) that provides key insights into Southeast Asia’s energy situation in 2024. This is an annual report, following the previous "ASEAN Energy in 2022" and "Outlook on ASEAN Energy 2023"

The analysis was based on data and information collected from various reliable sources: the official reports from the governments of the 10 ASEAN Member States, the private sector and international organisations, as well as the 7th ASEAN Energy Outlook. These are all available in the ASEAN Energy Database System (AEDS).

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Significant feedback was provided by ACE staff, namely Tung Phuong, Beni Suryadi, Adhityo Gilang Bhaskoro, and Michael Petalio.
The publication was supported by Rinda Rufaidah and ACE Communications Team.
The design was supported by Bayu Surya Prayogie.
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March 2024

Insight 1

Global Trends in Critical Material

Leveraging ASEAN's Role in Securing a Sustainable Global Supply Chain of Critical Materials

Written by Ambiyah Abdullah, Muhammad Shidiq

Examining ASEAN's Position in the Global Supply Chain of Critical Materials

The global greenhouse gas (GHG) emissions were reported to increase from 54.5 gigatons of carbon dioxide equivalent ($GtCO_2e$) in 2020 to 57.4 $GtCO_2e$ in 2022 [1]. Fossil-fuel electricity and the industry sector accounted for two-thirds of total emissions. G20 countries contributed 76% of the total global emissions in 2022. The rise in GHG emissions was driven mainly by the growth in primary energy consumption. In response to the world's energy crisis in 2022, there was a decrease in gas demand (3%), which caused an increase in coal, oil, and renewable energy consumption. The global energy demand is estimated to grow 0.7% annually from 2022 to 2030 and continue to grow until 2050, with around 16% growth in 2050 from emerging and developing countries' energy demand.

As the fifth-largest economy in the world, with an average 5.6% real GDP growth in 2022 [2] and a 6.9% share to global emissions during 1990-2019 [3], the ASEAN energy transition is in a crucial position in the worldwide energy sector. In 2019, the emissions from the power sector accounted for the largest share of the total GHG emission in the region (35%), exceeding the emissions from the land use and forestry sector (31%) [4]. Without any policy measures applied, the 7th ASEAN Energy Outlook projected that the region's emissions will increase by 3.7 in 2050 compared to the 2020 value [5]. Decarbonising the power sector would be the key to the energy transition in ASEAN due to its largest share of the total ASEAN's emissions. With the recently announced carbon neutrality strategy in 2023, the region moved towards more serious actions to support energy transition [4].

There were growing numbers of countries committed to achieving carbon neutrality or net zero emissions. As of November 2023, about 145 countries had announced their national pledges for carbon neutrality or net zero targets [6]. This trend needs to be complemented by more enabling policy measures to support transition in key energy sectors such as power, industry, and transportation. The implementation of net zero emissions by 2050 is predicted to reduce global primary energy consumption by 1.2% annually until 2030 due to energy efficiency, electrification, and renewable energy deployments [7]. However, stronger efforts to transition to cleaner energy would significantly increase the demand for critical materials used by low-carbon technologies compared to fossil-fuel ones. The growing development of energy transition technologies is predicted to increase demand for lithium (almost 90%), nickel and cobalt (60%-70%), and copper and earth elements (40%) [8]. The 2022 global energy crisis of gas and the price volatility of energy commodities are two major challenges added to the rising demand for critical materials for energy transition technologies. Thus, securing these key materials needed for clean energy transition becomes important not only in the context of energy transition but also in energy security and sustainability.

In 2020, ASEAN accounted for more than 47% of global nickel and 35% of global tin production [9]. About 30% share of critical materials in ASEAN were exported to foreign countries. Moreover, ASEAN's production growth of nickel, rare earth, and other materials also doubled the

global production growth, which indicates its great potential for contribution to the worldwide supply chain of critical materials. Among ASEAN Member States (AMS), Indonesia, the Philippines, and Myanmar are the key players in total ASEAN production of nickel and tin. In 2020, Indonesia and the Philippines accounted for 33% and 13%, respectively, of total ASEAN nickel production. Nickel and copper are the most used critical materials in energy transition technology, such as hydrogen, wind, solar PV, EV, and others [8] [9]. It shows that ASEAN has great potential to leverage its position along the worldwide supply chain of critical materials.

Linking ASEAN's potential production of some critical materials to securing a sustainable critical mineral supply for energy transition technologies needs to be started with examining the ASEAN's position in the current global supply chain. Identifying each country's key producers and consumers along the worldwide supply chain of critical materials will portray a complete picture of interconnection among nations. It also provides insights not only for leveraging ASEAN's role in securing a sustainable global supply chain of critical materials but also for identifying the potential policy measures needed for energy security and affordability in the region.

Linkage between Critical Materials and Energy Transition Technologies

Understanding what critical materials are needed or used by energy transition technologies is crucial for understanding ASEAN's position in the global supply chain. There has been a slight difference in using the terms "minerals" and "materials". The most used term is "minerals", which refers to raw materials at the beginning of the production step (mining). The latter term (materials) implies more production steps, including manufacturing and downstream stages. This article uses the term "materials" as the analysis covers until the last step of production. Table 1 shows the list of critical materials used for energy transition technologies.

Table 1 Critical Materials Needed for Energy Transition Technologies

Energy Transition Technologies	Critical Materials
Fuel Cell	Cobalt, copper, graphite, rare earth, nickel, polysilicon, silver, zircon, manganese, gold, titanium, iron, chromium, and magnesite
Batteries (including storage)	Cobalt, copper, graphite, lithium, nickel, polysilicon, tin, manganese, titanium, lead, and iron
Solar Photovoltaic	Aluminium, copper, nickel, polysilicon, silver, steel, tin, manganese, lead, and iron
Wind	Aluminium, cobalt, copper, rare earth, nickel, steel, manganese, lead, iron, and chromium
Electric Vehicle	Cobalt, copper, graphite, lithium, rare earths, nickel
Hydrogen	Aluminium, copper, nickel, palladium, steel
Hydropower	Aluminium, copper, nickel, steel

Source: Authors' compilation [5] [8] [9]

Global Demand for Critical Materials for Energy Transition Technologies

Global demand for energy transition materials in 2022 increased significantly from 2017, reaching about USD 320 billion due to increasing demand for electric vehicles (EV), solar photovoltaic (PV), and other energy transition technologies. In breakdown, the increasing global demand for lithium was the highest (300%), followed by cobalt (70%) and nickel (40%) [10]. The relationship between the growing demand for critical minerals and the demand for energy transition technologies is strongly correlated. Thus, the availability and stable price of critical materials will significantly affect the speed of energy transition technologies.

Global additional capacity for wind, solar PV, and EV in 2023 was projected to increase to 70%, 30%, and 30%, respectively, from the previous year [10]. It also affects the investment needed for the exploration and development of critical materials, which is crucial in ensuring a reliable supply of energy transition technologies. In 2022, global investment for critical materials increased up to 30% compared to 2021 value, with the largest share on lithium, followed by copper and nickel.

Global demand for critical materials under the net zero scenario by 2050 was projected to increase up to 3.5 times by 2030 compared to the 2021 value, which amounts to about 30 million tonnes [10]. To meet this significant demand increase, the reliability and sustainability of the supply side for critical materials are crucial. This is determined not only by the amount of supply but also by the price of critical materials. It was projected that the global supply of lithium and cobalt would face shortage when global demand for lithium and cobalt reaches a 15% increase [11]. In addition, the cost of lithium was estimated to be 40% of the total production cost of the battery. Thus, the volatility price of critical materials will also significantly affect its supply curve of critical materials for energy transition technologies.

The key challenges in global critical materials cover not only the reliability of global supply to meet the increasing global demand for critical materials but also the identification of potential supply diversification and ensuring its less environmental impact. Adding to these challenges, unfortunately, the exploration and mining of critical materials take a long time and substituting some critical materials (as inputs) is not a possible solution for energy transition technologies [12]. Under this context, examining the current pattern of the global supply chain of critical materials is a first crucial step. It can give us an overall picture of critical materials' flow at the global level. It is important to identify the vital spots along the global supply chain for addressing the above-mentioned challenges.

ASEAN's Position in the Global Supply Chain of Critical Materials

This section presents the ASEAN's role in the global supply chain of critical materials. It views the ASEAN's position from its consumption flow and the key users of the ASEAN critical materials. This will be used as a basis to identify the vital spots for ASEAN to leverage its role in the global supply chain of critical materials and policy measures to support other energy sectors' agendas in the region.

To analyse ASEAN's position in the global supply chain of critical materials, the most common approach is to look at trade and the interconnection of production processes among countries at the international level based on micro and macro analyses. This article will not focus on specific details of the critical materials mentioned in Table 1 but will examine the ASEAN's position from the overall category of critical materials under the context of energy transition technologies using macro-level analysis based on the 2020 international input-output table [13].

Pattern of the Total ASEAN Critical Energy Materials Consumption Flow

In 2020, the total world consumption of the ASEAN energy materials was valued at USD 179.1 trillion, including the AMS' consumption (Table 2). Interestingly, close to 70% of the total ASEAN energy materials consumption in 2020 was for domestic consumption. It indicates three important insights: (i) domestic consumption in each AMS is the main driver of the increasing demand for energy materials; (ii) the contribution of ASEAN to the other countries' consumption of energy materials is a smaller portion than domestic demand; and (iii) the characteristic of how ASEAN energy materials consumed by across sectors mostly was dominated by sectors associated with early stage of production (mining, extraction, and production), as compared to sectors linked with later stages of production sectors.

The findings of each AMS consumption show that Indonesia, Malaysia, and Thailand absorbed about 49% of the 2020 ASEAN energy materials. These countries are also among AMS that are actively implementing efforts towards energy transition. Furthermore, Indonesia accounted for about 42% of total nickel production worldwide. Malaysia accounted for the largest share of total ASEAN aluminium production in 2020. In addition to these three countries, Vietnam accounted for almost close to Thailand's share of the entire ASEAN's energy materials consumption in 2020. Other remaining AMS accounted for only a small portion compared to these four countries.

Among non-ASEAN countries that consumed ASEAN's energy materials, China was the largest consumer of the total ASEAN's energy materials in 2020 (12%). In addition, Japan, India, and Korea accounted for 8%, 5%, and 4%, respectively, of the total ASEAN's energy materials in 2020. The results are not surprising, considering the fact that these countries are among key partners of AMS, including under energy cooperation. These findings show the key consumer countries of the ASEAN total energy materials.

Table 2 Pattern of the Total ASEAN Energy Materials Consumption in 2020

No	Country	Total Consumption of the ASEAN Energy Materials
	World*	**179.1 USD Trillion**
1	Indonesia	21.0%
2	Malaysia	15.1%
3	Thailand	12.9%
4	China	11.8%
5	Vietnam	11.5%
6	Japan	7.7%
7	India	4.5%
8	Korea	4.0%
9	Singapore	2.2%
10	Philippines	2.0%
11	Australia	1.4%
12	Brunei Darussalam	1.2%
13	Taiwan	1.1%
14	Myanmar	1.1%
15	Laos	0.9%

Source: Authors' analysis

Pattern of Intersectoral Users of the Total ASEAN Energy Materials Consumption

This sub-section describes the findings of the pattern of intersectoral users of the total ASEAN energy materials in 2020 at the global level. It was found that the share of total ASEAN's energy material consumption in 2020 was dominated by intersectoral sector consumption (98%). A very small share was consumed by direct consumption at final demand, the last step of the consumption stage (2%).

Considering the countries with the largest share of total ASEAN's energy materials consumption in 2020, the pattern of the intersectoral users of the total ASEAN energy materials consumption in Indonesia, Malaysia, Thailand, and Vietnam was examined. The pattern of the intersectoral users in these four AMS shows some similarities and slight differences (Table 3). Indonesia and Thailand have a similar pattern of intersectoral users of energy materials in 2020, with the largest users being the coke and electricity sectors. The other remaining intersectoral users are also

the same. Another common finding between Indonesia and Thailand was that energy materials in these countries were consumed mainly by intersectoral sectors at the beginning of the production process (mining and processing), not the end-user sectors at the last step of production. On the other hand, slight differences between Indonesia and Thailand were also found. Thailand's coke sector consumed 75% more energy materials than Indonesia's coke sector. Basic metal sector in Thailand also consumed energy materials more than in Indonesia. Conversely, chemical and chemical products in Indonesia consumed more critical materials than in Thailand.

Table 3 Intersectoral Consumption Flow of the ASEAN Total Energy Materials in Indonesia, Malaysia, Thailand, and Vietnam, 2020

Sector	Indonesia	Malaysia	Thailand	Vietnam
Coke and refined petroleum products	35.2%	66%	61.6%	44.7%
Electricity, gas, steam, and air conditioning supply	28.4%	11%	32.6%	6.1%
Chemical and chemical products	18.9%	7%	0.9%	5.7%
Other non-metallic mineral products	9.3%	*	1.2%	10.8%
Mining and quarrying, energy-producing products	4.4%	12%	1.0%	25.0%
Basic metals	1.0%	1.1%	2.5%	1.7%
Paper products and printing	0.9%	0.9%	0.1%	0.4%
Fabricated metal products	0.8%	0.7%	*	1.3%
Food products, beverages, and tobacco	*	2%	*	*
Construction	*	1%	*	0.5%

*Note: * The value is very small. Source: Authors' analysis.*

On the other hand, Malaysia and Vietnam have a similarity of intersectoral users of energy materials. 'Coke and refined petroleum' and 'mining and quarrying, energy-producing' products accounted for the two largest users of energy materials in Malaysia and Vietnam. However, Malaysia and Vietnam also have some differences. The share of mining, quarrying, and energy-producing products in Vietnam is two times Malaysia's value. This is probably due to the lower utilisation or processing level in Vietnam compared to Malaysia. In other words, energy materials in Vietnam are not much to be processed outside of the mining sector. For example, electricity, gas, steam, and air conditioning supply in Vietnam also consumed nearly half of Malaysia's. Other non-metallic mineral products in Vietnam consumed energy materials at the third largest share after the coke and mining sectors. Among the four AMS, energy materials in Malaysia and Thailand were also consumed by food products, beverages, tobacco, and construction, which is located at one step further in production stages than Indonesia and Vietnam (Table 3).

Table 4 Intersectoral Consumption Flow of the Total ASEAN Energy Materials in China, Japan, India, and Korea 2020

Sector	China	Japan	India	Korea
Coke and refined petroleum products	46.7%	49%	19.1%	37.9%
Electricity, gas, steam, and air conditioning supply	23.6%	44%	11.5%	42.6%
Chemical and chemical products	8.6%	2.1%	2.2%	3.3%
Mining and quarrying, energy-producing products	8.1%	*	*	*
Other non-metallic mineral products	4.5%	1.1%	18.9%	0.6%
Basic metals	4.4%	1.6%	37.2%	15.3%
Paper products and printing	0.5%	1.4%	*	*
Textiles, textile products, leather, and footwear	*	*	3.9%	*

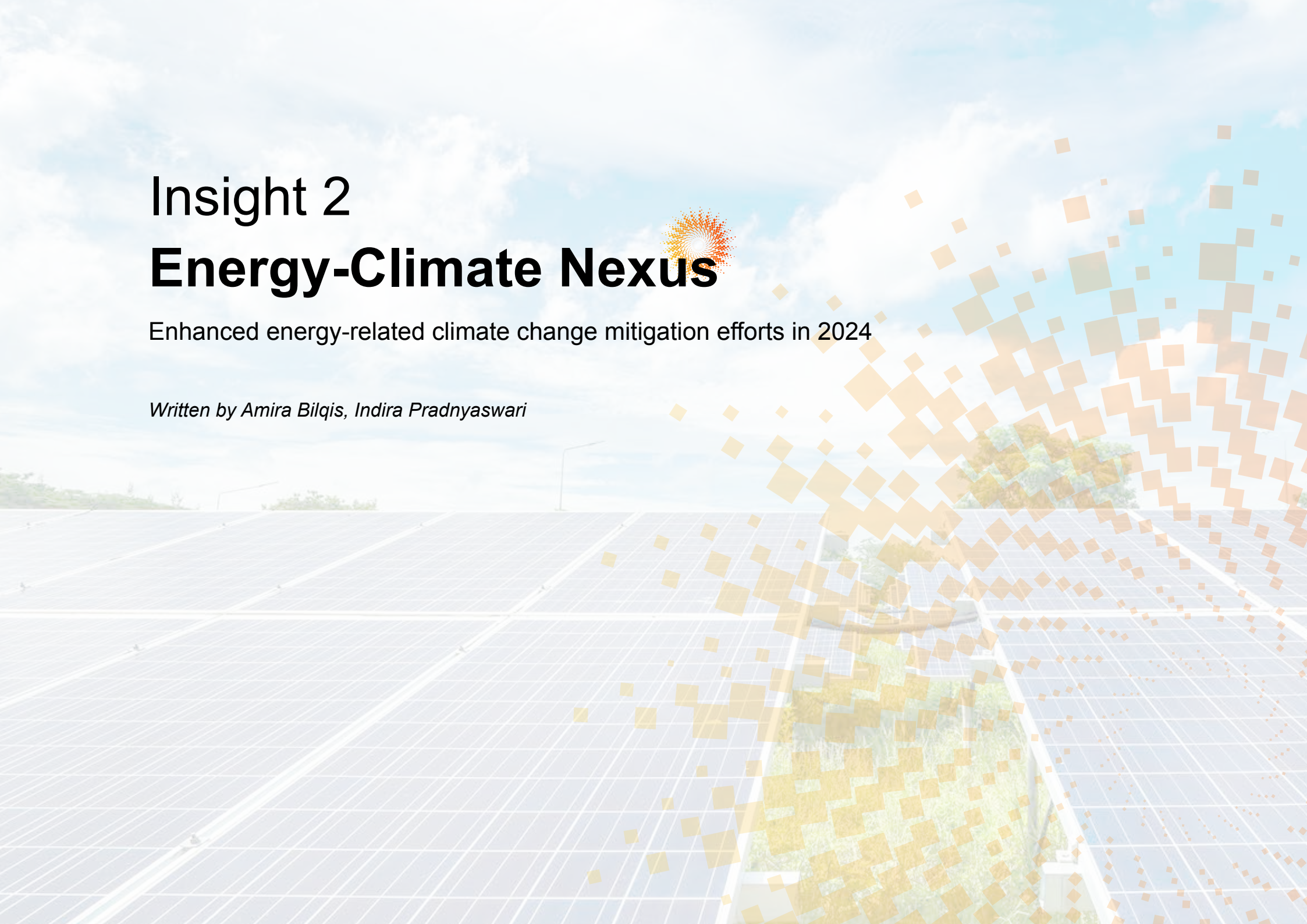
*Note: * The value is very small. Source: Authors' analysis.*

The intersectoral consumption flow of the total ASEAN's energy materials in China, Japan, India, and Korea shows the same pattern as the four key ASEAN countries (Table 3). China and Japan had the same pattern in which 'coke and refined petroleum products' and 'electricity, gas, steam, and air conditioning supply' accounted for the largest sectors of the ASEAN total energy materials consumption in 2020. Although the total China consumption for ASEAN energy materials was larger than Japan, the total energy material products consumed by electricity, gas, steam, and air conditioning in China was half of Japan's value. On the other hand, China's consumption of ASEAN energy material products by the second layer (such as 'chemical and chemical' and 'mining and quarrying, energy-producing' products) is almost three times Japan's consumption. Electricity, gas, steam, and air conditioning supplies in Korea also consume the largest amount of energy material products, as Japan does. In other words, this indicates that the dependency of Japan and Korea on energy material products from ASEAN in their electricity sector is more significant than in China and India (Table 4). Another interesting finding is that the basic metal industry in India consumed the largest share of energy material products from ASEAN, larger than coke and refined petroleum products and electricity sectors consumed. This finding is a very different pattern compared to China, Japan, and Korea. Similarly, the basic metals sector in Korea consumed a significant share, which was three times and close to four times the consumption of Japan and China, respectively (Table 4).

ASEAN exported its critical energy materials to the global market, particularly China, Japan, India, and Korea. The characteristics of sectors consumed of the ASEAN energy materials in those four countries are slightly different. Similarly, the pattern of energy materials consumption in the ASEAN key domestically consumed countries (Indonesia, Thailand, Malaysia, and Vietnam) is also slightly different. However, most of the ASEAN's critical energy materials in domestic and foreign countries are consumed as inputs for the early stages of production (such as coke and electricity). This indicates the potential that leveraging ASEAN's role in the global supply chain of critical materials could increase its added value

to cover larger production stages, not only as raw materials and mining but also in manufacturing (end-use/ downstream) sectors. As a result of the lower speed of global supply than demand, the global supply shortage of critical materials is projected to start in 2030 when global demand increases 1.5 times. Other challenges are the volatility of prices, the long time needed for exploration, and the low availability of raw materials.

A holistic and integrated policy design is crucial in this context, particularly for ASEAN's investment and energy cooperation. To capture the potential multiple benefits, the investment and energy cooperation scheme must be designed to balance domestic and foreign needs for critical energy materials. It starts by re-examining the existing policies in the region from upstream to downstream along the global supply chain of critical energy materials. The investment scheme should also cover the upstream stage of the region's energy transition and carbon neutrality targets. In addition, the energy cooperation of ASEAN (such as ASEAN+3: China, Japan, Korea) needs to be aligned with the investment scheme to cover upstream and downstream of ASEAN’s critical energy materials along its global supply chain.



Insight 2
Energy-Climate Nexus

Enhanced energy-related climate change mitigation efforts in 2024

Written by Amira Bilqis, Indira Pradnyaswari

ASEAN's Energy Commitments in COP28

During the 43rd ASEAN Summit in Jakarta on 5-7 September 2023, the ASEAN Member States (AMS) unveiled the ASEAN Joint Statement for the 28th United Nations Climate Change Conference of the Parties (COP28) [14]. The statement reiterates the commitment to meeting regional targets outlined in the ASEAN Plan for Action for Energy Cooperation (APAEC). These 2025 targets include achieving a 23% share of renewable energy (RE) in the Total Primary Energy Supply, a 35% share in installed power capacity, and a 32% reduction in energy intensity based on 2005 levels [15]. Held in Dubai from 30 November to 12 December 2023, COP28 generated several commitments to support the target's achievements on energy and its relevance to climate change. Three pledges related to energy were agreed upon by signatories' countries, including AMS (Table 5).

Table 5 Energy-Related Pledges Committed by Several ASEAN Countries Post-COP28

Pledge's Name	Targets	Signatories in ASEAN
Global Renewables and Energy Efficiency Pledge	Tripling the global's renewable energy generation capacity to at least 11,000 GW by 2030 and doubling the global average annual rate of energy efficiency improvement from around 2% to over 4% per year until 2030	Brunei Darussalam, Malaysia, Singapore, Thailand
Global Cooling Pledge	Reduce cooling-related emissions by a minimum of 68% to 2022 levels by 2050	Brunei Darussalam, Cambodia, Singapore, Thailand, Vietnam
Declaration on Hydrogen and Derivatives	Mutual recognition of certification for renewable and hydrogen	Malaysia, Singapore

Source: Authors' compilation [16], [17], [18]

The primary initiative garnering widespread support at COP28 is the Global Renewables and Energy Efficiency Pledge, which has backing from 130 countries. Among them, four AMS (Brunei Darussalam, Malaysia, Singapore, and Thailand) have endorsed the pledge, aiming to achieve a significant threefold increase in global installed RE generation capacity. Understanding the importance of international cooperation, the member states declare several key actions, underlining the aim to improve multisectoral collaboration, enhance financial support and mechanisms, and establish supporting capacity building and technical needs to maintain the technology [17]. Moreover, cross-border grid interconnection also takes the role of one of the main projects to be accelerated. Emphasising energy efficiency as the key factor, the pledge underscores its role as the "first fuel" in influencing policy, planning, and investment decisions.

In the second instance, with ASEAN recognising space cooling as the most rapidly expanding energy consumption in buildings, five member states (Brunei Darussalam, Cambodia, Singapore, Thailand, and Viet Nam) have taken proactive measures by supporting the Global Cooling Pledge [16]. In particular, the committed member states will regulate Minimum Energy Performance Standards (MEPS) by 2030 and regularly

increase the ambition to achieve net zero emissions by 2050. Notably, the pledge includes all relevant aspects from research, infrastructure development, and governmental support as the main principles to realise it. This commitment involves a collaborative endeavour to achieve a significant 68% reduction in global cooling-related emissions compared to 2022 by 2050. Notably, Cambodia and Singapore have already implemented cooling policies, namely Cambodia's National Cooling Action Plan [19] and Singapore's District Cooling Act [20], respectively.

Finally, emphasising the importance of international cooperation and acknowledging the growing potential of low-carbon hydrogen and its by-products, three AMS (Brunei Darussalam, Malaysia, and Singapore) have endorsed the Declaration on Hydrogen and Derivatives [18]. The signatories' countries back the creation of a mutual recognition framework for certification schemes through a pioneering letter of intent. This initiative demonstrates a joint dedication to exploring the evolving opportunities presented by low-carbon hydrogen for a sustainable future. Previously, both Malaysia [21] and Singapore [22] have introduced individual strategies for the hydrogen economy.

Outside the domain of energy-focused commitments, a notable initiative surfaced at COP28: the Gender Responsive Just Transitions and Climate Action Partnership. This underscores women's substantial contributions and roles in the transition to clean energy, aiming to empower them with access to resources, services, education, and training for a fair and inclusive energy transition. While none of AMS officially endorsed this pledge, the collaborative effort towards this common goal should not be underestimated. The dedication to promoting gender-responsive and inclusive practices in pursuing sustainable energy is a pivotal and integral facet of the broader energy and climate action narrative. Considering that there are pledges signed by several member states that also align with the achievement of national and regional targets, it is important to monitor these global commitments' adoption or translation mechanisms.

A strong commitment was also demonstrated by the private sector within the oil and gas sector. The significant effort is represented by establishing the Oil and Gas Decarbonisation Charter (OGDC) [23], a global industry Charter dedicated to high-scale impact and accelerating climate action in the industrial sector announced in the COP28. The charter focuses on collaboration between national oil and gas companies to keep 1.5°C within reach and strengthen global ambitions for decarbonisation, zero-out methane emissions, eliminating routine flaring by 2030, and continuing to work towards industry best practices in emission reduction. The signatories are represented by 40% of global oil production and 60% by National Oil Companies. In particular, ASEAN Member States also contribute to the charter through their national oil and gas company. From Indonesia, Pertamina, an Indonesian state-owned company, has been starting to develop carbon capture storage technologies and renewable-based power plants in Indonesia. The company continuously engage with international institutions, opening potential opportunities to move towards Indonesia's net zero targets in 2060 or earlier. Malaysia is represented by Petronas [24], which has stated its Net Zero Carbon Emissions pathways to address the emissions from operational processes. Meanwhile, PTT Exploration and Production Public Company Limited (PTTEP) from Thailand also signed the agreement to be involved in the OGDC. Currently, PTTEP is doing feasibility studies for CCUS and optimising renewable energy, including hydrogen utilisation. Those national companies aim to achieve net zero through significant decarbonisation efforts. Overall, those companies have been implementing or starting to observe more advanced climate technology to proof their commitment to COP28.

The COP28 successfully provided countries with new commitments on energy and climate nexus, accelerating them to achieve the global targets on climate action. Moving forward, the next UNFCCC COP29 will be held on 11-22 November 2024 in Baku, Azerbaijan. It is expected that climate financing plans for developing countries will be the main topic as the continuation of the New Collective Quantified Goal (NCQG) that was discussed during COP28 [25]. Though the urge for climate financing for developing countries has been brought since COP15 in 2009, the goal has not been fulfilled in any year. The mandatories on developed countries' commitments to mobilise USD 100 billion per year to support climate action in developing countries have not marked any milestone yet. In regard to achieving a more relevant target on climate finance, there is a need to identify a new climate finance goal through COP29. In fact, Azerbaijan is well known for its rich oil and gas production, emphasising its export activities to the western countries. However, Azerbaijan's President Ilham Aliyev underscores that it is important for oil and natural gas exporters to host global climate tasks that align with their mission of exploring clean energy sources [26]. The role of global oil and gas exporters might broaden the opportunity to invest in RE sources.

Energy Transition Mechanism and Just Energy Transition Partnership: An Update

As the world focuses on reducing greenhouse gas emissions, some strategies were made to cope with significant commitments in COP28. The energy sector is the biggest contributor to carbon emissions from abundant fossil fuel generation and utilisation in ASEAN countries. Coal-fired power plants contribute to 25% of annual global emissions, pivoting the world to establish a committed action plan to retire coal power assets as soon as possible. In 2021, the Asian Development Bank (ADB) launched a mechanism to reduce greenhouse gas emissions called the Energy Transition Mechanism (ETM). The program aims to distribute concessional and commercial capital by replacing fossil fuel power plants with clean energy alternatives. At its starting point, ETM collaborates with three pilot countries in ASEAN, namely Indonesia, the Philippines, and Viet Nam. ETM is seen as a scalable and collaborative initiative between developing member countries as an instrument to elevate a market-based approach to support the energy transition. ETM serves its participants to reach more ambitious emissions targets by driving up the coal-fired plant retirement, leading to 2-3 times increasing demand for clean energy. It will also enhance the market attractiveness of clean technologies and create cost-effective renewable generation. Moreover, the flexibility of this scheme pushes its potential to be scaled up to other parts of ASEAN.

Several remarkable progresses have been made to strengthen the commitment. In Indonesia, an MoU has been signed with Cirebon Electric Power to identify the early retirement of the first coal-fired power plant under the ETM scheme. It is estimated that the agreement will retire a 660 MW coal power plant in West Java. Additionally, an ETM Country Platform was established in Indonesia to oversee the broad structure of energy transition activities there. Meanwhile, the Philippines and Viet Nam are undergoing a pre-feasibility study and intense discussions with the stakeholders and government. Despite the ongoing phases of ETM implementation, safeguards and a just transition remain the priority, followed by a high-level consultation and social impact assessment under the “no one left behind” principal.

In fact, the ETM mechanism is part of the Just Energy Transition Partnership (JETP) financing scheme. The JETP is an agreement to distribute public and private funds to decarbonise the energy sector, which consists of grants, concessional loans, market-rate loans, guarantees and private investment. The long-term goal is to contribute to keeping the 1.5°C of global temperature. In 2022, the Government of Indonesia and the International Partners Group (IPG) launched the JETP Indonesia. With a total of USD 20 billion, JETP Indonesia [25] appears to be the world's largest energy transition financing package. JETP implementation in Indonesia will support decarbonisation, particularly in the electricity sector. Notably, the main objective of JETP is to establish a Comprehensive Investment and Policy Plan (CIPP) to evaluate and update recent market developments and policy priorities regarding energy transition. During COP28, Indonesia aims to attain a 44% RE mix by 2030 and emit no more than 250 million tons of CO_2 from power grids using the JETP strategy. Indonesia’s partnership will focus on projects, loans, and technical assistance. The investment plan will be funded by a mixture of developed countries and private firms from the IPG and Glasgow Financial Alliance for Net Zero (GFANZ) Working Group, respectively. As a continuation of the commitment, Indonesia has established the managing board of JETP, which comprises policy layers of Indonesia's decarbonisation task force and IPG task force, JETP secretariat, and project implementer. Moreover, the country also forms a Country Platform, namely PT SMI, to coordinate relevant projects under the JETP scenario, such as the early

retirement of coal-fired power plants, development of renewable energy power plants, grid or transmission, the supply chain of renewable energy, energy efficiency and just transition.

Another AMS that is involved in the JETP scheme is Viet Nam. The agreement between Viet Nam and the IPG was announced in December 2022. The JETP aims to support Viet Nam's low-emission and climate-resilient development, as well as to support Viet Nam to accelerate the just transition and decarbonisation of the electricity system and develop new economic opportunities to support Viet Nam's transition towards a net zero future. During the COP28, Vietnam launched the Resource Mobilisation Plan (RMP), also known as the JETP-RMP [27]. The RMP aims to be a living document as it will review and update relevant progress toward the JETP targets and its net zero 2050 goal. An amount of USD 15.8 billion is committed to the JETP, marking the strong willingness to mobilise a larger volume of private finance for the just energy transition. In particular, the JETP-RMP emphasises eight groups of tasks: (1) develop the regulatory framework on energy transition; (2) accelerate the energy transition to clean energy; (3) improve industrial and service ecosystem for renewable energy; (4) energy saving and energy efficiency; (5) elevate power transmission and energy storage system; (6) greening the energy transition and reducing greenhouse gas emissions in the transport sector; (7) innovation and technology transfer; and (8) ensuring a just energy transition.

Taking cues from the current JETP mechanisms and the country's target to achieve net zero, the financing scheme is a crucial instrument that needs to be developed comprehensively. As written in the Nationally Determined Contributions document, every country has their conditional and unconditional targets to be fulfilled within the timeframe. An unconditional target is set without external financial support, whereas conditional targets are dependent on external financial support. In this case, JETP and ETM are considered as the country's effort to achieve the conditional net zero emission target that has been determined. Thus, energy investment acceleration towards international collaboration is an important action plan to excel in the clean energy transition among ASEAN countries.

Insight 3

Tracking ASEAN Energy Policies and Statistics

Charting progress and changes in the energy targets

Written by Rika Safrina, Silvira Ayu Rosalia, Marc Benjamin Kusno

New and Upcoming Energy Policies

Several ASEAN Member States (AMS) launched policies and enabling regulations in 2023 to stimulate low-carbon energy development.

Brunei Darussalam

Since 2023, the Brunei Darussalam National Council on Climate Change (BNCCC) requires all greenhouse gas (GHG) emissions emitted by private and public sector facilities to be reported quarterly and annually [28]. This mandatory reporting aims to increase transparency in the national emissions accounting. GHG accounting is beneficial to quantifying the climate impact of an institution's economy activities. Brunei committed to cutting 20% of emissions compared to the business-as-usual scenario and moving towards net zero in 2050 through energy transition and forest conservation, as stated under its 2030 Nationally Determined Contribution (NDC). The government also plans to update their energy intensity reduction target in 2024.

Cambodia

In 2023, Cambodia geared up to implement the recently launched Power Development Masterplan (PDP) 2022-2040, which includes demand forecasts, generation expansion, and a transmission and distribution plan [29]. Under this new PDP, the country aims to increase renewable energy (RE) share and eventually reduce fossil fuel energy share by 2040. Solar and hydropower are expected to grow significantly, while more biomass and battery storage system technologies will likely increase. Cambodia aims for a 21% coal power share of the total energy mix by 2030, down from an initial expected 40% in 2040, with capacity expected to remain the same but an increase in other technologies. As part of the efforts to realise PDP 2022-2040, the Cambodian government approved five new renewable projects that would generate 520 MW for the national power grid and attempt to reduce CO_2 emissions [30]. The projects consist of hydro and solar power generation spread throughout Cambodia, supporting the new PDP's targets of a capacity of 3,155 MW solar and 3,000 MW hydro by 2040.

In addition, Cambodia also recently launched the National Energy Efficiency Policy (NEEP) 2022-2030 to set the plans and guidelines for reducing energy consumption and increasing energy efficiency (EE) [31]. The policy aims to reduce total energy consumption by 19% compared to a business-as-usual scenario. Most efficiency increases will be directed towards residential, aiming to reduce consumption by 34%, followed by the industrial and transportation sectors, at 20% and 5%, respectively. The overall goal of NEEP is to implement energy policies more efficiently, reduce costs and increase coordination in PDP implementation. With the strong actions in RE and EE, Cambodia aims to become carbon neutral by 2050.

Indonesia

In 2023, the Indonesian Minister of Energy and Mineral Resources (MEMR) issued Regulation Number 2 on the Implementation of Carbon Capture and Storage (CCS) and Carbon Capture, Utilization, and Storage (CCUS) in Upstream Oil and Gas Business Activities (MEMR Reg 2/2023) [32]. While CCS reduces carbon emissions by permanently storing the captured carbon deep underground, CCUS would use the captured

carbon to create products or services. The regulation covers several aspects, including technical, monetisation, operational, monitoring and measurement, reporting, and verification (MRV) requirements, safety and environmental, and closure of CCS/CCUS activities.

Following the ministerial regulation, in 2024, Indonesia released Presidential Decree Number 14 of 2024, instructing the development and implementation of CCS to reduce emissions [33]. Higher CCS technology in Indonesia will be achieved by attracting CCS investments and the framework of the CCS industry in Indonesia. About 70% of carbon capture capacity will be dedicated towards domestic carbon, while the remaining 30% will be utilised for carbon from abroad. As one of the results of this presidential regulation, Indonesia recently signed a letter of interest with Singapore on establishing cross-border CCS [34].

Indonesia also launched MEMR Regulation Number 2/2024, to encourage rooftop solar by removing limits on limitations on capacity and increasing rooftop solar quota. The goal of this regulation is to reduce the cost of rooftop solar and reduce GHG through cleaner energy. Under this new regulation, any rooftop solar with a capacity of over 500 kw per unit will be considered an energy supplier. Easing access to rooftop solar by reducing the initial installation costs can encourage more rooftop solar to be implemented.

In addition, Indonesia is planning to update its Government Regulation Number 79 of 2014 concerning the National Energy Policy (NEP). The draft would update the targets and policies for energy and emissions in Indonesia for the period 2023-2060. The new NEP is expected to launch in 2024 and to adjust the RE target from 23% to 17-19% by 2025.

Lao PDR

In 2023, Laos expanded RE generation as more clean emission technology is being implemented. National strategies on utilising hydrogen and ammonia for clean energy are being created, aiming to divert away from imported energy sources [35]. These technologies can also be used in the transportation sector. Utilising renewable and clean energy will benefit businesses, increase living standards, and facilitate economic growth.

Malaysia

Malaysia launched several policies in 2023 under its National Energy Transition Roadmap (NETR) [36]. One significant policy is the Low Carbon Nation Aspiration 2040 (LCNA 2040), which sets targets for energy transformation, prioritising cleaner and RE sources. LCNA 2040 highlights policies that reduce carbon emissions, namely, restricting and lowering coal power plants, increasing RE power share, increasing EE, adopting more electric vehicles, increasing the usage of public transport, and increasing carbon footprint tracking and sustainability reporting.

In collaboration with the Ministry of Natural Resources, Environment and Climate Change, the Ministry of Economy has reviewed and updated current RE policies. These updates increase the RE share in the national mix while outlining the benefits of economic opportunities from more RE generation and development. It is aimed to increase installed RE capacity from 40% in 2040 to 70% by 2050, attracting foreign investments into Malaysia. More solar generation is expected for government buildings, and more RE trade with neighbouring countries is planned.

In order to complement the policies and roadmap implemented by the Ministry of Economy under the 2023 NETR, additional policies were also released in cooperation with other government entities. These policies aim to increase new clean or lower emissions technology and incentivise steps to accelerate clean energy transition for all sectors and industries. Some policies include:

- The NDC Roadmap, Long-Term Low Emissions Development Strategies (LT-LEDS) and Future Proofing MESI by the Ministry of Natural Resources, Environment, and Climate Change (now Ministry of Energy Transition and Public Utilities)
- The Hydrogen Economy and Technology Roadmap (HETR) by the Ministry of Science, Technology, and Innovation (MOSTI)
- The Carbon Pricing Instrument developed by the Ministry of Finance (MOF)
- The National ESG Industry Framework, the New Industrial Master Plan (NIMP) and the Chemical Industry Roadmap (CIR) by the Ministry of Investment, Trade, and Industry (MITI)
- The National Biomass Action Plan by the Ministry of Plantation and Commodities (KPK)

The Ministry of Economy is also drafting a roadmap for natural gas in Malaysia's energy scenarios. Natural gas is viewed as a significant factor for lower-emission energy sources. The roadmap will expand domestic natural gas implementation and generation, increase the cost-competitiveness and supply security of natural gas, and ensure natural gas remains a dominant factor in Malaysia's energy transition.

Malaysia also released policies addressing demand-side energy efficiency and conservation, the Energy Efficiency and Conservation Bill 2023. The bill sets regulations for private companies and buildings that consume a certain threshold of energy, and those companies will be required to follow some standards, audits and ratings. This bill is expected to save Malaysia USD 21 billion in energy costs and reduce emissions by 200,000 kilotons by 2050, in line with Malaysia's goal of becoming net zero in 2050.

Myanmar

In Myanmar, the Ministry of Planning and Finance has exempted import taxes for solar generation technology [37]. Taxes on RE generation and transmission have also been waived as part of their promoted sectors. The higher frequency of blackouts in Myanmar has made the government attempt to attract more investment into the energy sectors. The political turbulence in Myanmar has made investments in Myanmar lacking, with aid from international organisations suspended. The incentives placed by the government to increase energy investments in Myanmar.

Philippines

The Philippines launched its 2023 National Energy Efficiency and Conservation Plan (NEECP) and roadmap for the 2023-2050 period [39]. The NEECP Roadmap was meant to complement the Energy Efficiency and Conservation Act of 2019, which was the first EE mandate introduced in the Philippines. The roadmap details which technologies should be developed and which policies related to EE should be implemented. The goal of the roadmap is to reduce emissions through programs in all sectors. The targets set out seek to reduce emissions in all sectors (government, commercial, residential, industrial, transportation, utilities), aiming for at least 15% emission reduction throughout all time frames. Significantly,

the goal is to reduce emissions in the residential sector by at least 30%. Another significant emissions reduction in utilities is set at around 28% throughout the period.

To increase efficiency in the residential and industrial sectors, the government implemented minimum efficiency performance standards (MEPS) for household appliances and lighting. More energy management systems and energy usage accounting are also being established in the industrial sector. Building certification and new building regulations were implemented for the commercial sector, in addition to the acceleration of energy-efficient technology. In the government sector, a 10% energy usage reduction was implemented for all departments and sectors. Programs for higher fuel efficiency and electric vehicles (EVs) are also in place in the Philippines, called Fuel Conservation and Efficiency in Road Transport (FCERT) programs.

Singapore

Singapore launched new emission standards for fossil-fuel-powered generation [38]. Generation will have higher emission and efficiency standards, with some generation being capped by carbon emissions. These standards also call for fossil fuel-powered generators to have at least 30% hydrogen ready to be used, with the possibility of hydrogen being used completely in the future.

Thailand

In Thailand, numerous policies and targets were released by different government entities [40]. The National Energy Policy Committee approved additional procurement of RE for 2022-2030, increasing the supply of RE in Thailand, with significant increases in wind and solar generation. The Electricity Generating Authority of Thailand (EGAT) implemented a green tariff sandbox trial in 2023, hoping for full implementation in 2024. The purpose of the green tariff is for consumers to purchase RE more easily.

In the transportation sector, more EVs are being implemented by public transport. Expansion of public electric bus, boat and rail lines is being undertaken throughout the country. There is also an electric car subsidy program for the private market, an expansion from the existing import fee removal introduced in 2022. The National Electric Vehicle Policy Committee extended the import fee exemption until the end of 2025. This incentive also aims to attract domestic EV production in Thailand. Tax incentives are also being offered to private companies in the automaking industry to invest in automation for increased productivity. In 2023, Thailand is expanding its EV incentives program in hopes of developing the technology and infrastructure for larger implementation in the future.

Thailand is also implementing the Carbon Border Adjustment Mechanism (CBAM) certification in collaboration with the EU, which attempts to track and price carbon emissions for products to be able to be imported into the EU. The CBAM certification trial is in effect from 2023 to 2025, with 2026 being fully implemented. CBAM targets high-emission industries such as cement, steel, electricity, fertilisers, aluminium, and hydrogen. This certification is to encourage private firms to start emissions accounting and reduce their own emissions. Some exporters will try to reduce their emissions, especially if their primary exports are destined for the EU. Thailand's Board of Investment also released strategies for Thailand

to decarbonise through innovation, competition, and inclusion. Battery Energy Storage Systems (BESS) are also being targeted by Thailand. The government is creating incentives, and action plans to increase demand for BESS corporations.

Vietnam

Vietnam issued Directive No. 20/CT-TTg to increase efforts for EE by reducing energy usage and using more energy-efficient hardware [41]. The directive focused on all aspects of energy usage, from commercial to industrial. It also instructed government entities to take action to improve EE.

In addition, Vietnam's government approved its National Energy Master Plan (NEMP) 2021-2030 [42]. The NEMP aims to achieve energy security while also reducing carbon emissions, targeting to reach net zero by 2050. The plan highlights several key points about fossil fuels and renewable sources of energy, as well as ways of achieving these goals by attracting capital investments that require a total of around USD 203 million. In terms of fossil fuel targets, Vietnam is expanding its domestic coal production, coal mines and raw. The goal is to stop importing coal by 2050 and start exporting coal by 2030. Domestic petroleum reserves and production are also to be increased, able to supply 70% of domestic oil demand. Vietnam will also aim for a threefold increase in natural gas production by 2030 and increase the capacity of liquified natural gas imports.

The master plan also highlights many renewable and emission-cutting targets, increasing RE capacity production and setting emission peaks. RE share is aimed to increase to 20% by 2030 and 85% by 2050, with conditional targets set at 40% by 2030 and 70% by 2050. Biogas is expected to be at 50 million m^3 and 100 million m^3 by 2030 and 2050, respectively, while observing an overall increase in synthetic fuel production by 3 million tonnes in 2050. Green hydrogen production is also expected to increase to 200,000 tonnes annually by 2030 and 20 million tonnes by 2050. More solar power for water heating is hoped to be achieved by increasing absorption area in all sectors, generating an amount of clean energy equivalent to 3.1 million tonnes of oil equivalent (Mtoe) by 2030. Overall, renewable sources will be used for heat and thermal power generation, equivalent to 9 Mtoe and 19 Mtoe by 2030 and 2050, respectively.

Vietnam aspires to export RE by 2030, aiming for 5,000 to 10,000 MW. CCS is another technology Vietnam wants to pursue, increasing its use and storage in the industrial sector and power generation to reach a capture capacity of 1 million tonnes of CO_2 by 2040, reaching 3 to 6 million by 2050. Higher hydrogen yield is also expected to help increase carbon capture to 10 million tonnes by 2050. GHG emissions will peak at 399 to 449 million tonnes in 2030, reaching 101 million tonnes by 2050. These targets are conditional under the Just Energy Transition Plan, seeing a 26% and 90% reduction by 2030 and 2050, respectively.

ASEAN Energy Demand

Figure 1 ASEAN Energy Demand 2024-2025 Projection by Fuel[1]

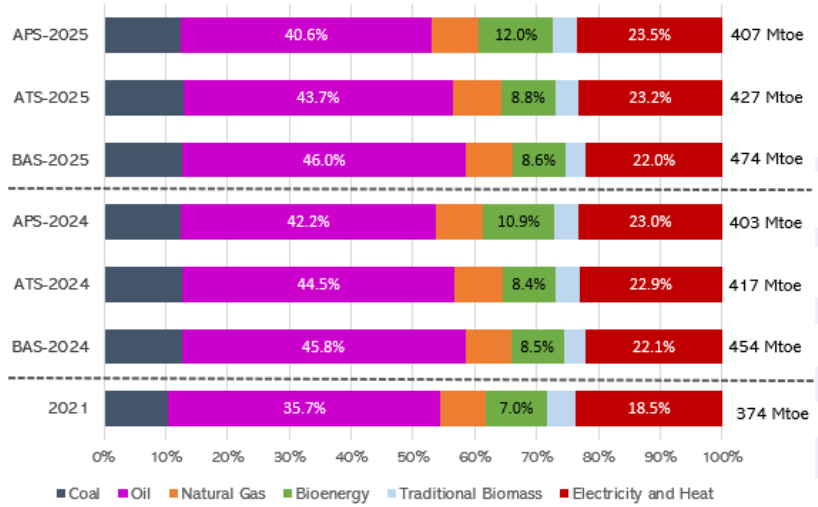
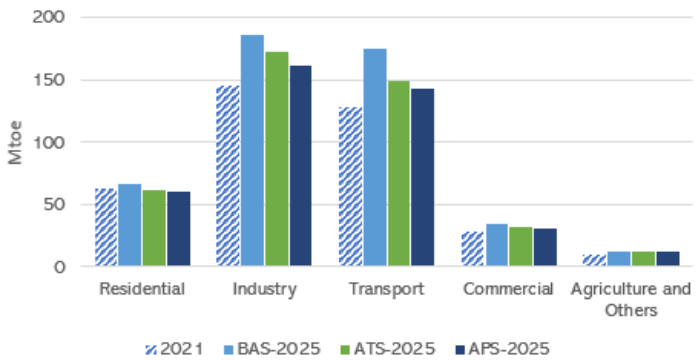


Figure 2 ASEAN Energy Demand Projection by Sector[1]

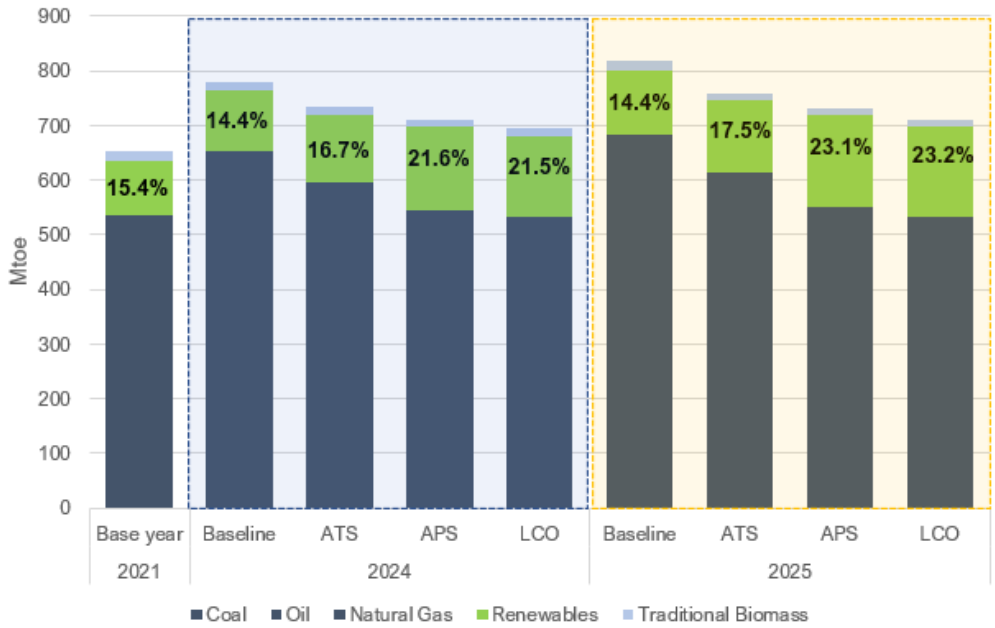


- In 2024, ASEAN's GDP growth is forecasted to be 5.2%. Economic activities have returned to pre-pandemic levels, however entering 2024 with a host of evolving economic pressures, some of which will also affect growth globally.
- Sectoral analysis shows that all end-use sectors see an increase in energy consumption driven by population and economic growth. Regional energy demand is expected to increase 21% by 2024 from 2021 level with no policy intervention. Fossil fuels are projected to continue to dominate the energy sector, with oil still contributes the largest share of 45.8% of energy consumption.
- Fuel shifting policies in AMS Targets Scenario (ATS) will slightly raise the shares of electricity and bioenergy in ASEAN energy demand by 9% and 2% in 2024 respectively, resulting from electrification of cooking, and more stringent EV deployment and biofuel mandates in several AMS Figue 1.
- The use of more efficient technologies throughout all end-user sectors, will significantly reduce the fossil fuel portion. With stronger regional efforts in APAEC Targets Scenario (APS), avoided energy consumption could reach 11.3% in 2024, as compared to the Baseline Scenario.
- The avoided energy consumption under APS will be the greatest in the transportation and industrial sectors in 2025, with 31.6 Mtoe and 24.5 Mtoe, respectively. Stronger energy-saving measures in national policies are required across the final energy sectors, to achieve the regional targets under APS (Figure 2).

[1] *Notes: BAS = Baseline Scenario; ATS = AMS Targets Scenario; APS = APAEC Targets Scenario. Source: The 7th ASEAN Energy Outlook (AEO7)* [43].

ASEAN Energy Supply

Figure 3 ASEAN Energy Supply 2024-2025 Projection by Sector



Notes: BAS = Baseline Scenario; ATS = AMS Targets Scenario; APS = APAEC Targets Scenario. Source: The 7th ASEAN Energy Outlook (AEO7) [43].

- The overall projection shows ASEAN will supply more energy around 19% in 2024 compared to 2021 (Figure 3).
- In 2021, the primary energy mix remained dominated by fossil fuel, with a 15.4% share for renewables.
- With implementation of energy efficiency measure and the Member States' policies in 2024, the share of renewables is forecast to be increased by 123 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.
- 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.

ASEAN Electricity Sector

Figure 4 ASEAN Installed Capacity Projection[2]

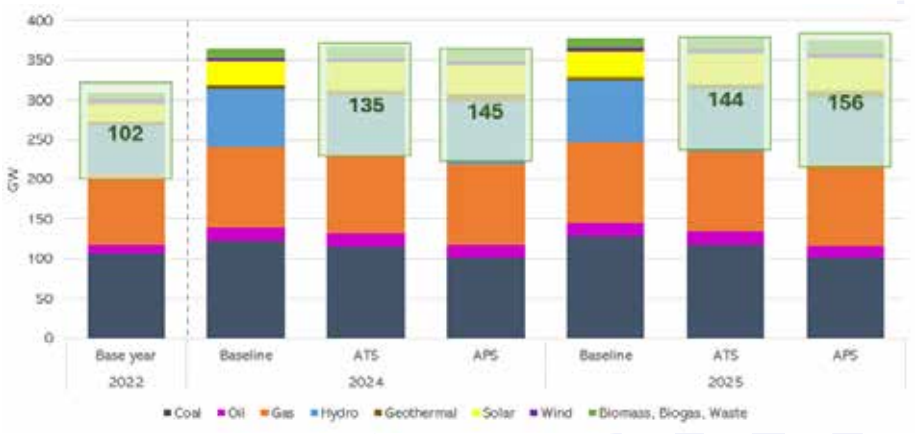
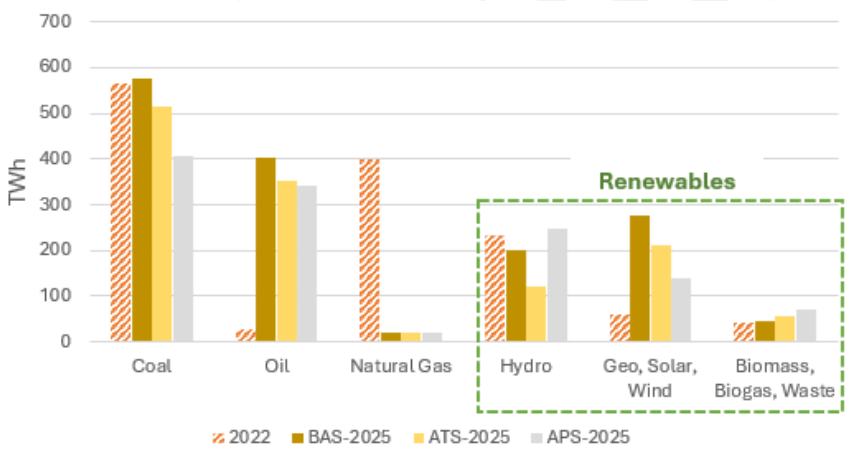


Figure 5 ASEAN Power Generation Projection[2]



- The power sector has a prominent contribution in maintaining energy security, particularly in terms of the stability of electricity supply as well as toward decarbonisation and transition to clean energy.
- ASEAN power capacity depends on fossil fuel, which its share will remain the largest at 67% in 2022 dominated by coal and natural gas. By 2024, the power capacity is projected to increase by around 18% - 19% in Baseline Scenario, ATS, and APS (Figure 4).
- In the ATS, where AMS is projected to implement its policies based on the Power Development Plan (PDP), share of renewables in 2024 will increase by 32.6% from 2022 level.
- The renewables share will 8.2% greater in APS if AMS accelerate deployment of RE capacity' based on country's potential in 2025. The high share of renewables in 2025 is still dominating by hydropower (22.3%) and solar (10.7%).
- In terms of power generation, the projections show that AMS will need to generate 1,524 TWh in 2025. While ATS running 16% less than Baseline Scenario (Figure 5).
- The renewables in 2025 APS will still be dominated by hydropower with a growth of 5.8% compared to 2022. While geothermal, solar, and wind will also contribute to the mix, reaching power generation of 62.8 TWh, 69.2 TWh and 8 TWh, respectively.

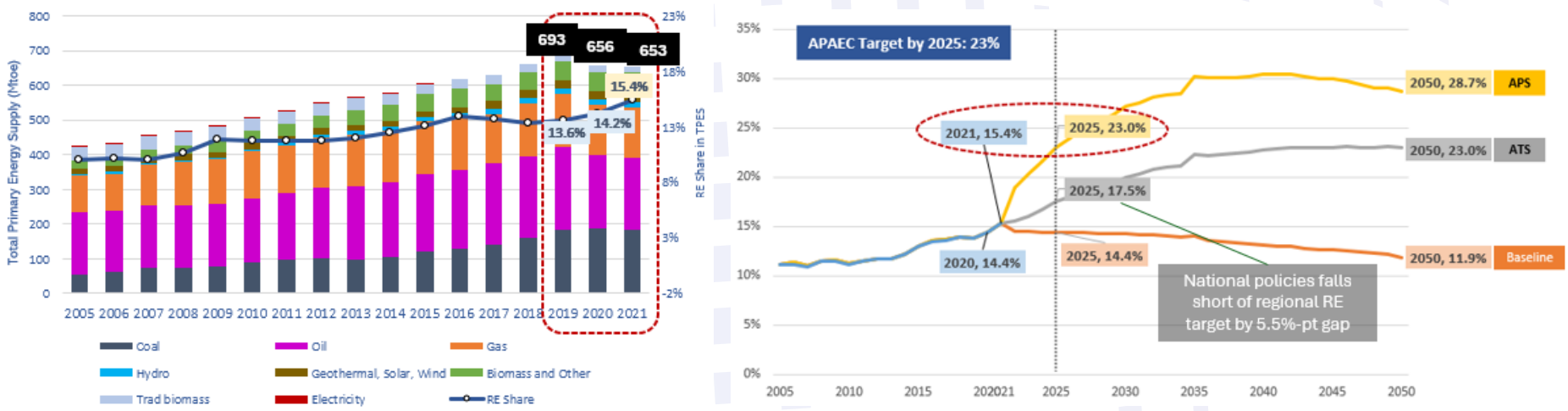
[2] *Notes: BAS = Baseline Scenario; ATS = AMS Targets Scenario; APS = APAEC Targets Scenario. Source: The 7th ASEAN Energy Outlook (AEO7)* [43].

ASEAN Energy Target Assessment

Renewable Energy in Total Primary Energy Supply

Based on regional targets, AMS have set to achieve RE targets on energy supply and installed power capacity. On energy supply, as the target of 23% RE share in Total Primary Energy Supply (TPES) by 2025, 2024 will be a significant measure towards the progress of this target. As reported in the 41st ASEAN Ministers on Energy Meeting (AMEM), RE share in TPES 2021 reached 14.4%, slightly increased from the previous year. Meanwhile, after AMEM, there was an update in the 2021 Energy Balance Table (EBT) of Cambodia, Malaysia, Singapore, and Vietnam, which also impacted the TPES update (decreased by 0.5%). Total RE in 2021 increased by 4.3%, whereas the updated RE share in TPES reached 15.4% (Figure 6).

Figure 6 ASEAN RE Share in TPES



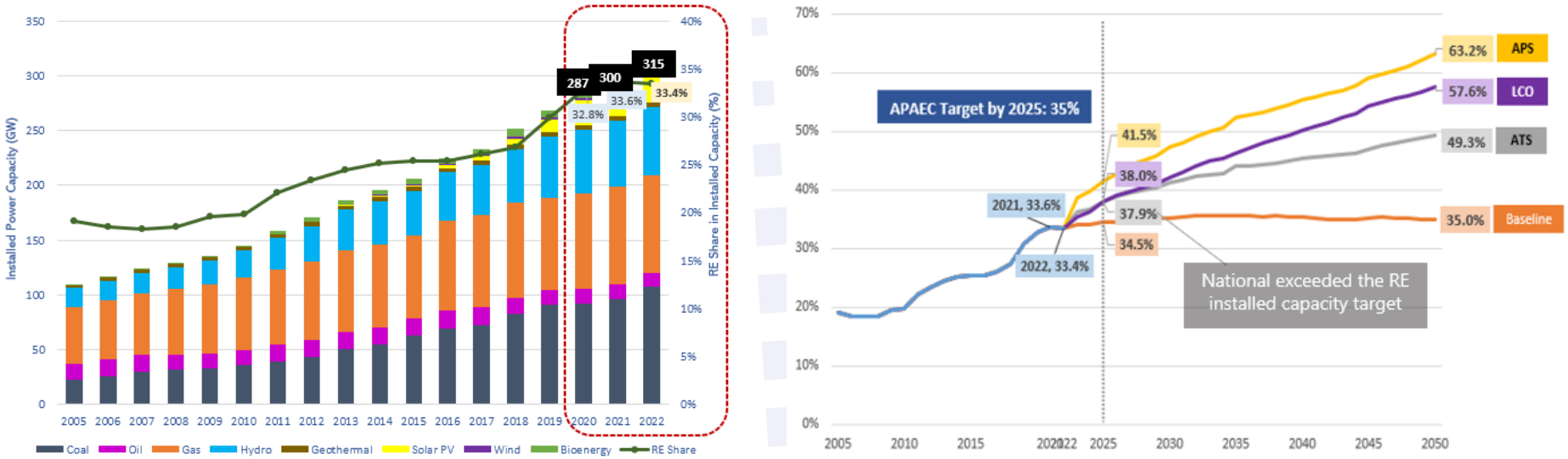
Notes: ATS = AMS Targets Scenario; APS = APAEC Targets Scenario. Source: The 7th ASEAN Energy Outlook (AEO7) [43].

Compared to 2020, RE increased by 7.1% in 2021. Solar and Wind contributed the largest increase, with 50% and 29%, respectively, and Vietnam was the largest contributor in the region. The actual RE Share in 2021 exceeded Baseline and ATS by 0.8%-point and 0.3%-point, respectively, but it has a gap of 2.5%-point from the APS pathway. The same national policy trend would result in a 17.5% share in 2025, 5.5%-point shy of the aspirational target. More innovative measures are required to fill the gap in achieving regional targets (APS), not only in power but also in end-use sectors.

Renewable Energy in Installed Capacity

Regarding installed power capacity, ASEAN is on track to achieving the regional target of 35% RE share in installed power capacity by 2025, under various trends. The 2022 power data of Brunei Darussalam and Vietnam were updated, and the total Installed Power Capacity increased to 315 GW, compared to that stated in 2023 ASEAN Power Updates [44]. The updated RE share in installed capacity in 2022 reached 33.4%, which decreased by 0.2% from 2021. Meanwhile, total installed capacity in 2021 increased by 0.9% from the 2020 level (41st AMEM version: RE share in installed power capacity was 33.6% in 2021).

Figure 7 ASEAN RE Share in Installed Capacity



Notes: ATS = AMS Targets Scenario; APS = APAEC Targets Scenario; LCO = Least Cost Optimisation. Source: The 7th ASEAN Energy Outlook (AEO7) [43].

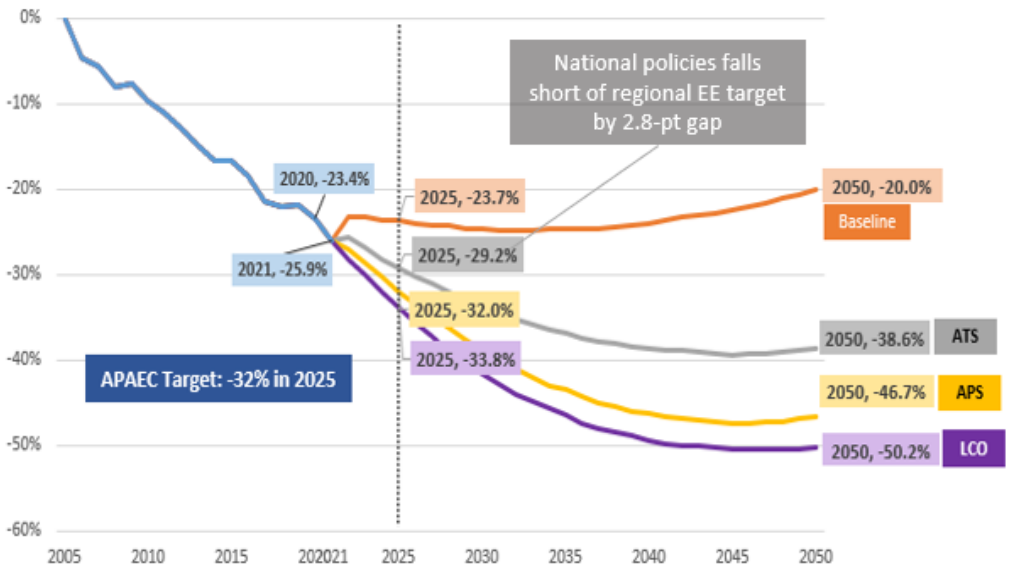
Compared to 2021, total RE increased by 3.8% in 2022, with Wind and Bioenergy contributing the largest increase with 15% and 9%, respectively. Continuing national efforts would lead to achieving the regional target of 37.9% of RE. In APS, a 41.5% share can be realised in 2025. In the long term, a maximum of 63.2% RE share can be reached in 2050 (Figure 7).

Energy Intensity

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. As reported in 41st AMEM, the meeting welcomed the 24.5% energy intensity reduction achieved by ASEAN in 2021 (based on

2005 levels) and urged all relevant energy bodies to exert optimum efforts to achieve the regional target. As previously mentioned, there was an update in 2021 EBT of Cambodia, Malaysia, Singapore, and Vietnam, in which TPES was updated to 653 Mtoe.

Figure 8 ASEAN Energy Intensity Reduction



Notes: ATS = AMS Targets Scenario; APS = APAEC Targets Scenario; LCO = Least Cost Optimisation. Source: The 7th ASEAN Energy Outlook (AEO7) [43].

With the updated data, energy intensity reduction in 2021 reached 25.9% compared to 2005. Compared to 2020, EI reduction increased by 2.5% in 2021 as TPES decreased by 0.5% and GDP grew by 2.9% from 2020. The actual EI reduction in 2021 exceeded Baseline and ATS by 2.7%-point and 0.2%-point, respectively, but it has a gap of 1.1%-point from the APS pathway. The same national policy trend would result in a 29.2% energy intensity reduction, 2.8% points shy of the aspirational target. A cost-efficient power system in the Least-Cost Optimisation (LCO) Scenario can achieve a higher EI reduction in 2050.

Insight 4

ASEAN Energy Priorities 2023-2024

Legacy and Progress: Indonesia’s Chairmanship Achievements and the Outlook of Lao PDR’s Priorities

Written by Amira Bilqis, Nguyen Quang Hoang Anh

Unpacking Indonesia’s Chair Accomplishment in 2023

Indonesia assumed the role of the ASEAN Chair for the year 2023, succeeding Cambodia, taking the theme of “Epicentrum of Growth”. This marked Indonesia's fifth time leading ASEAN, with their previous chairmanships in 1976, 1996, 2003, and 2011. Indonesia's Chairmanship was characterised by the challenges arising from a post-COVID world, heightened geopolitical tensions, and fluctuating energy prices driven by disruptions in trade [7]. The theme for Indonesia's Chairmanship was "ASEAN Matters: Epicentrum of Growth," reflecting the country's commitment to addressing challenges in an increasingly complex world and strengthening ASEAN's position as a stable, peaceful, and economically sustainable region [45]. One of the priorities includes energy security, as highlighted in the statement of the ASEAN Coordinating Council and ASEAN Foreign Ministers’ Retreat, which usually served as the kick-off of the chairmanship year [46]. Over the year, Indonesia has delivered notable annual priorities:

- Adopted the Joint Declaration on Sustainable Energy Security through Interconnectivity, which exerts two highlighted outcomes: 1) reached consensus on aspirational target for interconnection towards 2045, and 2) initiated and endorsed the subregional multilateral power trading initiative, namely Brunei Darussalam-Indonesia-Malaysia-the Philippines Power Integration Project (BIMP-PIP) [47]
- Conducted High Level Policy Dialogue on “Sustainable Energy Financing and Mobilization of Energy Investment to Ensure Energy Security and Achieve the NDCs in ASEAN” on 24 July 2023 [48].
- Initiated the development of the Long-Term Renewable Energy Roadmap up to 2050.
- Disseminated ASEAN best practices on energy security and energy transition with two different topics, namely 1) Improving Energy Security in Islands and Remote Grid Contexts in ASEAN Through Utilisation of Emerging Clean Energy Innovations [49], and 2) Development of Bioenergy Market Potential in ASEAN [50].
- Advanced the development of Carbon Capture, Utilisation and Storage (CCUS) by initiating the CCUS pilot project for coal to be considered by the Japan-ASEAN Integration Fund (JAIF) and conducted two workshops: “Carbon Pricing Implementation in ASEAN to Advance Decarbonisation” [51] and “Advancing CCUS Implementation for Energy Sector in ASEAN” [52].
- Organised ASEAN Power Grid (APG) Consultative Meeting, which resulted in a 2-year extension of the current Memorandum of Understanding (MoU) to prepare the successor agreement and appointed the APG Consultative Committee (APGCC) as the lead body to prepare the successor APG MoU.

In addition to specific energy, there is also achievement on the declaration on developing standardisation for regional electric vehicle ecosystem [53]. followed by the engagement of this plan with the ASEAN Plus Three (China, Japan, and South Korea) [54].

Highlights from the 41st ASEAN Minister on Energy Meeting

The Joint Ministerial Statement of the 41st ASEAN Ministers on Energy Meeting (AMEM) as the benchmark of output from the energy sector. In addition to an update from each APAEC Programme Area, the statement highlighted energy security through interconnectivity and competitiveness through the ASEAN sustainability agenda and energy transition. Monitoring update of regional targets towards 2025 with 2021 levels also endorsed here with energy efficiency has reached 24.5% (based on 2005 levels) of 32%, renewable energy share in total primary energy supply reached 14.4% of 23%, and while installed power capacity reached 33.6% of 35%.

Another highlight is the endorsement for the new pathfinder of Multilateral Power Trading (MPT) for the Brunei Darussalam-Indonesia-Malaysia-the Philippines Power Integration Project (BIMP-PIP).

The statement also updated the engagement of ASEAN with, among others, IRENA for assistance to achieve the ASEAN renewable energy targets and the US on the USAID Smart Power Program (SPP) as the collaboration programme. In the matters of energy engagement expansion, ASEAN also revived Energy Dialogue with the European Union (EU) and the newly engaged Asian Development Bank (ADB).

ASEAN is also continuously championing region's best practices in energy efficiency and conservation, renewable energy, excellence in energy management, clean coal technologies, and youth awards.

Welcoming Lao PDR's ASEAN Chairmanship 2024

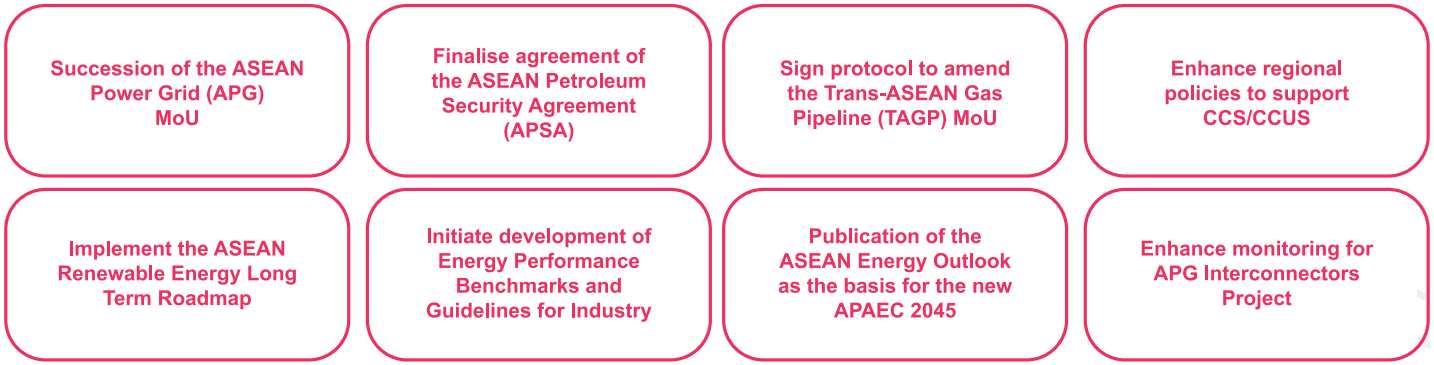
Lao PDR has started its Chairmanship as of January 2024 following the gavel handover ceremony from Indonesia during the 42nd ASEAN Summit in Jakarta. This year, Lao PDR centred its focus on the theme of "Enhancing Connectivity and Resilience" for its third time taking the position since the country joined ASEAN on 23 July 1997. As the region's only landlocked country, Lao PDR strives to achieve a more connected and resilient ASEAN.

The first time was in 2004-2005, under the theme "Advancing a Secure and Dynamic ASEAN Family through Greater Solidarity, Economic Integration and Social Progress", and the second time was in 2016, under the theme "Turning Vision into Reality for a Dynamic ASEAN Community" [55].

To realise the theme, there are several strategies highlighted, namely: 1) promoting infrastructure connectivity, 2) narrowing the development gap, 3) promoting greater economic integration and people-to-people exchanges, and 4) further strengthening ASEAN's relations with external partners while maintaining ASEAN's relevance and ASEAN centrality in the evolving regional architecture via three ASEAN pillars.

The official website has been set up at https://laoschairmanship2024.gov.la/, including the hundreds of ASEAN meetings scheduled over the course of 2025.

Lao PDR for Regional Energy Agenda in 2024



Lao PDR is widely recognised as the "Battery of ASEAN" due to its substantial electricity exports to neighbouring countries, including Cambodia, Thailand, and Vietnam which stand at 89%[56]. Notably, Lao PDR achieved a significant milestone by exporting 100 MW of renewable energy to Singapore through the Lao-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP), marking the first multilateral cross-border electricity trade [57].

Historically, Laos has harnessed its abundant water resources, primarily for hydropower generation, despite being landlocked. As of 2022, the country's renewable energy share stands at 55.2% RE in TPES and 83% RE in Installed Capacity. To reinforce its position, Lao PDR is actively promoting renewable energy development within its portfolio, emphasising the nation's critical role in the APG.

Under the chosen theme, Lao PDR has positioned itself as a key player in shaping the regional energy agenda. Every Chairmanship shall determine its Annual Priorities for Energy, including the Priority Economic Deliverables (PED). The PED submitted is on achieving substantial progress in finalising the successor agreement for the APG and promoting MPT in the region. This priority underscores the importance of energy interconnectivity and resilience, with the APG being advocated as a crucial solution for regional energy security. Particularly, Lao PDR's importance to the regional MPT.

The existing MoU on the APG [58], which has guided ASEAN cooperation since 2009, is set to expire in December 2025. In 2023, ASEAN agreed to (i) extend the 15-year validity of the existing MoU by about 21 months until 31 December 2025 and (ii) to develop a new or successor MoU as the next step. The preparation and development leading up to the signing in 2025 are deemed imperative. This PED aligns with the Joint Declaration of the 41st AMEM on Energy Security through Interconnectivity [47] contributes to implementing one of the 16 priority initiatives under

the ASEAN Strategy for Carbon Neutrality [4], focusing on connecting green infrastructure and markets. To complement these efforts, mobilising support from ASEAN External Partners and monitoring the APG Interconnectors Project will be prioritised.

In addition to APG, there are several annual priorities highlighted by Lao PDR based on each programme's areas of APAEC. In the Trans-ASEAN Gas Pipeline (TAGP), there are two plans: to achieve substantive progress in finalising the text of the new or successor agreement of the ASEAN Petroleum Security Agreement (APSA) [59] and sign the Protocol to Amend the TAGP (TAGP MoU). APSA development was also discussed under the Indonesian chairmanship and Lao PDR continued the work for petroleum (crude oils, products and natural gas) security by pushing for the extension of the agreement.

Clean Coal Technology, under Lao's Chairmanship, plans to enhance regional policies and regulations to support Carbon Capture and Storage (CCS) or CCUS implementation in power and carbon-intensive sectors. If possible, the plan is to identify the necessary institutional arrangements and to map out the short-, mid-, and long-term milestones for utilisation, development, and maturation of CCS/CCUS in the region.

While in the energy efficiency and renewable energy sector, publishing is to develop the Energy Performance Benchmarks and Guidelines for Industry energy efficiency and to implement the first-year implementation of the Long-Term Renewable Energy Roadmap, specifically in Offshore wind and Bioenergy, including but not limited to capacity building and publish regional strategy publishing.

In terms of energy planning, considering that 2024 marks the preparatory year for the new ASEAN energy blueprint, Lao PDR plans to push the publication of the 8th ASEAN Energy Outlook. The 8th edition will serve not only as a compass but also as a catalyst that will steer the formulation of visionary regional targets and spearhead the strategic development of energy policies and planning for the next transformative decade.

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