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Energy Transition in ASEAN

April 2023

EU-ASEAN BUSINESS COUNCIL

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ASEAN's Energy Needs & The Case for Acceleration of Energy Transition

ASEAN's demand for energy grew by more than 80% between 2000 and 2019, a huge leap that demonstrates unwavering growth in the foreseeable future.[1] In line with rapid economic growth, energy demand in the region is expected to triple by 2050 from the 2020 level under the Baseline Scenario.

> "Meeting the urgent climate challenge and seizing the opportunities will take massive investment. Emerging Markets and Developing Economies must transform their economies and energy systems to lower carbon emissions and net zero pathways, while ensuring that energy is secure and accessible to their citizens, many of whom are still in poverty. To achieve global net-zero targets by 2050, the International Energy Agency (IEA) projects that capital spending on clean energy in EMDEs (ex. China) must increase over sixfold from under USD150 billion per year in 2020 to over USD1 trillion per year by 2030"
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> *Code Red! Call for Urgent Action on Emerging Markets Transition Finance (EMTI), September 2022 Published by the EU-ASEAN Business Council, SDIP and the UN-convened Net Zero Asset Owner Alliance*

The recovery from the worst of the economic ravages in ASEAN brought about by the COVID-19 pandemic is well and truly underway: collectively the region has seen remarkable levels of GDP growth from the second half of 2021 and continuing throughout 2022. Foreign Direct Investment in-flows to Southeast Asia is now at record levels underlining the continued attraction of the region as a centre of global growth. As ASEAN Member States (AMS) have significant developmental aspirations in areas like infrastructure, digitalisation, high-tech manufacturing, and electric vehicle adoption which, coupled with a rapidly growing urban middle class that will become greater energy consumers, will significantly grow ASEAN's appetite for energy.

Currently, ASEAN's rising energy demand has been met by increasing the usage of fossil fuels, which constitute about 80% of the regional energy mix, with the remaining 20% from renewable energy.[2] Fossil fuels are projected to continue to supply most of the regional energy demand, with oil accounting for 47.4% of total final energy consumption (TFEC), followed by electricity (20.3%), coal (14.5%), and bioenergy (9.2%) in 2050[3].

If ASEAN were to continue to rely mainly on fossil fuels for its development, this would have serious consequences for the environment and would also mean that none of the ASEAN member states would be able to meet their net-zero targets. In 2020, 40% of Southeast Asia's CO2 emissions came from power generation[4]. With today's policies, energy demand, fossil fuel imports, and emissions are set to increase; the region would also fall short of its target to provide access to clean cooking for all by 2030[5].

[1] IEA, "Southeast Asia Energy Outlook 2019" (Paris, 2019), pp. 10, 28.
[2] Dolf Gielen, "Singapore International Energy Week," Singapore International Energy Week (August 18, 2020), https://www.siew.gov.sg/docs/default-source/event/2020/asean-energy-transition-outlook_dolf-gielen_irena.pdf?sfvrsn=2.
[3] See: https://aseanenergy.org/the-7th-asean-energy-outlook/
[4] Rethinking Energy In Southeast Asia, Wärtsilä Energy, 2022 see: https://www.wartsila.com/rethinking-energy/southeast-asia
[5] See: https://www.iea.org/reports/southeast-asia-energy-outlook-2022

A well-managed shift to lower carbon energy sources and increased usage of renewable energy sources is now, therefore, essential if ASEAN is to meet its Paris Agreement commitments.

A secondary effect of a decisive transition to sustainable energy is that AMS will be able to participate in an increasingly valuable economic sector. With a strong manufacturing base and a competitive labour force, ASEAN can become an important regional player in the rapidly growing economic value chain of sustainable energy equipment and solutions.

The cost of renewable energy is also declining rapidly. It is already generally cheaper than fossil fuel alternatives and will become more so in the coming years. A shift to renewable energy sources will reduce the cost for AMS of growing their domestic energy supplies.

Lastly, large companies around the world are increasingly committing to net carbon-zero operations. It will be difficult, if not impossible, for them to maintain and increase their investments in AMS if they do not have access to clean energy. For domestic ASEAN businesses with ambitions to grow their global trade, it will also become increasingly important to have green sources of energy supply, as changes in market conditions in their export destinations will either mean markets will be closed off without it, or some form of the carbon tax will be imposed on those exports.

Practical Reasons for ASEAN's Energy Transition

The urgency in accelerating the transition towards renewable energy stems primarily from the fact that the impact of climate change is pronounced for all AMS – increasingly severe weather, rising sea levels, and widespread tropical diseases all accompany climate change, to name a few scourges. There are estimates that climate change and its effects will wipe out 11% of ASEAN's GDP by 2100.

Findings from Swiss Re Institute's Climate Economics Index warn that Indonesia, Malaysia, the Philippines, Singapore, and Thailand would lose economic output totalling more than seven times their GDP between now and 2050, and ASEAN as a region could lose 37.4% of their current GDP by 2048, if steps are not taken to mitigate climate change.[6] This makes the ASEAN market the most vulnerable in the Asian region.[7]

[6] Cherie Gray and Thomas Haller, "The Economics of Climate Change: Impacts for Asia," Swiss Re Group, May 21, 2021. https://www.swissre.com/risk-knowledge/mitigating-climate-risk/economics-of-climate-change-impacts-for-asia.html
[7] Ibid.

The financial drivers for change extend beyond the impacts of damaging climate-related events. The long-term trend of cost for power generation is clearly in favour of renewable sources (see figure 2, page 11).

Manufacturing industries in ASEAN will be materially disadvantaged if they rely on expensive fossil fuel-generated electricity, both because of the higher cost, and through the possibility of carbon border adjustment mechanisms that add a carbon price to exports. Further, without clean energy sources, ASEAN will become unattractive to foreign investment flows. As large companies, both domestic and international, implement their commitments to achieve net zero-carbon operations, investment decisions will increasingly be driven by the availability of zero-carbon electricity supply for factories, offices, and transport.

In addition, regulators and stock exchanges have been placing more focus on ESG disclosures. Stock exchanges in Singapore, Malaysia, Thailand, Vietnam, Indonesia, and the Philippines all require listed companies to produce sustainability reports annually. While some exchanges started with voluntary guidelines or requirements only on a 'comply-or-explain' basis, there is an increasing shift towards mandatory disclosures that converge towards global standards such as the Global Reporting Initiative (GRI), Task Force on Climate-Related Financial Disclosures (TCFD) or Sustainability Accounting Standards Board (SASB). Both investors and investees will be under increasing pressure to report on climate-related metrics.

Therefore, there are not only international pressures but also strong economic rationale and practical reasons to accelerate the energy transition.

NESTE

Role of Sustainable Aviation Fuel

Sustainable Aviation Fuel (SAF) plays a key role in the aviation industry's net zero carbon emissions by 2050 goal. It is a next generation aviation fuel and can reduce greenhouse gas emissions by up to 80% over its full life cycle, compared to using fossil jet fuel. SAF is estimated to contribute around 65% of the necessary emissions reductions.

One of the challenges is ramping-up SAF production capacity as currently SAF represents less than 1% of global jet fuel consumption. Governmental support plays a crucial role as it can help to create the demand certainty needed to attract investments in production capacity. This could for example be done by introducing mandates or incentivising SAF use.

Neste is the world's leading producer of SAF and has been supplying its Neste MY Sustainable Aviation fuel to commercial airlines across the globe since 2011, including airlines in the Asia-Pacific region.

Neste is expanding its global SAF production capacity 15-fold to 1.5 million tons per annum by the end of 2023. Neste's Singapore refinery is nearing the completion of an expansion which includes an annual SAF production capacity of 1 million tons by the end of the first quarter of 2023.

The Role of Fossil Fuels in ASEAN's Energy Transition

While there is an urgent need to reduce carbon emissions, the reality of the situation is that the world is still dependent on fossil fuels. As of 2019, 84% of the global energy system still depended on fossil fuels, and 64.2% of global electricity generation used uses fossil fuels.[8] In ASEAN, fossil fuels are projected to make up 86.4% of the total energy mix in 2025.[9]

Industries such as cement, steel, aviation, maritime shipping, and long-haul trucking are significant carbon emitters but face practical difficulties in incorporating renewable energy sources into their operations.[10] These industries are important to ASEAN. For example, ASEAN's steel industry produces 77% of the long products and 30% of the flat products consumed in Southeast Asia.[11] Vietnam and Indonesia are also large cement producers with a domestic production capacity of around 100 Mega Tonnes (Mt). Thailand produces 60Mt, and Malaysia and the Philippines produce around 33Mt. Each of these countries produces equal to or more than their domestic demand, which means that these industries are key to ASEAN's aspirations for greater infrastructure development.[12] Although carbon pricing might encourage Carbon Capture Units, switching to natural gas and alternative renewable energy technologies for these industries are still unavailable at the scale needed. As such, these industries are still heavily dependent on fossil fuels. Using biofuels as part of the transition process will surely be part of the solution, as is being explored in the aviation sector (see side bar).

Moreover, renewable energy still faces challenges. For example, solar and wind generate energy intermittently due to varying environmental conditions,[13] making energy storage systems and flexible fast-starting grid-balancing power plants essential. Such solutions are increasingly both technically and commercially feasible. It is true that ASEAN's power grids will indeed require significant upgrading to incorporate electricity from renewable sources, but again this is both technically and commercially feasible.

In short, the energy transition journey in ASEAN will be complex as it encounters multiple overlapping constraints. A combination of levers must be used to facilitate the transition of industries that remain dependent on fossil fuels from using carbon intensive carbon-intensive fossil fuels. Carbon capture technology and projects may help ASEAN achieve net-zero emissions in some of these economic and industry industrial activities within AMS.

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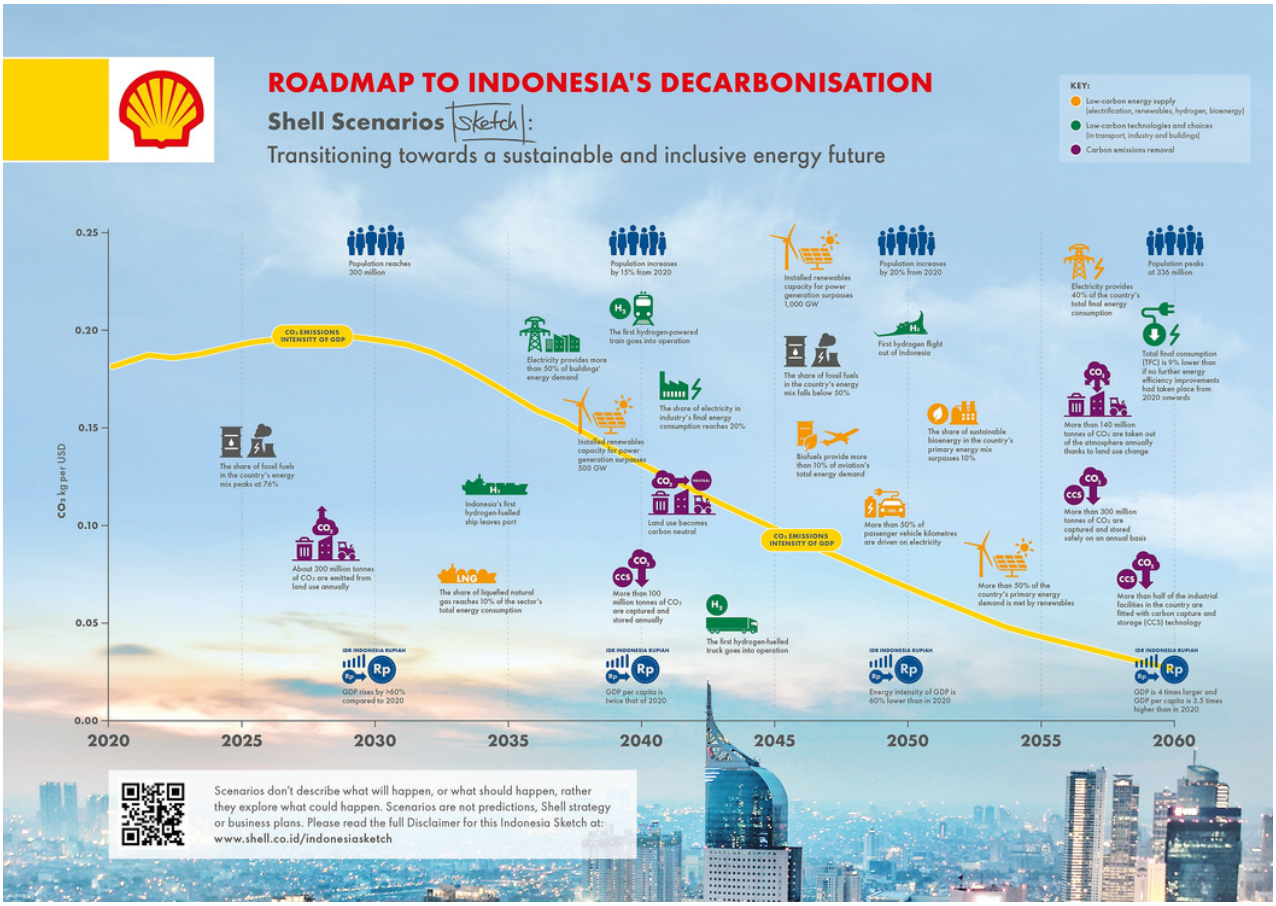
[8] Robert Rapier, "Fossil Fuels Still Supply 84 Percent Of World Energy - And Other Eye Openers From BP's Annual Review," Forbes (Forbes Magazine, June 25, 2020), https://www.forbes.com/sites/rrapier/2020/06/20/bp-review-new-highs-in-global-energy-consumption-and-carbon-emissions-in-2019/
[9] ACE, "The 6th ASEAN Energy Outlook (AEO6)", p. 18.
[10] Scott Foster and David Elzinga, "The Role of Fossil Fuels in a Sustainable Energy System," The Role of Fossil Fuels in a Sustainable Energy System (United Nations, 2013), https://www.un.org/en/chronicle/article/role-fossil-fuels-sustainable-energy-system.
[11] Yeoh, Wee Jin. "The ASEAN Steel Industry Situation." Steel Committee Meeting Organisation for Economic Co-Operation and Development. March 19, 2020.
[12] Manas Tamotia, "Southeast Asia: Tough Times – Consolidation Ahead?" (Singapore: L.E.K. Consulting, 2019).
[13] Gautam Gowrisankaran, Stanley S. Reynolds, and Mario Samano, "Intermittency and the Value of Renewables Energy" (Cambridge, Massachusetts: National Bureau of Economic Research, 2011), 1.

These may include a Carbon Capture Utilisation Storage (CCUS) system whereby carbon is upcycled into chemicals, diamonds, and fuels, or a Carbon Capture Storage (CCS) that stores carbon underground. However, these technologies are still costly and have yet to be tested at scale. Therefore, AMS should embark on other decarbonisation measures in the meantime. Shell recently published a scenario for Indonesia to achieve its net-zero targets, which demonstrates the need to move through cleaner fossil fuels as part of the process decarbonising the economy (see below). In addition, this paper calls for policy frameworks that promote energy efficiency and support ASEAN's energy transition, such as government-led carbon pricing mechanisms to encourage companies to decarbonise.

Indonesia: Transitioning Towards a Sustainable and Inclusive Energy Future

Shell published Indonesia scenario sketch (Indonesia Sketch) titled "Transitioning towards a sustainable and inclusive energy future", which outlines plausible pathways for Indonesia to achieve its net-zero emissions target in 2060. To successfully make the transition to net-zero emissions by 2060, Indonesia will need to fundamentally transform its energy and land use systems. This is to be done in a way that ensure affordable and secure energy supplies to support the country's economic growth and development during the transition. Changes in how energy is produced are matched by a transformation in how energy is consumed. There is large-scale electrification of end-use sectors such as buildings, passenger road transport and light industry. Coal is phased out of the electricity system, with renewables such as wind and solar dominating. Difficult-to-electrify sectors are decarbonised with a combination of low-carbon fuels like clean hydrogen, advanced bioenergy and technologies like carbon capture, utilization and storage. The transformation of the land use sector – from a net contributor to a net negative source of emissions – proceeds alongside the transformation of the energy system so that Indonesia achieves net-zero emissions by 2060.



ASEAN's Energy Transition Challenges

To help ASEAN accelerate its transition towards renewable energy and low-carbon solutions, it is crucial to understand the challenges this region face. This paper identifies 5 challenges ordered based on what the Council sees as the most pressing challenges in achieving ASEAN's energy transition.

Restricted Green Financing Ecosystem

While the number of sustainable infrastructure projects – including those involving renewable energy, is increasing, the financing of developing world sustainable infrastructure is limited and lacks sufficient private investment. Green financing is crucial in providing much-needed upfront capital to develop large renewable energy infrastructure projects in ASEAN. Despite ASEAN having an estimated US$3 trillion worth of green finance opportunities between 2016 and 2030, the cumulative ASEAN issuance of green loans and bonds is US$13.4 billion from 2013 to 2019. This makes up only 0.45% of the region's green finance opportunities.[14] DBS Bank noted that, between 2016 and 2030, the current average annual supply of green finance is around US$40 billion, while the average annual demand is US$200 billion.[15] The growth rate of green finance issuance in ASEAN is increasing rapidly, though it is not growing fast enough to ensure that there is a sufficient supply of capital to fully meet ASEAN's green investment opportunities by 2030.[16] Furthermore, given that 75% of green finance is from public funds, the strained government budget caused by COVID-19 will significantly impact the green finance flows in the near future.[17] Thus, ASEAN needs to not only ramp up the flows of green finance but also needs to encourage greater private green investments. In this respect, the development of the ASEAN Taxonomy[18] was very much welcomed and the Council looks forward to the Phase 2 Development of the Taxonomy and hopes that some of the recommendations it made in its report on the Taxonomy will be taken into account in the revised version[19].

[14] DBS Bank, "Green Finance Opportunities in ASEAN", p 13; Cedric Rimaud et al., "ASEAN Green Finance State of the Market 2019" (Singapore: Climate Bonds Initiative, 2020), p 1.
[15] DBS Bank, "Green Finance Opportunities in ASEAN", p 13.
[16] ASEAN Working Committee on Capital Market Development, "Report on Promoting Sustainable Finance in ASEAN" (Kuala Lumpur: ASEAN, 2020), pp. 3-7.
[17] DBS Bank, "Green Finance Opportunities in ASEAN", p 13.
[18] See: https://asean.org/wp-content/uploads/2021/11/ASEAN-Taxonomy.pdf
[19] See: https://www.eu-asean.eu/wp-content/uploads/2022/04/ASEAN-Taxonomy-Paper-For-Publication.pdf

The need to drive more investment into emerging markets for transition finance was further highlighted in a joint report from the EU-ASEAN Business Council, the UN Convened Net Zero Asset Owner Alliance, and the Sustainable Development Investment Partnership under the World Economic Forum. The report, entitled "Code Red! Call for Urgent Action on Emerging Markets Transition Investment (EMTI)"[20] noted there was an urgent need to "increase awareness among public and private financial institutions of EMTI as an essential element of responsible investment strategies." It went on to state that "critical actions are also required by policymakers, regulators, stock exchanges, rating agencies, standard setters, as well as multilateral development banks (MDBs) and development finance institutions (DFIs)".In other words, for ASEAN, the entire financial and project ecosystem needs to work better and smarter to ensure that funding for transition projects is available.

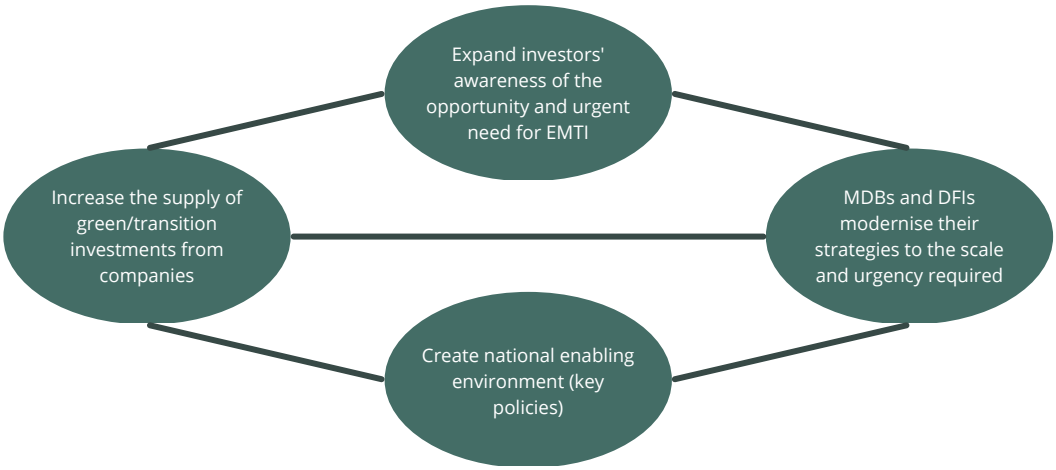


Figure 1: Thematic Action Areas to Increase Emerging Markets Transition Investments [21]

Conflicting Priorities to Enable Growth of Renewable Energy and Low Carbon Energy Solutions

The transition towards renewable energy will be difficult without robust public policies that regulate and incentivise its growth and adoption. Currently, some AMS have been more proactive in putting forward regulatory and fiscal policies to promote the growth and adoption of renewable energy than others (see table 6).

[20] See: https://www.eu-asean.eu/wp-content/uploads/2022/10/EMTI-Paper_4-October-2022.pdf
[21] Ibid.

Table 6. Summary of AMS regulatory and fiscal policies to promote the growth and adoption of renewable energy.[22]

Type of Policy		BN	KH	ID	LA	MY	MM	SG	TH	PH	VN
Regulatory Policies	Renewable energy in Intended Nationally Determined Contributions	●	●	●	●	●	●	●	●	●	●
	Renewable Energy Targets	●	●	●	●	●	●	●	●	●	●
	Feed-in Tariffs/ Auctions/ Premium Payment		●	●		●			●	●	●
	Net Metering/ Billing/ Direct Consumption supply			●		●		●		●	●
	Biofuel blend obligation/ mandate/ target			●		●			●	●	●
	Electric Utility quota obligation/ RPS			●		●				●	●
	Tradable Renewable Energy Certificate										●
Fiscal Incentives and public financing	Tax Incentives		●	●	●	●			●	●	●
	Public Investment/ loans/ grants/ subsidies/ rebates			●	●	●	●	●	●	●	●
	Reduction in sales, CO2, VAT or Taxes			●		●			●	●	●
	Tendering			●		●	●	●		●	
	Investment or Production Tax Credits			●						●	●
	Energy Production Payment								●	●	

[22] Roman Vakulchuk et al., "Singapore: How to Attract More Investment in Renewable Energy?," vol. 11 (Jakarta: ASEAN Centre for Energy, 2020), p. 2

The effectiveness of public policies is just as important as the size of the policy portfolio. The 6th ASEAN Energy Outlook found that many AMS' policies and fiscal approaches can be improved through more stable policies, clearer and less complicated permitting processes, and stronger regulations and incentives.[23]

In most AMS, the current power purchasing agreement frameworks do not incentivise investment in power projects fuelled by renewable energy sources. This is because a government-controlled entity (e.g., Indonesia's PLN and Malaysia's Tenaga Nasional) that oversees and regulates the power market sets power purchase agreements with independent power producers. These agreements mean that the state-controlled utility pays a fixed payment (capacity payment) to the independent power producer irrespective of the actual amount of electricity generated. This incentivises the state-controlled utility to use these independent power producers, even if they are powered by fossil fuels. Hence, policymakers need to consider and adopt more competitive and sustainable power purchase arrangements that enable investment in economically viable renewable energy projects in AMS.

Continued Subsidy of Fossil Fuels

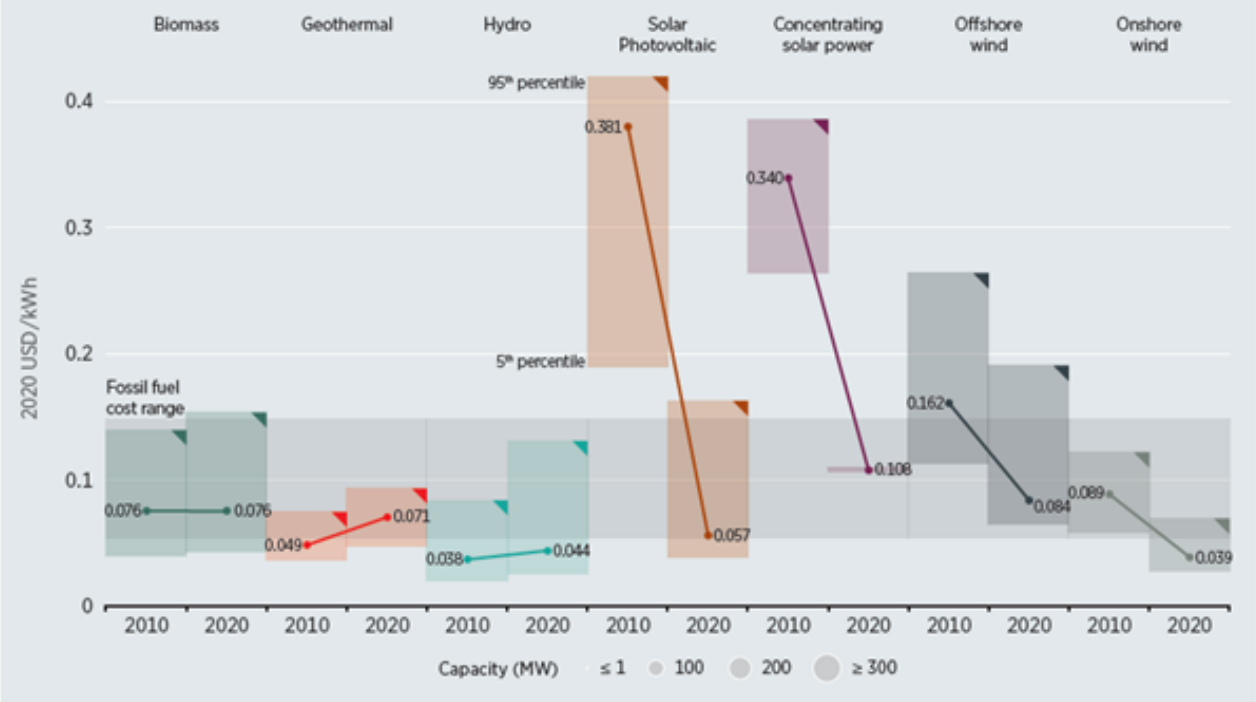
Indonesia, Brunei, Malaysia, Thailand, and Vietnam allocate a considerable amount of their GDP to costly fossil fuel subsidies (see table 7). Spending scarce public funds on fossil fuel subsidies constrains the growth and adoption of renewable energy and low-carbon energy solutions in ASEAN as they make renewable energy artificially more expensive than fossil fuels.[24] Moreover, fossil fuel subsidies divert public funds that could be used to invest in renewable energy and low-carbon solutions projects or other public goods.[25]

Targeted policy support and industry drive since 2010 have spurred a remarkable decrease in the costs of renewable electricity from solar and wind power, which are now competitive with that fossil fuels. Specifically, between 2010 and 2020, the global weighted average LCOE (levelised cost of energy) of utility-scale solar PV for newly commissioned projects fell by 85%, while onshore and offshore wind projects fell by about half (56% and 48% respectively) (Figure 2).[26] The global weighted average LCOE of bioenergy for power projects experienced some volatility in the same period but ended the decade at about the same level it began, which was a figure at the lower end the cost of electricity from new fossil fuel-fired projects. The global weighted average LCOE of hydropower rose by 18%, which was still lower than the cheapest new fossil fuel-fired electricity option, and that of geothermal power has ranged between USD 0.071/kWh and USD 0.075/kWh since 2016. In 2020, this figure was at the lower end of this range, at USD 0.071/kWh, having declined 4% year-on-year.

[23] ACE, "The 6th ASEAN Energy Outlook", p. 131.
[24] Richard Bridle and Lucy Kitson, "The Impact of Fossil-Fuel Subsidies on Renewable Electricity Generation" (Winnipeg, Manitoba: International Institute of Sustainable Development, 2014), pp. 5-9.
[25] Donald P. Kanak, "For Health and Climate: Retiring Coal-Fired Electricity and Promoting Sustainable Energy Transition in Developing Countries," PIFS International, p.9
[26] IRENA (2021), Renewable Power Generation Costs in 2020, International Renewable Energy Agency, Abu Dhabi, p. 14.

The results of an LCOE study in ASEAN similarly found that the LCOE generated from various forms of renewable energy could compete with that of electricity generated from conventional fuels.[27] In short, without taking into account subsidies, taxation, and other incentives, the costs of renewables are now cheaper or similar to that of fossil fuels.

Figure 2. Global LCOE trends from newly commissioned, utility-scale renewable power generation technologies from 2010 to 2020, screengrab from IRENA Renewable Cost Database



Source: IRENA Renewable Cost Database

Note: This data is for the year of commissioning. The thick lines are the global weighted-average LCOE value derived from the individual plants commissioned in each year. The project-level LCOE is calculated with a real weighted average cost of capital (WACC) of 7.5% for OECD countries and China in 2010, declining to 5% in 2020; and 10% in 2010 for the rest of the world, declining to 7.5% in 2020. The single band represents the fossil fuel-fired power generation cost range, while the bands for each technology and year represent the 5th and 95th percentile bands for renewable projects.

Table 7. Cost of Fossil Fuel Subsidies by ASEAN country for 2021[28]

Country	Fossil Fuel Subsidy (% of GDP - 2021)	Actual Value - 2021 (in USD)[29]	Actual Value per Capita – 2021 (in USD)
Indonesia	2.7	24.6 Billion	2.68
Brunei	1.5	292.1 Million	1.53
Malaysia	1.0	3.03 Billion	0.95
Thailand	0.6	2.38 Billion	0.60
Vietnam	2.3	4.54 Billion	2.33

[27] ACE, "Levelised Costs of Electricity (LCOE) for Selected Renewable Energy Technologies in the ASEAN Member States II," ASEAN Centre for Energy (ACE), February 2019.
[28] https://www.iea.org/data-and-statistics/data-product/fossil-fuel-subsidies-database#subsidies-database
[29] https://www.iea.org/data-and-statistics/data-product/fossil-fuel-subsidies-database#subsidies-database

Underdeveloped Power Grid Capacity for Renewable Energy Integration

Power grids are crucial in the transmission of renewable energy to households and industries. As the AMS actively work towards their APAEC renewable energy targets, they must ensure that their power grids can account for the increased demand and generation of intermittent electricity from renewable energy. Seeing how Vietnam, as one of ASEAN's leading countries in renewable energy development, has struggled with its underdeveloped grid, power grids must develop in step with renewable energy expansion.[30] Doing so will also strengthen AMS' power networks as they work towards implementing the ASEAN Power Grid.

Moreover, the uneven distribution of economic activities between urban and rural areas has resulted in uneven access to power supplies. In archipelagic AMS like Indonesia and Phithe Philippines, many regions still do not have stable access to electricity. Consequently, these regions often use small-scale diesel fuel. To ensure decarbonisation across the country, electricity grids capable of providing renewable energy must be able to reach sparsely populated areas.

Protecting and Supporting Affected Communities

The EU has developed a Just Transition Mechanism (JTM) to ensure that the transition towards a climate-neutral economy happens fairly, leaving no one behind. The JTM provides targeted support to people in industries and regions, such as coal mining regions, which will suffer the greatest socio-economic impacts of the transition. ASEAN will need to consider developing a similar tool, either at the regional level or in each AMS. This will require funding, which can come from both public and private sector sources as set out in the Energy Transition Mechanism below.

Indeed there have been a number of studies that have shown that moving to green investments can actually create more jobs. A working paper from the World Resource Institute[31] highlighted the following upsides for employment from green investments:

- Green investments generally create more jobs per US$1 million than unsustainable investments when comparing the near-term job effects from clean energy versus fossil fuels, public transportation versus roads, electric vehicles versus internal combustion engine vehicles, and nature-based solutions versus fossil fuels.
- Investing in various types of clean energy generally creates more jobs than investing in fossil fuels. Investments in building efficiency have the highest employment multipliers, creating 2.8 times as many jobs as fossil fuels per $1 million on average in the near term. Solar PV creates 1.5 times as many jobs as fossil fuels and wind creates 1.2 times as many jobs as fossil fuels per $1 million on average. Other clean energy investments like upgrades to existing grids, hydropower, geothermal energy, and industrial efficiency also create more jobs than fossil fuel investments.
- Renewable energy and energy efficiency investments generally create more near-term jobs than fossil fuel investments, but efforts are needed to strengthen job quality.

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[30] Joyce Lee and Feng Zhao, "Global Wind Report 2019" (Brussels: Global Wind Energy Council, 2020), p. 52.
[31] See: https://files.wri.org/d8/s3fs-public/2021-10/the-green-jobs-advantage-how-climate-friendly-investments-are-better-job-creators.pdf?VersionId=_4g3pkXM5qB8_DEy1MhhbF8AloDhqGUY

Table 8: Green Investments Can Create More Jobs in the Near Term than Unstainable Investments[32]

SECTOR	# COUNTRIES/ REGIONS ACROSS STUDIES	TYPE OF GREEN INVESTMENT	MEDIAN RATIO ACROSS STUDIES	COMPARISON TO UNSUSTAINABLE INVESTMENT
Energy	7	Building efficiency creates...	2.8	...times as many jobs as fossil fuels per $1 million
	7	Industrial efficiency creates...	1.8	
	6	Geothermal energy creates...	1.7	
	8	Solar photovoltaic energy creates...	1.5	
	7	Upgrades to existing grids create...	1.5	
	8	Wind energy creates...	1.2	
	7	Hydropower creates...	1.2	
	1	New grids create...	1.1	
	1	Reducing methane emissions creates...	0.8	
	1	Carbon capture, utilization, and storage creates...	0.5	
	1	Nuclear energy creates...	0.3	
Public and non-motorized transport	1	Pedestrian-only infrastructure creates...	1.3	...times as many jobs as road construction per $1 million
	1	Bicycle-only infrastructure creates...	1.4	
	1	Roads with pedestrian and cycling infrastructure create...	1.1	
	2	Mass transit creates...	1.4	
	2	Railways create...	0.8	
Vehicles	2	Electric vehicle manufacturing creates...	0.9	...times as many jobs as internal combustion engine vehicle manufacturing per $1 million
	1	Battery cell manufacturing creates...	1.2	
	1	Electric vehicle charging infrastructure creates	2.0	
Nature	1	Ecosystem restoration creates...	3.7	...times as many jobs as oil and gas production per $1 million

Note: A ratio >1 (colored in green) means that green investments create more jobs than an equivalent amount of unsustainable investments. A ratio <1 (colored in red) means that green investments create fewer jobs than an equivalent amount of unsustainable investments.

Source: WRI analysis of 12 studies: IEA (2020), UNIDO and GGGI (2015), Chen (2019), Garrett-Peltier (2017), SGA (2011), Heintz et al. (2009), Ianchovichina et al. (2013), Garrett-Peltier (2011), Schwartz et al. (2009), Freedman et al. (2017), Soni (2020), and Peltier (2020).

Recommendations

To assist ASEAN in overcoming the challenges it faces in its energy transition, this paper believes that bolstering ASEAN's sustainable finance ecosystem warrants AMS' most urgent attention amongst the other recommendations the Council has proposed. Viable low-carbon technologies already exist for most industries. The bigger issue is improving AMS' access to these technologies at a reasonable cost while managing the socioeconomic effects of change. On this note, the EU has the practical resources and expertise to provide technological and financial support. More importantly, the rapid success and feasibility of the following recommendations are premised on the commitment of stakeholders in ASEAN (i.e., governments, industry players, and state-owned entities such as power generation companies) in ensuring their implementation and seeing them through the operation.

[32] See: https://files.wri.org/d8/s3fs-public/2021-10/the-green-jobs-advantage-how-climate-friendly-investments-are-better-job-creators.pdf?VersionId=_4g3pkXM5qB8_DEy1MhhbF8AloDhqGUY P.3

This section is split into 2 portions – (1) Strengthening ASEAN's Sustainable Finance Ecosystem, which aims to provide practical-driven solutions to attract more private capital into green projects, and (2) Challenges and Recommendations Framework, which aims to provide high-level recommendations to the other challenges of ASEAN's energy transition journey highlighted in this paper.

Strengthening ASEAN's Sustainable Finance Ecosystem

Energy Transition Mechanism

The EU-ABC advocates for an Energy Transition Mechanism (ETM) as a practical recommendation in helping AMS transition to renewable energy and low-carbon energy solutions.

The ETM is a financial mechanism originally championed by Prudential and is now being promoted by the Asian Development Bank. It aims to retire carbon-intensive fossil fuel-run power plants earlier than their intended lifespan (see figure 3).[33] The ETM is formed for a specific country and comprises two complementary facilities: The Carbon Reduction Facility (CRF), and the Clean Energy Facility (CEF).

The ETM would be funded by long-term investors with low costs of funds, e.g. developed country governments, national development finance institutions, and multilateral banks. There is potential to blend those public sources with private sector investment and philanthropic or impact capital. Instead of developing a new and costly bureaucracy to oversee the ETM, ASEAN could form a study group with existing global or regional multilateral development banks (MDBs) to explore the potential of MDBs acting as the lead shareholder and administrator that drives the establishment of each AMS' ETM based on their different national circumstances.[34] In return for ETM investment and technical assistance, the developing country (and its energy and climate authorities) would commit to an agreed schedule the for replacement of carbon-intensive power, with agreed standards for energy access and security, alongside programs to ensure a just transition for affected stakeholders. These agreements would also require strong provisions to ensure follow-through and to prevent the building of new coal-fired power plants.

Current owners of carbon-intensive power assets would contribute their assets towards the CRF in exchange for cash and potentially equity or debt in the ETM. Those utility asset owners, which in many cases are state-owned power companies, would be expected to use the cash for renewables investments and just transition.

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[33] Donald Perry Kanak, "How to Accelerate the Energy Transition in Developing Countries," World Economic Forum, January 25, 2021, https://www.weforum.org/agenda/2021/01/how-to-accelerate-the-energy-transition-in-developing-economies
[34] Donald Kanak, " How to replace coal power with renewables in developing countries," Eco-Business, June 5, 2020, https://www.eco-business.com/opinion/how-to-replace-coal-power-with-renewables-in-developing-countries/

The power assets placed under the CRF's supervision continue to operate for an agreed period which is shorter than the asset's current expected lifetime, but long enough to pay back the ETM investors/lenders. In parallel, the CEF collaborates with the national authorities and power sector to provide finance, technology assistance, and know-how to accelerate renewables. As the CEF builds up renewable energy capacity and storage, the CRF retires its assets.

If the ETM can be proven feasible in specific countries, it would be a practical way to retire at least 50% of existing carbon-intensive power assets, dramatically scale up demand for renewable energy (see figure 4) and provide resources for just transition. If well integrated with national development plans, the ETM would also create sustainable jobs to support a green recovery from the impacts of COVID-19.

Figure 3. How Energy Transition Mechanism would work, by Donald Kanak, from https://www.weforum.org/agenda/2021/01/how-to-accelerate-the-energy-transition-in-developing-economies

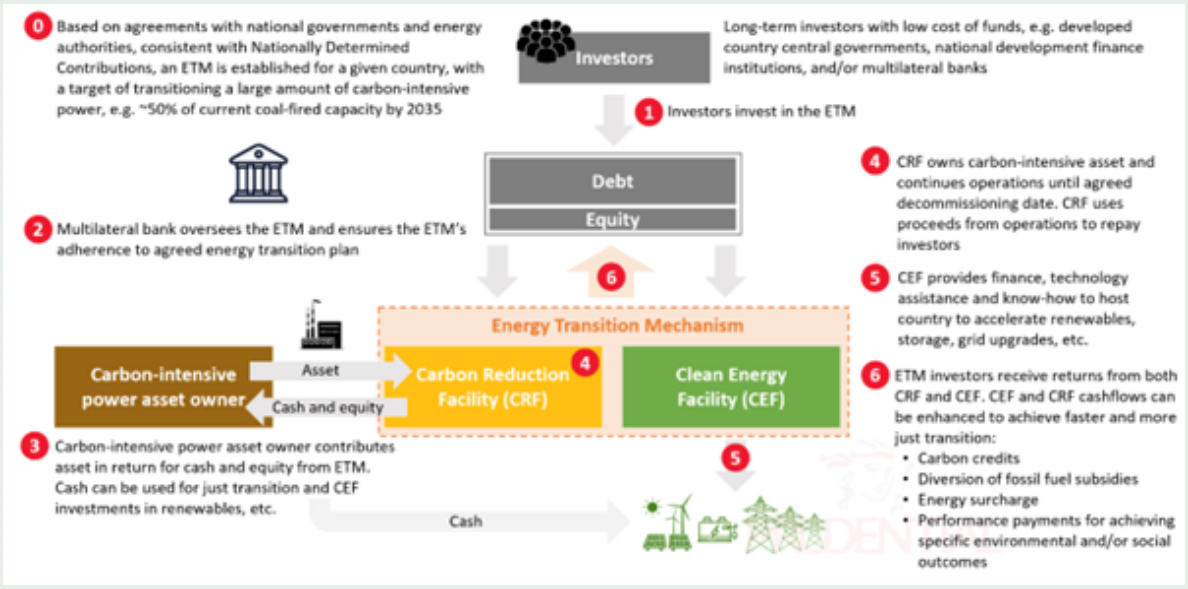
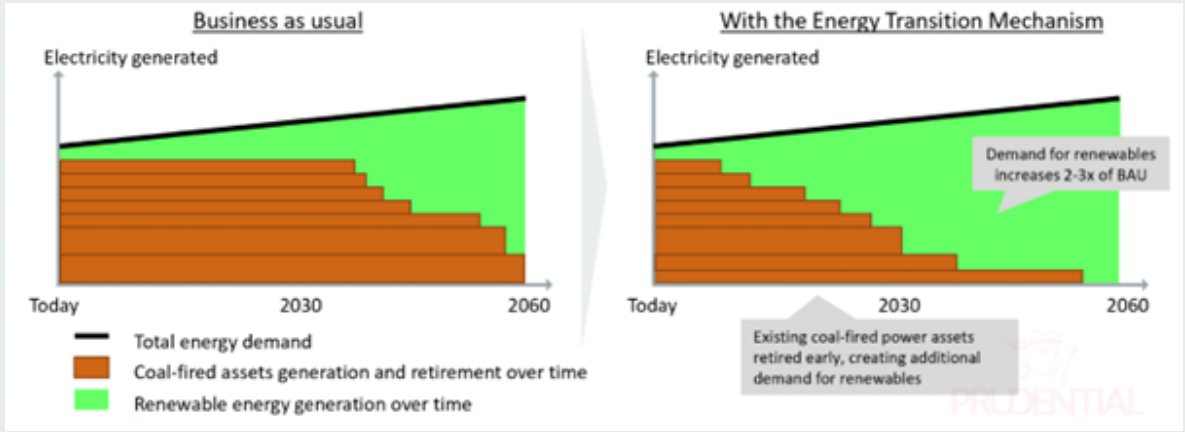


Figure 4. How the ETM accelerates the retirement of carbon-intensive assets while boosting demand for renewable energy as the total energy demand increases, by Donald Perry Kanak, from https://www.weforum.org/agenda/2021/01/how-to-accelerate-the-energy-transition



Thus, we strongly urge ASEAN to tailor the ETM to Southeast Asia's unique and dynamic circumstances and launch a project with the goal of a nationwide rollout.

De-risking Green Investments

The major impediment to attracting private investment has been identified as the high investment risks associated with developing world sustainable infrastructure. Hence, this paper recommends (1) the de-risking of green projects and (2) the development of a sustainable infrastructure labelling system which also contributes to reducing the uncertainty and risks surrounding sustainable infrastructure investment.

Firstly, investments in developing regions like ASEAN inevitably carry higher risks. Consequently, the costs of financing projects in ASEAN can be close to double that of those in developed countries (see figure 5)[35]. For green investment mechanisms like the ETM to be feasible, investment costs in ASEAN must be reduced. This is because lower investment costs would translate to a lower levelised cost of electricity from newer renewable energy sources, which means more competitive utility prices for ferroelectricity generated from renewable sources as compared to fossil fuel. Thus, de-risking green projects is critical to achieving success in ASEAN's energy transition.

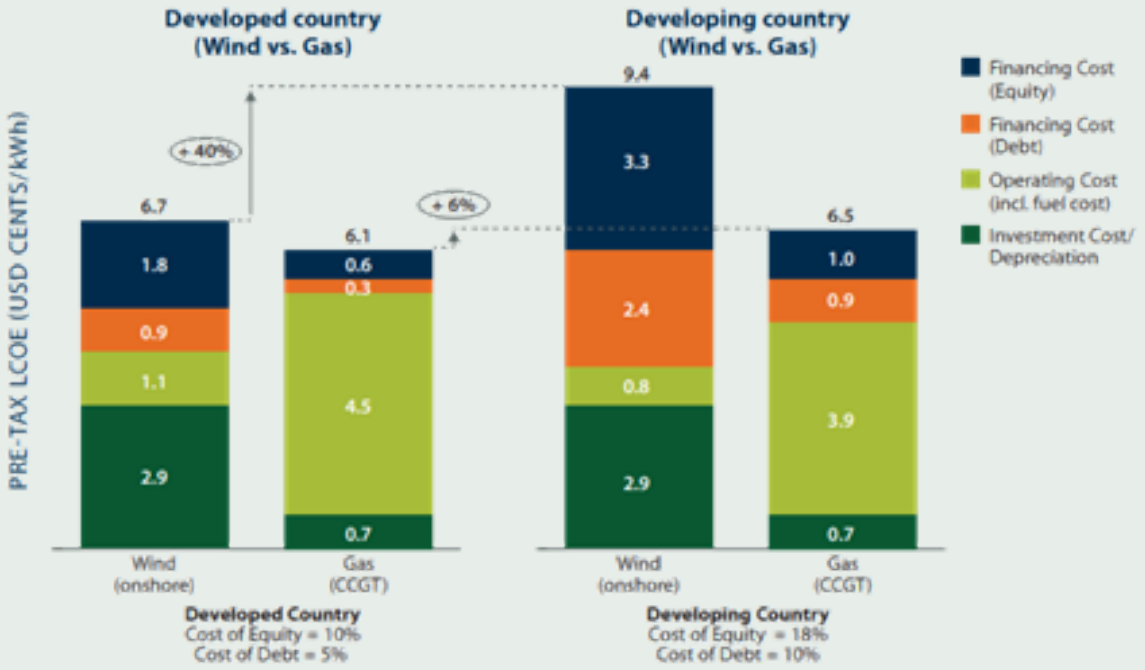


Figure 5. The Impact of financing costs on wind and gas power generation costs in Developed vs Developing countries, from "Derisking Renewable Energy Investment" by United Nations Development Programme, 2013, p.12.

AMS can de-risk green projects using 2 main instruments – (1) Public Policy Derisking Instrument, and (2) Financial De-risking Instrument.

[35] O. Waissbein et al., "Derisking Renewable Energy Investment. A Framework to Support Policymakers in Selecting Public Instruments to Promote Renewable Energy Investment in Developing Countries." (New York, New York: United Nations Development Programme, 2013), 12.

The Public Policy De-risking Instrument focuses on removing the underlying barriers that heighten investment risks. Such barriers can exist in the form of public policies that are unfriendly to investments or inefficient bureaucratic processes. Examples of Public Policy De-risking Instruments include passing **policies that guarantee grid access for new renewable energy sources, easing foreign ownership restrictions**, or **streamlining permit issuance processes**.

Policies that **mandate the disclosure of the performance data of sustainable infrastructure** would also increase transparency and reduce the risks and uncertainties of private investment. A lack of understanding and quantification of the benefits (revenue, resultant economic activity, and environmental and socio-health benefits) and risks of infrastructure projects in the planning and financing stages, and the absence of quantitative data on the financial and risk performance of infrastructure projects in the investment evaluation process,[36] increases the risks and uncertainties of private investment.

To reduce these risks and uncertainties, there must be mandatory obligations to disclose the ESG performance data of infrastructure projects across their full life cycles. However, a consensus on the sorts of disclosures that the issuers of securities should make to their investors must first be achieved. The Task Force on Climate-related Financial Disclosures (TCFD) and Sustainability Accounting Standards Board (SASB) are two organisations that have begun the crystallisation of such a consensus. The SASB provides a clear set of industry-specific metrics and standards for reporting ESG information. On the other hand, the TCFD evaluates company exposure to and management of climate-related risks and opportunities and references SASB Standards as an appropriate framework by which to fulfill the TCFD recommendations.

Based on such a uniform agreed-upon standard, stock markets and funding models for sustainable infrastructure projects must include mandatory obligations for ESG data disclosure and assessment. This, as well as public-private agreements that share risks and rewards between both sectors, will help mobilise finance towards sustainable infrastructure, which will in turn improve the quality of sustainable infrastructure projects in the region. To ensure the success of AMS' public investment into green investments, the Council recommends AMS study as many Public Policy De-risking Instruments as possible and select the best fitting instrument for their context.

[36] "Increasing private sector investment into sustainable city infrastructure," PwC and Global Infrastructure Facility, January 2020, p.12

Financial De-risking Instruments are meant to transfer financial risks to another actor. Utilising Financial De-risking Instruments shifts the risk-reward profile of investment more favourably to the investor with a higher prospective rate of risk adjusted returns. The Council commends ASEAN for innovating a financing and de-risking initiative called the ASEAN Catalytic Green Finance Facility (ACGF). The ACGF provides public loans and technical assistance to public green infrastructure projects to catalyse private capital into these projects. This initiative recognises that public funds (which make up 75% of the total investment in green projects) are not sufficient and it is crucial to attracting private capital[37]. The United Nations Development Programme further stressed the need for a stronger public-private partnership to attract private capital, mentioning that **to successfully scale-up renewable energy in developing countries, it is clear that private sector investment must be at the forefront**".[38]

As such, to further attract more private sector investment, the Council recommends that AMS seek **to enhance the adoption of insurance in the planning and investment process**. For example, green investments could include construction insurance against delays and non-completion, or climate risk insurance against residual risks related to weather and natural catastrophe events, to mitigate the risks involved in constructing and operating new renewable energy infrastructure.

Generally, this would significantly reduce the risk profile of green investments, reduce the cost of financing which increases financial returns, make decarbonisation mechanisms like the ETM more feasible, attract more private investments, and lower the LCOE of renewable energy to make renewable sources more price competitive than fossil fuel sources (see figure 6). Reinsurance would also create an opportunity for large-scale investments to be pooled to accelerate and achieve scale.

[37] "ASEAN Green Catalytic Facility," ASEAN Green Catalytic Facility (Madaluyong, Philippines: Asian Development Bank, 2020), 4.
38] O. Waissbein et al., "Derisking Renewable Energy Investment", 11.

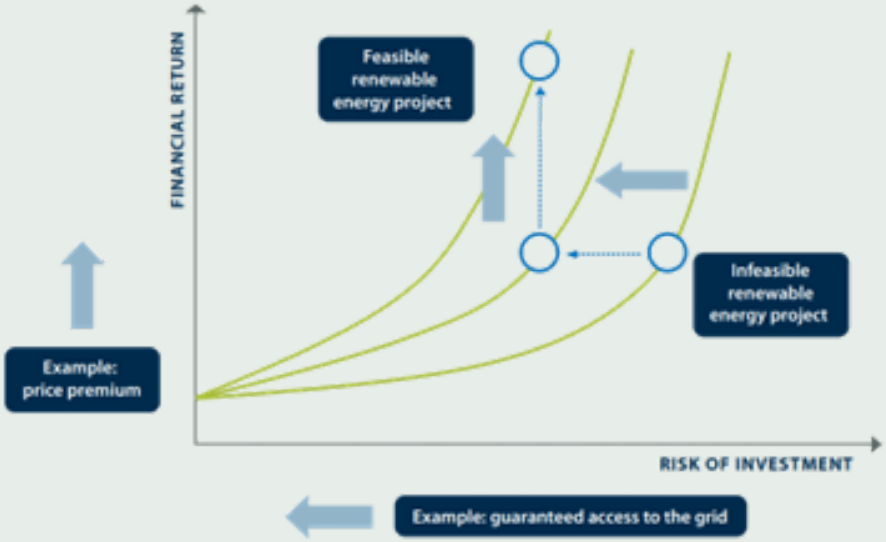


Figure 6. Utilising Policy and Financial De-risking Instruments can enhance the feasibility of renewable energy projects, from "Derisking Renewable Energy Investment," by United Nations Development Programme, adapted from Glemarec (2011), by United Nations Development Programme, 2013, p.13.

Secondly, there is currently no avenue through which investors can verify which assets are genuinely sustainable. Thus, the Council calls for the development of a sustainable infrastructure labelling system that (1) assesses sustainability issues over the whole lifecycle of an asset, (2) helps the market easily signal asset sustainability, and (3) through a globally applicable label, transforms sustainable infrastructure into a mainstream, standardised, liquid asset class. Such a label could be based upon the recommendations or best practices of the IPFS (International Platform on Sustainable Finance) to make it compatible or comparable with the EU Taxonomy. The label would help investors make capital allocation choices that indeed support ASEAN's transition to a sustainable economy.

Carbon Pricing Mechanism

In addition to phasing out fossil fuel subsidies and repurposing them to subsidise renewable energy and low-carbon solutions projects, carbon pricing is another mechanism that can harness market forces to encourage investments in low-carbon technology and infrastructure. A carbon pricing mechanism, in the form of a carbon tax or fee, a cap-and-trade system, or an emissions trading scheme that depends on governments allotments or permits, would create fiscal incentives for companies and governments to lower their emissions by switching to more efficient processes or cleaner fuels.

In a nutshell, further progress in ASEAN's sustainable finance ecosystem would benefit from closer public-private collaboration on data disclosure and project risk allocation and a more consistent and coherent system for assessing and communicating priority ESG elements of sustainable infrastructure in financial markets.

Challenge-Recommendation Framework

	Challenges	Recommendations
1	Impact of COVID-19 and current interest rate and inflation increases on Public Fiscal Capacity for Green Recovery	1. Strengthening ASEAN's Sustainable Finance Ecosystem • Continue the **development of an ASEAN-specific Energy Transition Mechanism with a view toward national implementation.** • **Increase the amount of Public Policy Derisking Instruments being implemented** to improve the regulatory climate for private sector investors. This includes policies that guarantee grid access for new renewable energy sources, easing foreign ownership restrictions, streamlining permit issuance processes, public-private collaboration to develop clear policies for **performance data disclosure**, and multi-stakeholder engagement with the private sector to align energy and climate policies based on APAEC targets and the ASEAN Comprehensive Recovery Framework. • **Enhance the adoption of Financial Derisking Instruments**, such as insurance for renewable energy projects, projects that involve the decommissioning of legacy carbon-intense fossil fuel electric plants, and public equity co-investments to improve the risk-reward profile for private investors. • **Further develop and enhance the ASEAN-wide green finance taxonomy** to improve the transparency of green investments for private investors. • **Develop a sustainable infrastructure labelling system** that complements an ASEAN taxonomy, to incentivise governments and project developers to embed ESG standards throughout the lifecycle of new developing world infrastructure and mobilise private finance into developing world sustainable infrastructure assets. 2. **Support government-led carbon pricing mechanism** that will enable member states to meet the goals of the Paris Agreement. Furthermore, encourage member state governments to adopt mechanisms that help ASEAN economies to be linked internationally, **promote increased ambition in reducing emissions and create incentives to invest in low-carbon technology and infrastructure.** 3. Policymakers to consider and adopt **more competitive and sustainable power purchase arrangements** that enable investment in economically viable renewable energy projects in AMS.
2	Restricted Green Financing Ecosystem	
3	Conflicting Priorities to Enable Growth of Renewable Energy and Low Carbon Energy Solutions	
4	Continued Subsidy of Fossil Fuels	**Begin phasing out fossil fuel subsidies**, to ensure a more level-playing field, and repurpose fossil fuel subsidies to invest in renewable energy and low carbon solutions projects or other public goods.
5	Underdeveloped Power Grid Capacity for Renewable Energy Integration	1. **Engage the private sector in the rapid expansion of AMS' electrification network**, particularly in rural areas. 2. **Engage the private sector to ensure power system flexibility** so that grid capacity is scalable and able to integrate new sources of renewable energy.
6	Protecting and supporting affected communities	1. **Establish a Just Transition Mechanism** for ASEAN to provide support to affected communities. 2. **Establish a Just Transition Fund** and loan facility to mobilise funds for investment in affected communities

ANNEX I: CAMBODIA

Executive Summary

The current exposure to fossil commodities', though limited in their overall energy mix share, might push Cambodia towards Energy Security Risks, not least a difficult financial trade balance. Cambodia today stands at a crossroads, having to choose how to cater reliably to tripling demand (by 2040). In our opinion the country has an opportunity to go beyond its existing and new renewable energy strategies in order to benefit from its unique location between the two leading Greater Mekong Subregion (GMS) economies of Thailand and Vietnam, and to position itself as a leader in green business. This chapter advocates for that ambition.

The levelized cost of electricity benchmarks suggests that renewable energy from solar panels, solar farms, onshore wind and even offshore wind projects have enormous potential; therefore, the country should invest more with the help of international institutions as well as private investors.

Leading international garment and shoe brands and garment purchase agencies have established ambitious targets for green and sustainable sourcing, often with zero-emissions targets for their global supply chains by 2030, and made these ambitions clear to the Cambodian government stakeholders. Also, local manufacturers have expressed a clear need for a more progressive legislation toward rooftop solar panels that will allow the industry to remain competitive and become more sustainable.

As the Royal Government of Cambodia aims at a diversification of the manufacturing industries in the country, pushing away from labor-intensive industry (Garments) towards industries of higher-value, more skills-based and attracting outsourced production from neighboring industry bases - these ambitions cannot be fulfilled without bringing down cost of electricity while liberalizing green energy investments. Rooftop solar without expensive capacity charges will be essential to signal such openness to investors.

Currently, Cambodia has some of the highest energy costs in the region, averaging between $0.1370/kWh to $0.17232/kWh. Cost reductions could be achieved with the help of Variable Renewable Energy (VRE) sources.

Advances in automation and the ambition of Cambodia to become part of regional supply chains will make it crucial to reduce energy cost and consumption to:

- Stay competitive vis-a-vis regional peers (Vietnam, Thailand)
- Diversify from garment production towards more advanced industries
- Better integrate Cambodia's economy with its more advanced regional peers
  - Benefit from skill and labor transfers
  - Receive investment from international investors already in neighboring countries
    - Outsourcing from these markets
  - Attract new residents and investors
- Attract quality buyers and brands sourcing from Cambodia

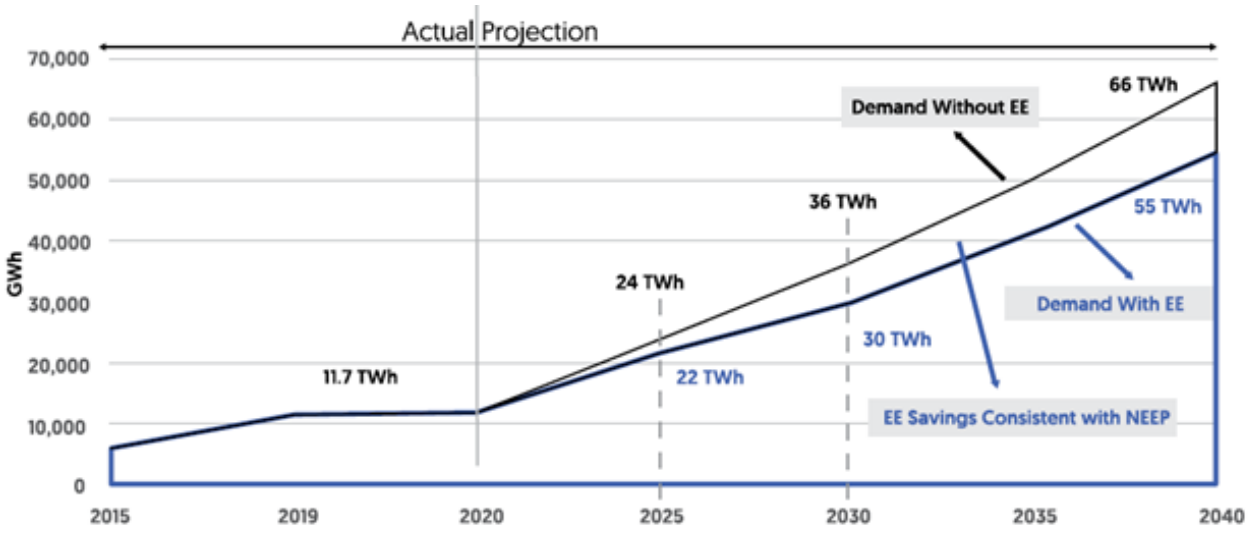
Therefore, a more favorable policy on Solar PV and RE is required to create an investment-friendly reputation as a **"green" manufacturing, tourism and lifestyle destination** for Cambodia.

The Royal Government has in the past months accepted respective inputs, however, continues prioritizing affordable, reliable and improved energy security, as stated in its Power Development Plan (PDP) 2040. An updated solar rooftop policy is expected in 2023, with observing stakeholders anticipating a reduction of the capacity charge by around 50%.

Cambodia's energy needs will triple by 2040

During the past 15 years, capacity of power sources has increased 9.58 times and power supplied has increased 8.31 times. Demand is set to further increase threefold by 2040.

Even during the Covid-19 crisis, power demand increased: total energy delivered in 2021 was 12,601 Gigawatts hours (GWh), 1.61% higher than the previous year, according to an Electricity Authority of Cambodia (EAC) report released in February 2022[39].



The above energy targets can be met by a diversified mix of supply: coal, gas, hydro, solar, and wind. New technologies, imports, and improved energy efficiency will support.

[39] Consolidated Report 2021 – Electricity Authority of Cambodia, page 1

From 5 scenarios presented in the PDP 2040, “scenario 4” was chosen. This scenario shows a path that relies less on imported coal and is overall less expensive in the long run. However - it also shows a meager 14,2% of Variable Renewable Energy (VRE = Solar and Wind) in the total domestic generation (when talking of VRE we always prefer to refer to Generation mix rather than a sometimes misleading “installed capacity”), mix by 2040[40].

Role of RE and VRE by scenario in Domestic Capacity and Generation Mix

Parameter	Year	SCEN1	SCEN2	SCEN3	SCEN4	SCEN5a	SCEN5b	SCEN5c
VRE % Generation Mix	2030	3.8%	3.8%	8.2%	7.5%	8.1%	6.9%	6.9%
	2040	1.5%	6.4%	14.8%	14.2%	14.3%	14.4%	20.3%
VRE % Installed Capacity	2030	9.3%	9.3%	18.5%	18.5%	15.8%	15.8%	15.8%
	2040	4.3%	16.3%	32.2%	30.3%	30.3%	30.3%	41.2%
RE % Generation	2030	30.8%	30.8%	34.2%	35.0%	38.0%	37.8%	37.8%
	2040	23.0%	28.4%	38.2%	43.1%	43.8%	44.3%	44.1%
RE % Installed Capacity	2030	43.4%	43.4%	48.9%	48.9%	56.3%	56.3%	56.3%
	2040	34.3%	44.2%	56.5%	60.8%	60.8%	60.8%	63.7%

VRE = Solar + Wind, RE = VRE + Hydro + Bio **Imports and EE Savings are not considered in this calculation*

Source: Cambodia Power Development Plan - April 2022 - Scenario 4, page 31

This compares to approximately 6.36% of solar power generation and a total of 51.17% of RE generation that shaped Cambodia’s energy mix in 2021, as the country’s still modest demand is largely fed by hydropower, both national plants as well through imported energy (from Laos PDR).

Covering its substantially growing demand will be a challenge that Cambodia, in our opinion, could meet through appropriate incentives policies for RE in general and a more favorable legislation/tariff elimination on solar photovoltaic (PV) systems.

An increased growth in RE share (compared to the one shown in the PDP Scenario 4 will significantly reduce power generation costs for the operator of Cambodia (EdC) and reduce cost for consumers (residential and industrial)[41].

International commitments by Cambodia regarding its energy transition

Cambodia presented its Long-Term Strategy for Carbon Neutrality (LTS4CN) in December 2021 with a commitment to the Paris Agreement on Climate Change, presenting a policy scenario of a carbon neutral and resilient society within the next 30 years. Its current power development plan does not reflect this ambition.

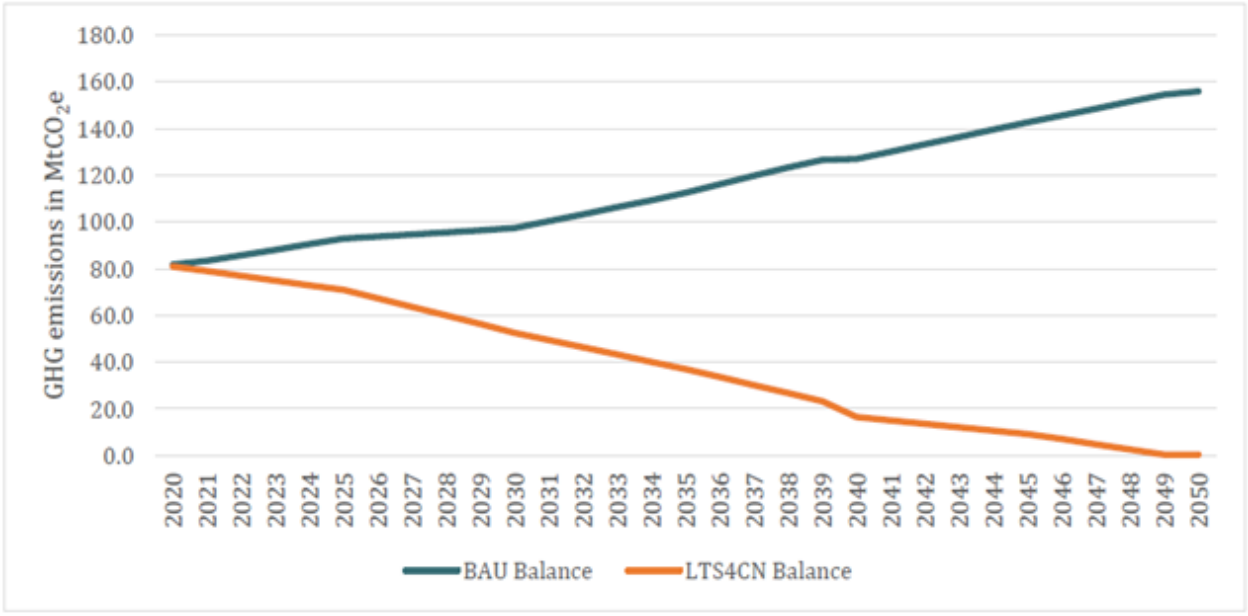
[41] Compare: https://www.eurocham-cambodia.org/uploads/4f977-positionpaperonrenewableenergycambodia.pdf

Table 1: GHG emissions projection by sector in 2050, BAU and LTS4CN scenarios

Sector	BAU scenario, $MtCO_2e$	Emissions reduction in LTS4CN scenario, $MtCO_2e$	Emissions balance in LTS4CN scenario, $MtCO_2e$
Agriculture	34.9	-15.6	19.3
Energy	82.7	-54.3	28.2
FOLU	21.2	-71.4	(-50.2)
IPPU	10.7	-9.1	1.6
Waste	6.5	-5.3	1.2
Total	156.0	155.6	0,3

***The FOLU sector uses the national forest definition and soils have been included into the calculations.**

Source: Long-Term Strategy for Carbon Neutrality of Cambodia, Page 2



Source: Long-Term Strategy for Carbon Neutrality of Cambodia, Page 2

As per the tables above, the **LTS4CN** modeling suggests that Cambodia could achieve carbon neutrality in 2050 with Forestry and Other Land Use (FOLU) sectors providing a total carbon reduction of 50 megatons of carbon dioxide equivalent (MtCO2e).

This vision for carbon neutrality relies, most likely too confidently, on the implementation of existing commitments in the FOLU sector by reducing deforestation rates by 50 percent in 2030 and stopping deforestation by 2045, among other measures.

On the Energy side, reductions are to come from switching to electricity for cooking, increases in public transport and electric vehicles as well as higher efficiency in buildings.

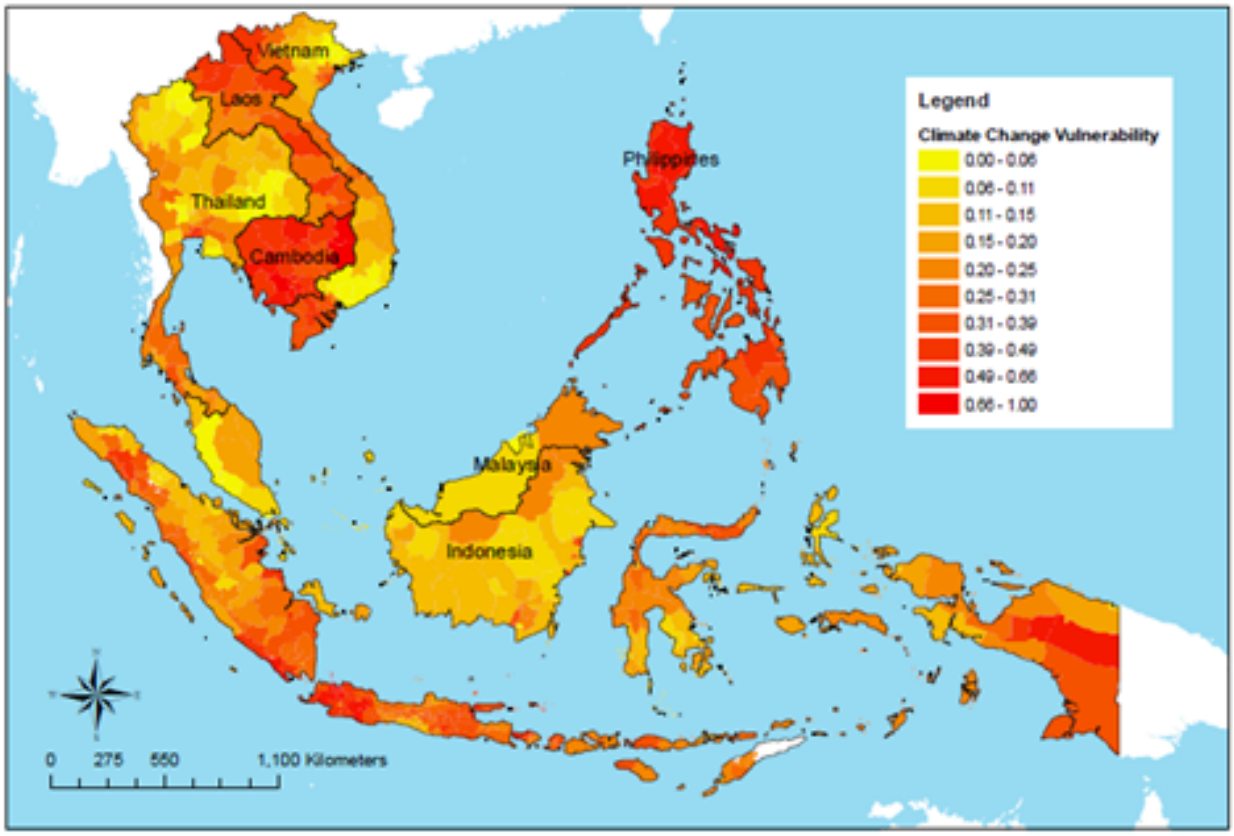
Specifically, with regards to power generation the RGC committed the Kingdom of Cambodia to the COP26 principles, three specific commitments in electricity generation were made, through the Ministry of Environment:

- No hydropower development on the Mekong Mainstream
- No more coal power plants, beyond existing commitments (which are: Han Seng 3rd unit; CIIDG 2nd and 3rd unit; Royal Group Coal 1st and 2nd unit)
- Injecting intermittent renewable energy to the maximum level the national grid can tolerate

Impact of climate change on Cambodia

There is no doubt that climate change will greatly affect Cambodia and its surrounding neighbors. The country is ranked as one of the most climate-vulnerable countries, not only in Southeast Asia, but in the world. The Climate Risk Index ranks countries most affected by climate change in the period 1996–2015 based on extreme weather events. *Cambodia ranked 13th out of 181 countries*[42].

The Ministry of Economy and Finance and the National Council for Sustainable Development estimate that climate change impacts could reduce Cambodia's expected GDP by almost 10% by 2050 - even if global temperature increases are kept within a 2°C target[43].



[42] Arief Anshory Yusuf & Herminia A. Francisco, Climate Change Vulnerability Mapping for Southeast Asia, January 2009
[43] https://cambodia.un.org/en/164901-information-note-16-climate-change

Why is a consequent and speedy transition to Renewable Energy needed?
From a pure perspective of the business and industry, we can say:

a) A problem for investors
The push from consumers and brands for a more sustainable supply chain is shifting manufacturing and sourcing patterns across the globe: repercussions on sourcing from Cambodia are already a reality. Investment decisions for new and existing locations will therefore depend on the availability of green policies, enabling companies to fulfill greenhouse gas (GHG) commitments and targets.

Competition from large regional players to attract significant investment will be strong. Cambodia has taken a first step with its 2020 Law on Investment (LOI), but it is imperative that this LOI is complemented with a liberalized and substantial renewable energy policy.

As the RGC itself recently observed, *"the responsibility for environmental protection or environmental sustainability in the garment industry is on the rise, especially among major brands and buyers, who have begun implementing energy reduction programs by encouraging the factories or manufacturers within the industry to use the renewable energy"[44]. Moreover, the Government will "encourage and promote the use of renewable energy as an efficient option and continue to monitor electricity prices in a timely manner"[45].*

b) The garment industry: brand targets, global consumers & impact on sourcing
Traditionally the Garment Sector has been the backbone of Cambodia's exports, job creation and relative wealth distribution, therefore their ongoing commitments are essential. Major garment brands are committing to reducing their GHG emissions within five to 10 years. These are firm commitments requiring global supply chains to decarbonize speedily.

Through global programs such as RE100[46], SBTI, Race to Zero, or COP26, many international companies operating in Cambodia have committed to sourcing 100% renewable electricity. The ability by competing, industrializing countries will thus have an impact on sourcing decisions.

Indeed, key players in this industry will make their decision about maintaining and expanding to Cambodia as a sourcing country by 2025. These decisions are going to be made based on progress made and a tangible strategy put in place to enable them achieving their 2030 goals.

[44] Cambodia Garment, Footwear and Travel Goods (GFT) Sector Development Strategy 2022 – 2027, page 16.
[45] Ibidem, page 25.
[46] https://www.there100.org/re100-members

European brands and retailers represent a substantial portion of Cambodia's garment exports (estimated at 30-35% of Cambodia's total apparel export). The importance of this bulk buying and the real possibility that these orders might shift to other countries should not be underestimated. American, Canadian, and Japanese[47] brands, amongst others, are also increasingly under pressure to use green energy in their supply chain.

c) Garment Factories & GMAC support consequent push for renewable energy

The Garment Manufacturing Association of Cambodia (GMAC) has a clear stance on the issue: *"We want to be able to use more solar energy to reduce electricity costs".*

Garment factories use high energy consumption with consistent load profiles. Nevertheless, garment factories typically operate on short two to three or five-year lease agreements with site owners, making long term investments difficult to prioritize.

Current regulations that add capacity charges on top of an investment in Rooftop Solar, push the Return on Investment (ROI) of a rooftop solar PV investment to 8-10 years, effectively more than doubling a regular ROI for a rooftop project (typically about 4 years). Companies that want to install smaller systems have even negative payback times.

It is not a coincidence that a letter from GMAC dated 15.02.2020 to the honorable Minister of MME highlighted Prakas No. 40 (issued one day before) with the following comments:

- *"This regulation does not encourage the use of solar energy to consumers in the industrial sector";*
- *"This tariff policy does not seem to encourage the use of solar energy. Currently, buyers in the garment and footwear industry are urging factories to increase their use of renewable energy in order to reduce electricity demand from the national grid and reduce electricity costs. Well, in case we cannot meet Requests and Requirements of Buyers, these factories may be affected by the lack of orders or the cancellation of orders. In addition, under the new electricity tariff, we may also have to pay more for solar energy use";*
- *"The Garment Manufacturers Association of Cambodia (GMAC), which represents members in the garment and footwear industry, is calling for more leverage reductions and pricing reviews for companies that have installed solar energy".*

The challenging role of fossil fuels in Cambodia's energy transition

Cambodia's current energy mix sets RE at an impressive 51.17%[48] , providing a leading RE position in the region, but the outlook is bleak with already approved coal and fossil fuel investments.

[47] UNIQLO – Fast Retailing signed the Fashion Industry Charter for Climate Action in January 2020. The Charter supports the goals of the Paris Agreement in "limiting global temperature rise to well below two degrees Celsius above pre-industrial levels." It also calls for a commitment to "30% aggregate GHG emission reductions in scope 1, 2 and 3 of the Greenhouse Gas Protocol Corporate accounting and Reporting Standard, by 2030 against a baseline of no earlier than 2015."
[48] Consolidated Report 2021 – Electricity Authority of Cambodia, page 1

The proposed Power Development Plan (PDP) in its Scenario 4 in fact envisions a reduction, due to a tripling of demand, in the domestic renewable energy share to 35% by 2030. This will again increase to a meager 43.1% a decade later, by 2040[49] - effectively reducing the RE mix by almost 8.1% in 20 years.

The situation gets more challenging for the RE mix when accounting for coal power imports from Lao PDR (via dedicated plants for Cambodia). In this case, the share of renewable energy drops to approximately 25%[50]. Most of this fossil fuel energy will be imported.

The future balance of the overall energy mix leans heavily towards coal (CIIDG/CHDHK, Royal Group) or gas (LNG)[51]. In the immediate future, the total Import Power will jump 5.24 points, rising from 26.55% in 2021 to 31.79% in 2022. At the same time, Total Domestic Generation will decrease from 73.45% to 68.21%.

As of 2021, 62% of the electricity mix was dependent on imports:

- 26.55% electricity directly imported from neighbors and
- 35.45% electricity generated from imported fuel (coal or oil burned in a domestic power plant)

By 2040, 69% of the energy mix will be dependent on imports (the share of power imports will remain the same, but the electricity produced with imported fuel will rise, according to the Cambodia PDP 2021-2040)[52].

Consequences

The impact of such less progressive policies supporting renewable energies will be:

a) Energy security risk: In 2040, with 75% of electricity dependent on imports (either primary as coal or gas or a secondary source) from neighbors. This will impact trade balances. According to the World Bank in fact, Cambodia already has one of the highest import dependencies of fuel and electricity in East Asia, when measured as a % of GDP.

b) Price volatility risk: Fossil fuel projects (such as the existing and planned Sihanoukville coal plants) face exposure to global price volatility. Increasing the coal mix means that Électricité du Cambodge (EDC) must pay more when global coal prices are high: currently at its highest in the past 22 years (US$388 per tonne in Nov. '22; in 2020: US$46 per tonne). Oil has reached a price peak in the last 14 years; gas prices are four times higher than they were two years ago.

[49] MME ADB - Cambodia Power Development Plan - April 2022 Scenario 4, page 31
[50] MME ADB - Cambodia Power Development Plan - April 2022 Scenario 4, page 27
[51] On this topic also see a very informative article recently published on the Phnom Penh Post: https://www.phnompenhpost. com/special-reports/powering-coal-what-cost
[52] MME ADB - Cambodia Power Development Plan - April 2022 - Calculated based on graph page 26, scenario 4, with 3GWh Lao PDR Hydro imports, the rest (17GWh coal or Thai/VN)

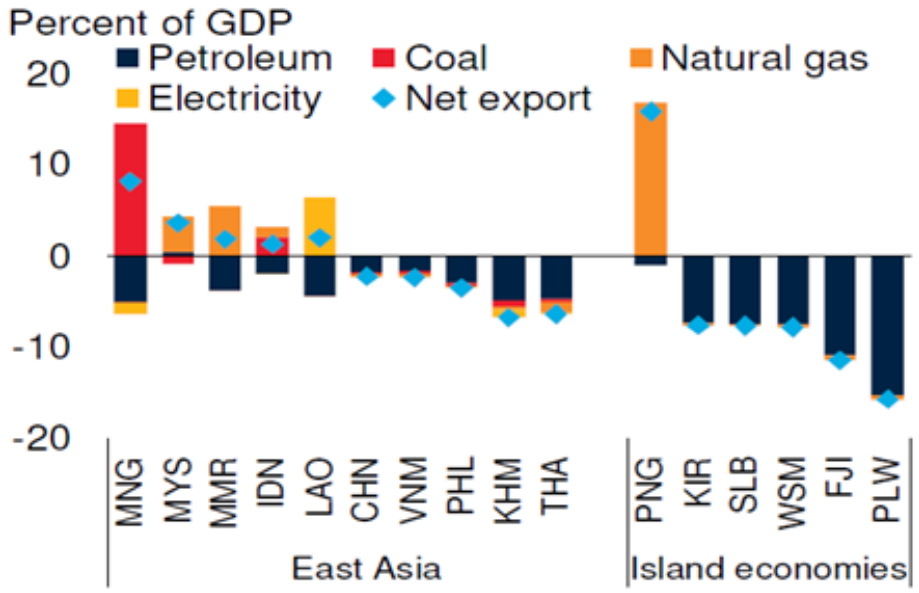
c) Finance risk: China, Korea, Japan have all stated they will cease financing coal projects. The proposed power plan for 2040 includes 3*,100MW of yet-to-be-financed coal projects*. This includes the 2,400MW coal projects in Lao PDR, with a fixed price of 7.7c/kWh. With current coal prices, these projects will struggle to be financially viable and therefore struggle to find investors. Power produced here will be expensive.

d) New & existing investment risk: International investors in manufacturing and production are already demanding a higher share (not a decreasing share) of renewable energy if they are to continue to invest in Cambodia.

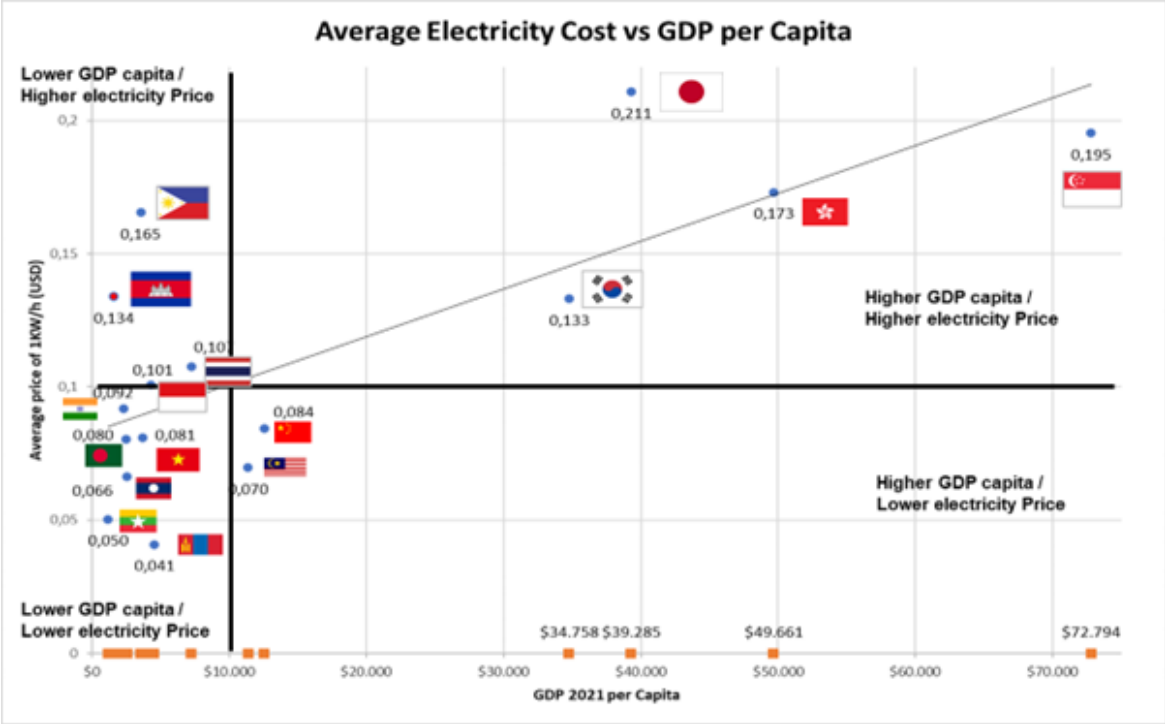
e) Electricity cost risk: Solar and wind power are the cheapest sources of new electricity supply. Cambodia's solar auction for the 40MW solar park was announced last month at 2.67 cents/ kWh cost for the operator - in 2019, it was 3.9 cents/kWh and in 2016, it was 9.1 cents/ kWh.

Although prices have to be adjusted for land cost and HV infrastructure, they represent lower prices than the purchase price offered by the 2,400 MW Laman and Xekong thermal coal-fired power plants - which have an electricity production price of 7.7 cents/kWh.

Cambodia will lose a competitive advantage if the country does not embrace benefits from lower generation prices offered by renewables opportunities.
Source: https://tradingeconomics.com/commodity/coal



Net exports of fuels and electricity as a % of GDP – KHM=Cambodia
Source: https://www.worldbank.org/en/publication/global-economic-prospects



Source: https://www.cable.co.uk/energy/worldwide-pricing/

Conclusions & Recommendations

We urgently suggest that the government prioritizes RE sources (solar and wind in particular) and to set more ambitious/higher RE targets when finalizing the PDP 2021-2040. The total energy mix in 2040 should at least reflect the current RE share of above 51% of the total generation mix. Neglecting the private sector and overall economic requirements to RE will undoubtedly damage Cambodia's development in multiple aspects.

In terms of industry, the current solar tariff situation (and "Capacity Charge") in fact penalizes the private sector that intends to install rooftop Solar PV:

- Very high capacity charges are levied for solar projects
- Inability to access off-peak cheaper nighttime rates;
- Capped at 50% of the contracted load;
- No export excess solar electricity to the grid).

Advances in automation and the positioning of Cambodia as part of regional supply chains will make it crucial to reduce energy cost and consumption to:

- Stay competitive vis-a-vis regional peers (Vietnam, Thailand)
- Diversify from garment production towards more advanced industries
- Better integrate Cambodia's economy with its more advanced regional peers
    - Benefit from skill and labor transfers
    - Receive investment from international investors already in neighboring countries
        - Outsourcing from these markets
    - Attract new residents and investors
- Attract quality buyers and brands sourcing from Cambodia

Therefore, a more favorable policy on Solar PV and RE is required to improve Cambodia's reputation as a **"green" manufacturing, tourism and lifestyle destination**.

At the time of writing this document in October 2022, the Republic of Singapore has engaged Cambodia in talks for the supply of renewable energy to Singapore via HVDC subsea cable by 2028. Cambodia intends to take advantage of this deal that is said to be worth more than 85000 Terawatts of solar radiation to share clean energy with Singapore.

We would suggest the RGC consider floating solar farms to implement this solar project. These investments do not take up space much needed, leaving open resources for agriculture/food production, avoid land conflicts, and could even contribute to fisheries revenues by creating an undisturbed environment for fish reproduction. Not to mention ample availability of water bodies and the cooling effect that water creates, allowing floating solar cells to operate more efficiently (gain of 5.3%).

ANNEX II: INDONESIA

This Chapter on Energy Transition in Indonesia has been prepared by the European Chamber of Commerce in Indonesia (EuroCham Indonesia).

Executive Summary

Indonesia is the world's 9th largest emitter of CO2 emissions while its per capita emissions are well below half the global average. The country's sustainable and low carbon development is therefore crucially important for the country itself as well as the global community as a whole. It may go both ways.

Indonesia has an enormous renewable energy potential estimated to be 3,686 gigawatts (GW). But it is also the largest global coal exporter by far and struggling with fossil fuel power generation over capacity. Statistics Indonesia (BPS) reports that the energy demand in 2050 is expected to reach 2.9 billion barrels of oil equivalent (BOE) in 2050. This figure is higher than the 2040 projection of 2.1 billion BOE[53]. The projected increase in energy demand is in accordance with economic growth, population, energy prices, and government policies. Much of that energy is directly or indirectly subsidised to support low-income groups and economic development. Unfortunately, subsidies also result in low energy costs making energy efficiency investments less likely.

There is a keen interest from domestic and international investors due to the potential of resources as well as the size of its population, economy, and expected growth. But the country is struggling to successfully introduce or implement regulations supporting such investments or raising the price of energy even to at-cost levels. Only 0.3%, or 11.5 gigawatts (GW), of the renewable energy potential has been utilised as of 2021[54]. Introduction of a modest carbon tax has been postponed several times. The reasons are numerous, but the main driver is that low energy cost, nutrition, education, and health care are – understandably – of greater priority to voters than sustainability. The COVID-19 pandemic added to the difficulties and presented a major shock, especially to the energy and economically important tourism sectors.

Efforts are being made. Just this year, in September 2022, a presidential regulation about the procurement of renewable energy by PLN as been signed after more than two years of deliberation.

[53] Ibid.
[54] https://en.antaranews.com/news/248989/only-03-of-indonesias-new-renewable-energy-potential-utilized

It also establishes a legal foundation for the development of a road map for the early retirement of coal-fired power plants, as well as the government's support through a financing framework that includes blended financing from the state budget, which is expected to reignite Indonesia's energy transition implementation[55].

The mid-term RUPTL (Electricity Business Plan) of the state-owned electricity provider, PLN, must consider the national energy targets and is including an addition of 20.9 GW of renewable energy capacity by 2030[56].

There is also a diesel power plant conversion program attempting to convert or modify 5,200 diesel power plants with a total capacity of 2.37 GW towards low-carbon alternatives across the country[57]. Geothermal exploration shall be carried out in 20 working areas with a total resource of 1,869 megawatts. There are also government investments in off-grid NRE electricity infrastructure, such as solar-powered street lighting and a regulation to allow solar rooftop net metering. Lastly, in mid-September 2022, the Government of Indonesia finally issued Presidential Regulation on Renewable Energy Development (Presidential Regulation No. 112 of 2022)[58].

International financial support, as well as attention, will be crucial for sustainable development in Indonesia. Some steps in this direction are the development of the Energy Transition Mechanism by multilateral banks and impact investors, the Japanese Joint Crediting Mechanism (JCM), or the renewed Norwegian forest preservation fund for Indonesia. Otherwise, it will be difficult to provide access to affordable, reliable, and sustainable energy for all while leaving no one behind.

We propose recommendations on how Indonesia may turn its effort into success at the end of this report. In essence:

- Provide a clear and predictable path to international-level carbon pricing
- Clear and predictable renewable energy procurement conditions, ideally backed up by a strong and independent regulator
- Reduce subsidies on energy to promote efficient development and investments in energy efficiency

Indonesia’s energy needs for the future

Indonesia is a large archipelago of over 17,000 islands spanning 5,000 kilometres across Southeast Asia and Oceania. With a population of 269 million people, Indonesia is the fourth most populous country in the world. More than half of its population lives on the island of Java, where economic activity is concentrated. The other half is distributed over Sumatra, Bali, the Southern parts of Borneo, and about 6.000 smaller inhabited islands.

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[55] UMBRA Newsletter 15 September 2022
[56] https://en.antaranews.com/news/248989/only-03-of-indonesias-new-renewable-energy-potential-utilized
[57] Ibid.
[58] https://ebtke.esdm.go.id/post/2022/09/15/3261/telah.terbit.peraturan.presiden.ri.nomor.112.tahun.2022.tentang.percepatan.pengembangan.energi.terbarukan.untuk.penyediaan.tenaga.listrik

The economy of Indonesia is heavily dependent on energy, and the nation's progress depends on the segment's fair and practical development. Especially in the form of coal, natural gas, metals, and other mining and agricultural goods, Indonesia has an abundance of commodities. The energy industry and economy as a whole are based on the extraction of natural resources.

Indonesia has been a net oil importer since 2004[59]. existing oil and gas fields are nearing depletion and new exploration and development has been slow over the last decade.

But Indonesia is the 5th largest coal producer in the world exporting about 80% of its 500 million ton produced per year[60]. This makes Indonesia the world's largest coal exporter by weight[61]. Palm oil is the largest export product by value[62].

With its demographic and geographic situation, Indonesia has vastly different challenges depending on the region. Access to electricity is generally available in the connected transmission and distribution grids of Java, Madura, and Bali ("Jamali Grid"). A large capacity extension program over the past ten years has even resulted in an oversupply situation.

Meanwhile more remote areas depend on small diesel power generation, sometimes managed by local communities in private initiative.

The government of Indonesia has policies in place to level this imbalance and promotes economic development in regions outside of Java-Bali. One strong signal is plans to relocate the capital city to the province of East Kalimantan (Southeast Borneo). Grid interconnections between the Islands are part of the midterm energy plan (RUPTL 2021-2030)[63].

Strong drivers for future energy needs are large smelter developments. These smelters are the result of regulations requiring domestic ore processing prior to export and are often located outside the Jamali grid, e.g. eastern Sulawesi. Another factor is Indonesia's support to expand electric mobility on a large scale. This is a policy driven by the desire to build a local manufacturing base for electric vehicles and batteries, absorb excess capacity in the Jamali grid, and reduce oil imports.

These policies are also driven by a desire to reduce oil imports while expanding domestic use of available resources such as coal and palm oil. Further examples of this development are initiatives to expand biodiesel quotas and coal-to-liquid/gas projects.

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[59] https://www.eia.gov/todayinenergy/detail.php?id=23352
[60] https://www.worldometers.info/coal/indonesia-coal/
[61] https://www.iea.org/reports/coal-2020/trade
[62] https://oec.world/en/profile/country/idn
[63] https://web.pln.co.id/statics/uploads/2021/10/ruptl-2021-2030.pdf

Generally, energy policy in Indonesia is driven by the mantra of security of supply, affordability, and access. While public electrification rates have increased successfully, the structure may be unable to keep up with demand. The cost of required additional public generation capacity until 2025 is estimated to be $154 billion, but obtaining financing will be difficult given the impact of the COVID-19 pandemic on public sector earnings[64] as well as subsidies on Energy.

A major concern is the financial viability of the State Electricity Corporation (PLN) which is struggling with low regulated electricity tariffs, a 15% falloff in electricity demand in 2020 during the pandemic, and increasing fuel prices as well as legacy power plant projects resulting in significant overcapacity in the Jamali grid.

Statistics Indonesia (BPS) reports that energy demand in 2050 will reach 2.9 billion Barrels of Oil Equivalent (BOE) in 2050.

This represents an increase from the 2040 projection of 2.1 billion BOE. The projected increase in energy demand is in line with economic growth, population, energy prices, and government policies. With regards to the sector, energy demand will be dominated by the industrial sector with an estimated average growth of 3.9% per year. This is subsequently followed by the commercial sector, household, and other sectors that also continued to increase in line with economic and population growth. Meanwhile, the transportation sector's growth rate is estimated to be lower than the industrial sector, which is at 3.2% per year[65].

By type, final energy demand is still dominated by fossil fuels with an average growth rate of 2.8% per year[66].

In addition, biodiesel use has increased due to its role as a substitute for fossil fuels. Finally, the expansion of electricity-based technological innovations in almost every sector, such as electric vehicles, is expected to result in an increase in electricity demand with a growth rate of 4.7% per year by 2050[67].

[64] Ibid.
[65] https://databoks.katadata.co.id/datapublish/2021/12/03/kebutuhan-energi-indonesia-diproyeksikan-capai-29-miliar-setara-barel-minyak-pada-2050
[66] Ibid.
[67] https://www.adb.org/sites/default/files/institutional-document/666741/indonesia-energy-asr-update.pdf

Future risks of climate change in Indonesia and the implications to energy transition

Indonesia is highly vulnerable to the effects of climate change, including extreme events such as floods and droughts, as well as long-term changes caused by sea level rise, shifts in rainfall patterns, and rising temperatures[68]. Therefore, steps towards energy transition are high on the agenda. The energy transition is a long process that must be carried out by countries globally to reduce carbon emissions that can lead to climate change. The agreement in the energy transition aims to reach the same point, namely the use of clean energy that continues to increase. President Joko Widodo has said that Indonesia will achieve Net Zero Emission (NZE) in 2060 or sooner.

Given Indonesia's important geographical position in the global ocean conveyor belt (thermohaline circulation), the largest archipelagic country and its tropical rainforests rich in biodiversity, high carbon reserves as well as energy and mineral resources, Indonesia is known for its role in efforts to deal with climate change[69]. However, Indonesia is also vulnerable to natural disasters that will be exacerbated by climate change, especially in low-lying areas throughout the archipelago. Therefore, Indonesia views comprehensive land-based and maritime adaptation and mitigation efforts as a strategic consideration to achieve climate security related to food, water, and energy[70].

Indonesia's Nationally Determined Contribution (NDC) outlines Indonesia's transition to a low-emissions and climate-resilient future. The NDC describes increased actions and supportive conditions during the 2015-2019 period that form the basis for setting more ambitious goals beyond 2020, which contributes to efforts to prevent a global temperature rise of 20oC and pursue efforts to limit global temperature rise by 1.50oC compared to pre-industrial times[71]. For 2020 and beyond, Indonesia views the achievement of archipelagic climate resilience as a result of implementing a comprehensive adaptation-mitigation program and disaster risk reduction strategy. Indonesia has set ambitious goals for sustainable consumption and production related to food, water, and energy. This goal will be achieved through empowerment and capacity building, improving basic health and education services, technological innovation, and sustainable natural resource management in line with good governance principles[72].

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[68] https://climateknowledgeportal.worldbank.org/country/indonesia#:~:text=Indonesia%20is%20highly%20vulnerable%20to,rainfall%20patterns%20and%20increasing%20temperature.
[69] Ibid.
[70] Ibid.
[71] Ibid.
[72] http://greengrowth.bappenas.go.id/updated-ndc-indonesia-untuk-masa-depan-yang-tangguh-iklim/

The international, regional, and domestic commitments that Indonesia made regarding energy transition

Indonesia has a key role in the global effort to contain global warming to 1.5°C. It is 9th largest emitter of fossil CO2 emissions in 2019 (with EU28 considered as a single block). It is also the world's fourth most populous nation. The CO2 emissions of 2.321 tCO2 per capita are therefore well below the global average of 4.93 tCO2 per capita[73]. Low carbon intensity of Indonesia's expected economic development is therefore critically important.

Indonesia actively participates in negotiations on the environment, climate change and sustainable development, and sometimes even take a leading position in such matters.

The Joko Widodo presidency incorporated commitment towards climate change by putting in the National Medium Term Development Plan 2015-2019 a statement, "to enhance the quality of environment, disaster mitigation, and climate change." Under President Joko Widodo, Indonesia ratified the Paris Agreement in 2016 by promulgating Law No. 16 of 2016 concerning Ratification of the Paris Agreement to The United Nations Framework Convention on Climate Change[74].

As part of the Paris Agreement, Indonesia has pledged to reduce its national emissions by 29 percent below its baseline emissions by 2030. In line with the Paris Agreement, in COP26, Indonesia committed in a new 'Global Coal to Clean Power Transition Statement' to phasing out coal power, scaling up clean power, and ensuring the transition away from coal[75]. To accelerate the transitions, Indonesia also announced a partnership with the Climate Investment Funds and a pioneering partnership with the Asian Development Bank[76].

In addition, Indonesia improves its Nationally Determined Contribution (NDC) in 2021. The most noticeable difference as part of NDC 2021 is that various changes have been made to the 2020-2024 Medium Term Plan and Indonesia's Vision 2045[77]. Updated NDCs reflect progress beyond existing NDCs, particularly in increasing adaptation ambitions, increasing clarity on mitigation by adopting the Paris Agreement rulebook (Katowice Package), aligning national contexts with existing conditions, milestones aligned with national development period 2020-2024, and an indicative path towards a long-term vision (Vision Indonesia 2045) and Long-Term Strategy on Low Carbon and Climate Resilient Development 2050 (LTS-LCCR)[78].

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[73] JRC Report „Fossil CO2 emissions of all world countries - 2020 Report" https://publications.jrc.ec.europa.eu/repository/handle/JRC121460
[74] Retrieved https://workingpapers.bappenas.go.id/index.php/bwp/article/view/100/73
[75] https://www.ekon.go.id/publikasi/detail/3420/pertemuan-cop26-indonesia-sampaikan-komitmen-kembangkan-ekonomi-hijau-dan-kuatkan-iklim-investasi
https://katadata.co.id/yuliawati/ekonomi-hijau/6188c1070bd18/dalam-cop26-pertamina-komitmen-turunkan-emisi-29-pada-2030
[76] https://workingpapers.bappenas.go.id/index.php/bwp/article/view/100/73
[77] https://iesr.or.id/en/check-out-6-differences-in-indonesias-2016-ndc-and-2021-update-results
[78] http://greengrowth.bappenas.go.id/updated-ndc-indonesia-untuk-masa-depan-yang-tangguh-iklim/

In addition, to supplement this latest NDC, the MEF has issued a Long-Term Strategy document[79]. Furthermore, the Indonesian government describes three climate change risk mitigation scenarios: CPOS (Current Policy Scenario), TRNS (Transition Scenario), and LCCP (Low Carbon scenario Compatible with Paris Agreement). In addition to emission reduction targets, these three scenarios have a direct impact on per capita income and government investment costs.

The government-owned electricity company, PLN, is tasked to help Indonesia reduce temperature rises by gradually transitioning steam power plants to renewable energy from 2030 to 2056. PLN will begin the first phase of retiring an old fossil fuel power plant of 1 gigatonne (GW) in 2030, followed by the shutdown of 9 GW of subcritical plants in 2035[80]. The electricity company will then retire 10 GW of supercritical plants by 2040. The retirement of 24 GW of ultra-supercritical plants will begin in 2045. The last of the 5 GW ultra-supercritical plants will be retired in 2055[81].

In terms of regional commitment, ASEAN member states issued a joint statement in preparation for COP26, reaffirming their commitment to addressing the climate emergency. The data emphasises the region's achievement of 21% energy intensity reduction in the energy sector, exceeding its aspirational target, and 13.9 percent renewable energy share in the energy mix in 2018[82]. The new ASEAN Plan of Action for Energy Cooperation aims to reduce energy intensity by 32% by 2025. Phase II: 2021-2025 (APAEC 2016-2025)[83].

During the event, the ASEAN decision-makers expressed their contributions in different ways. Indonesia announced its new regulation that puts a price on emissions and mechanisms to trade carbon[84]. The carbon emissions market should be implemented transparently and inclusively, as the scheme should not be used to allow countries to avoid reducing emissions.

Indonesia is one of the forty signatories to the Global Coal to Clean Power Transition Statement, an international effort to transition away from unrestricted coal power generation by 2040, or as soon as possible thereafter. Indonesia and the Philippines, however, excluded the third clause, which prohibits the issuance of permits for new unabated coal-fired power plants. This has to be seen in light of Indonesia being one of the world’s largest coal producers[85].

Some national, not multilateral, targets are to reach 23% of primary energy consumption from renewable sources and a mix of 30% biofuel in the national diesel supply, 22% gas, 55% coal, and 0.4% oil by 2025[86][87].

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[79] ibid
[80] https://workingpapers.bappenas.go.id/index.php/bwp/article/view/100/73
[81] ibid
[82] https://aseanenergy.org/cop26-aseans-commitment-in-the-energy-sector-economy/
[83] http://ditjenppi.menlhk.go.id/reddplus/images/adminppi/adaptasi/dokumen/Updated_NDC.pdf
[84] https://aseanenergy.org/cop26-aseans-commitment-in-the-energy-sector-economy/
[85] ibid
[86] https://www.purnomoyusgiantorocenter.org/the-23-nre-target-within-grasp-or-not/
[87] https://www.adb.org/sites/default/files/institutional-document/666741/indonesia-energy-asr-update.pdf

Presidential Regulation No. 112 of 2022 on the Acceleration of Renewable Energy Development for Electricity Generation

The Indonesian government has issued Presidential Regulation (PR) No. 112 of 2022 on the Acceleration of the Development of Renewable Energy for Electricity Generation (PP No. 112/2022)[88] in September 2022. It is a long-awaited regulation and important because the sector has previously been regulated by ministerial regulations. The hope is that a presidential regulation will better align the relevant ministries of Energy, State Owned Enterprises, Environment, Finance, and Industry. The regulation covers five subjects which are Electricity Business Plan (RUPTL) and energy transition roadmap for the electricity sector; mechanisms, contracts, and electricity purchase prices; government support on renewable energy; monitoring and supervision; and transition provisions[89]. The MEMR is mandated in this recent regulation to prepare a road map on the acceleration of early retirement of coal-fired power plants (CFPP) after coordinating with the Ministry of Finance (MoF) and Ministry of State-owned Enterprises (MSoE), which will stipulate: reduction of CFPP GHG emissions; strategies to accelerate CFPP early retirement; and harmonization with other various policies[90]. There are various minimum criteria set out in PR 112/2022 that PLN must perceive when implementing the CFPP early retirement program, including the availability of domestic and international financial support, emphasising the importance of financing support to allow successful implementation of the CFFP early retirement program. PR 112/2022 also states that the government may provide fiscal assistance in the form of funding and financing, including blended finance sourced from the state budget and/or other legitimate sources, in order to accelerate the energy transition. This will be regulated further in a MOF regulation[91].

In contrast to MEMR Reg. 4/2021[92], which stated that the price for renewable energy electricity purchase must refer to PLN's cost of supply (BPP), PR 112/2022 states that the price for renewable energy electricity purchase will be based on a ceiling price, which will apply to all types of renewable projects regardless of capacity (including solar and wind projects with battery systems, Expansion Projects, and Excess Power); or an agreement, which will apply only to hydro peaker[93]. PR 112/2022 specifies the ceiling price and purchase price based on agreement, which are distinguished based on the types of renewable energy power plants and by also taking power plant capacity into account, with the ceiling price for smaller scale projects being higher than the ceiling price for larger scale projects. The mechanisms outlined in PR 112/2022 are generally the same as those outlined in MEMR Reg 4/2021 because both regulations use a specific cap for the purchase price, but the cap reference differs. MEMR Reg 4/2021 is about the BPP, while PR 112/2022 is about the ceiling price[94].

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[88] https://ebtke.esdm.go.id/post/2022/09/15/3261/telah.terbit.peraturan.presiden.ri.nomor.112.tahun.2022.tentang.percepatan.pengembangan.energi.terbarukan.untuk.penyediaan.tenaga.listrik
[89] https://pro.hukumonline.com/a/lt6322cdf73f95e/peraturan-energi-terbarukan-untuk-penyediaan-tenaga-listrik-akhirnya-terbit
[90] UMBRA Newsletter 15 September 2022
[91] ibid
[92] https://peraturan.bpk.go.id/Home/Details/141259/permen-esdm-no-4-tahun-2020
[93] UMBRA Newsletter 15 September 2022
[94] ibid

PR 112/2022 requires PLN to use domestic products in the implementation of RUPTL and to report to MEMR every 6 months until the commercial operation date on its TKDN implementation for renewable energy power plants[95]. PR 112/2022 also directs the Minister of Industry to assist business entities with local content requirements, such as determining import quotas for renewable power plant components based on domestic/national supply capability[96]. Such assistance will be further regulated in a Minister of Industry regulation.

However, the introduction of numerous new concepts stipulated in PR 112/2022 is not without controversy.Some items in the regulation will require additional implementing regulations to be implemented, such as CFPP early retirement. Furthermore, the transition from a different tariff concept to a single tariff concept under PR 112/2022 will necessitate additional clarification on how this concept will be implemented in the PPAs tariff stipulation, which, in general, has a different tariff concept than a single tariff concept. It remains to be seen whether PR 112/2022 will actually boost renewable energy development in Indonesia, or if it will simply become another regulation in a slew of regulations aimed at encouraging renewable energy development[97].

The role of fossil fuels in Indonesia's energy transition

The energy sector is the second largest contributor of emissions after agriculture, forestry, and other land uses. 8.5 million new vehicles are entering Indonesian roads each year and 91% of its energy supply is currently from fossil sources[98]. The current power generating capacity of about 40GW from coal is expected to rise further until slowly declining from a 60GW peak expected in 2030.

The heavy dependence on coal as well as the political sensitivity of energy prices has resulted in policies making coal-generated electricity artificially cheap. In 2022, the Government budgeted US$37.75 billion or 19.87% of its total 2022 expenditure budget for subsidies and compensation in order to keep most energy and fuel prices unchanged despite soaring global energy prices and significant domestic inflation. This is more than Indonesia's 2022 healthcare budget of US$17.73 billion, defence budget of US$9.3 billion, and national police budget of US$ 6.1 billion combined.[99]

This amount does not include the economic loss of opportunity cost of the coal domestic market obligation forcing coal miners to sell 30% of production to the local market at regulated prices. The cost of this policy is estimated at up to US$ 26.31 billion adding another 70% to the official energy subsidy budget[100].

[95] Ibid.
[96] Ibid.
[97] Ibid.
[98] See:https://www.adb.org/sites/default/files/institutional-document/666741/indonesia-energy-asr-update.pdf
[99] Bill Sullivan, "Coal BLU Scheme – Rearranging the deck chairs on the titanic"
[100] Ibid.

These mechanisms make renewable energy sources seem uncompetitive – with no similar mechanisms in place. Another major issue is the expansion continued expansion of coal power plant capacity into an already saturated electricity market. This overcapacity pushes PLN into rejecting renewable power plant development specifically in the Jamali grid system – be it captive or IPP. This is projected to change from 2030 when coal and other fossil fuel power plant assets are starting to retire.

At the same time is this development promotes the expansion of electric vehicle use. The policies are designed to increase power absorption and the development of a domestic manufacturing industry around electric mobility. But it may also be the nucleus for an infrastructure to better deal with renewable intermittent sources in the future.

The cost of importing oil-based fuels as well as a weak market for edible oils late in the last decade has resulted in a B30 policy to increase the mix of biodiesel to 30%.

Another policy pushed by the high cost of oil imports and the abundance of coal resources is a program to expand DME production in lieu of LPG.

Indonesia's challenges with energy transition

Since 2014 the Government of Indonesia has set a target of reaching 23% renewable energy in its primary energy consumption by the year 2025. In 2021 the Ministry of Energy and Mineral Resources reported to have reached 11.5%, which is only 0.3% points more than in 2020[101]. A carbon tax and trade system introduced by the tax law in 2021 has twice been postponed and is currently in jeopardy due to the high fossil fuel prices and the expected burden on PLN – despite the small amount of only about US$ 1.5 per ton of CO2 (floor price potentially exceeded by trading prices). Clearly, there are challenges with the Energy transition in Indonesia.

Most of the drivers have been described in the previous section; they are energy subsidies distorting the market for fuels and electricity, oversupply of existing capacity in the main markets of Java and Bali as well as the political sensitivity of energy prices in general. This is understandable in a developing country where energy cost is a substantial part of disposable spending for most of the population and sufficient supply is not always and everywhere guaranteed. Indonesia's President, Joko Widodo, had previously revealed Indonesia's three main challenges in energy transition[102]. The first concern is access to clean energy. In the energy transition, the reality is that not all Indonesians have access to affordable, dependable, sustainable, and modern energy. The government and key stakeholders in clean energy development must promote the availability of clean energy for all, particularly energy used for electrification and clean cooking so that no one is left behind[103].

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[101] Retrieved https://katadata.co.id/maesaroh/ekonomi-hijau/61e4fb91ae585/realisasi-bauran-ebt-sepanjang-2021-hanya-11-5-jauh-di-bawah-target
[102] https://setkab.go.id/en/president-jokowi-reveals-three-big-challenges-in-just-energy-transition/
[103] Ibid.

Another major obstacle is the difficulty to integrate the whole country into one electrical system. Numerous independent grid sections exist and are often separated by water. Plans to interconnect these systems are being developed but require large financial resources and will take a long time to be implemented.

Successes are possible where industry and political interests align. An example is the biodiesel policy which has reached its goals of 30% biodiesel supply, an increased price of palm oil as well as reduced oil imports for the diesel sector. A transition towards electric mobility is favoured by a political desire to improve electricity absorption as well as the establishment of a manufacturing base.

A CO2 trading scheme is more likely to succeed if it opens the door for export revenues or investment foreign direct investment in return for the (temporary) transfer of carbon credits to supporting countries without burdening the domestic economy and specifically PLN. There are great hopes that multilateral carbon funds and other partners can support such schemes. Japan is already implementing a mechanism along these lines.

A breakthrough might be the Energy Transition Mechanism (ETM) which is aiming to fund the early retirement of coal power plants. If successful, this could help reduce the electricity oversupply situation and expansion of renewable power generation in Indonesia. As mentioned above, the Indonesian Government, in partnership with the ADB, has committed to running one or more pilot projects to test the ETM. Lastly, Indonesia is also supporting the use of depleting natural gas and oil fields for CCS/ CCUS (Carbon capture and storage/ Carbon capture, utilisation, and storage)[104]. But these projects are currently struggling with economic concerns. The CCS/CCUS program is planned in combination with a program to produce Dimethyl Ether (DME) from coal is being developed to lessen Indonesia's dependence on oil and gas imports to provide an alternative market to the coal industry for the future.

Finally, funding is a barrier to expanding and increasing the NRE mix in Indonesia. Developers will have limited financing options if NRE projects are not bankable[105]. To attract more investment in NRE, the government should also regulate tax breaks and attractive sales-purchase agreements within the PLN scheme[106].

Green Agenda Financing

The global challenges posed by the COVID-19 pandemic were unprecedented. The initial epicentre, the health crisis, quickly expanded into a multidimensional crisis that caused socioeconomic disruption. Various global macroeconomic indicators also recorded 'red' values, which governments in various countries have been attempting to combat with huge money in fiscal stimulus[107].

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[104] Ibid.
[105] https://www.reuters.com/article/indonesia-energy-idUSL1N2R106T
[106] https://www.reuters.com/article/indonesia-energy-idUSL1N2R106T
[107] http://portal.fiskal.kemenkeu.go.id/pustaka/index.php?p=show_detail&id=5950&keywords=green+economy

However, amidst these economic recovery efforts, the world continues to face the same catastrophic challenge, namely the threat of climate change. The World Health Organization (WHO) report shows that climate change affects more than 250,000 people every year due to malnutrition, malaria, diarrhoea, and heat stress[108]. In fact, recent research has shown that climate change correlates with the spread of the COVID-19 pandemic. In January 2021, a study found in the journal Science of the Total Environment revealed the first evidence of a mechanism by which climate change can play a direct role in the emergence of SARS-CoV-2, the virus that causes Covid-19[109]. In addition, the experts also explained that COVID-19 is not the only infectious disease associated with climate change. Over the years, the WHO has forged a link between changing environmental conditions and disease epidemics[110].

Climate change will pose a serious threat to humanity in the future. The world must shift from a "black" economy that relied on fossil fuels such as coal and oil to a "green" economy that prioritises harnessing renewable energy sources such as solar power, wind power, and hydropower for long-term growth. Green economy itself, as portrayed by UNEP (United Nations Environment Program), serves as a system that improves welfare and is a social phenomenon that significantly reduces risks to the environment and the ecology; low carbon, resource efficient, and socially inclusive[111]. Therefore, what steps need to be taken by the world in implementing a green economy and mitigating the impacts of climate change?

The UNEP report on emissions, that the earth's temperature has now experienced a very significant increase, with the average warming rate over the last fifty years almost doubling the average warming of the last hundred years. This indicator has become one of the main control targets in climate change, including those that have been ratified by 187 countries in the 2016 Paris Agreement[112]. As part of its commitment to reducing climate change, Indonesia has developed a green growth program with a variety of policy combinations in terms of content, institutions, and finance. Indonesia targets a 29% emissions reduction using its resources and efforts or a 41% reduction if it receives international cooperation from a business as usual (BAU) scenario by 2030 in the NDC (Nationally Determined Contribution) document[113].

In expansion, Indonesia must include viewpoints of climate alteration within the 2020-2024 RPJMN through three endeavours, specifically making strides in the quality of the environment; expanding catastrophe versatility and climate alter; and low-carbon advancement. In terms of climate governance in Indonesia, many ministries/agencies are involved in sustainable development efforts. The Ministry of Finance bears the responsibility for financing and funding through the fiscal instruments of the State Budget.

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[108] https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health
[109] https://www.cam.ac.uk/research/news/climate-change-may-have-driven-the-emergence-of-sars-cov-2
[110] https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health
[111] https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-economy
[112] https://www.kemenkeu.go.id/publikasi/artikel-dan-opini/pandemi-momentum-transformasi-green-economy/
[113] http://greengrowth.bappenas.go.id/en/what-is-green-climate-fund-and-how-to-access-it-in-indonesia/

In terms of income, expenditure, and financing, the arm's-length State Budget is intended to be a catalyst for low-carbon development while accelerating the process of transforming the green economy, including mobilising various parties to take roles in climate change mitigation commitments[114]. In terms of state revenues, the current policy direction is directed at efforts to stimulate the development of new and renewable energy. The Ministry of Finance provides various tax facilities in the form of tax holidays, tax allowances, import duty exemptions, reductions in VAT, Income Tax is borne by the government, and reductions in PBB (Land and Building Tax) to support the development of geothermal and other new renewable energy[115]. On the expenditure side, the Ministry of Finance implements the Climate Budget Tagging (CBT) policy to ensure the alignment of budgetary commitments between the central and local governments in addressing climate change.In terms of the financing side, the Ministry of Finance develops innovative and prudent financing through the issuance of Green Sukuks, SDGs Bonds, and other 'green financing' instruments[116].

However, the government continues to face the challenges of limited funding sourced from the State Budget (APBN).During 2016-2019, the average realisation of spending on climate change only touched Rp. 86,7 trillion from the ideal requirement of Rp. 266,2 trillion per year (before the NDC roadmap). Meanwhile, in the future, the need per year will reach Rp. 343,6 trillion[117]. The size of the financial gap needs to be anticipated and minimised through a comprehensive strategy mix. These include increasing the private sector's contribution to sustainable development through tax incentives, strengthening the role of local governments through the RCBT (Regional Climate Budget Tagging) program, and strengthening sustainable financing platforms[118]. The government's initiative in implementing the Carbon Pricing or NEK (Carbon Economic Value) policy is currently in the spotlight. Carbon pricing will provide an opportunity to reduce greenhouse gas emissions while also providing a new source of funding for sustainable development.

The Continued Subsidy on Fuels

Since the beginning of the twenty-first century, the Indonesian government has attempted numerous times to reform gasoline and diesel subsidies. Because the government has the mandate to provide affordable energy to the poor, subsidies are more targeted. In the 1970s, seven types of fuel were subsidised: aviation kerosene, aviation gasoline, marine fuel oil, industrial and marine diesel oil, diesel, gasoline, and kerosene. However, aviation kerosene and gasoline have not been subsidised since 1999[119]. Until recently, the government heavily subsidised the majority of fuels to keep energy prices stable and affordable for all levels of society. By keeping energy prices below market, it allows low-income people to access energy that they could not otherwise afford.

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[114] https://www.kemenkeu.go.id/publikasi/artikel-dan-opini/pandemi-momentum-transformasi-green-economy/
[115] https://www.kemenkeu.go.id/publikasi/artikel-dan-opini/pandemi-momentum-transformasi-green-economy/
[116] Ibid.
[117] Ibid.
[118] Ibid.
[119] Retrieved https://www.oecd.org/fossil-fuels/publication/Indonesia%20G20%20Self-Report%20IFFS.pdf

The policy also aims to optimise the use of fossil energy to propel the Indonesian economy. As the most reliable energy source, securing fossil energy is critical for developing countries to meet rising energy demands[120].

Energy subsidy implementation impedes the growth of renewable energy sources by encouraging the increased use of fossil fuels. Renewable energy becomes less cost-competitive with fossil fuels as a result of subsidies, and the general public has less access to it. The provided subsidy might not fully account for the harmful externality of the used fossil fuels. So, in terms of attempts to enhance Indonesia's renewable energy mix and lessen the effects of climate change, the increased energy subsidies can be seen as a step backward[121].

Subsidies for liquefied petroleum gas (LPG) are expected to rise significantly in 2022, from an estimated IDR 49.9 trillion (USD 3.38-3.48 billion) in 2021 to an estimated IDR 66.3 trillion (USD 4.62 billion) in 2022, as consumption is expected to rise from 7.5 million tonnes in 2021 to 8 million tonnes in 2022[122]. The state budget allocation for subsidies was increased from 152 trillion rupiah ($10.2 billion) to 502 trillion rupiah ($33.8 billion), according to a statement made by President Joko Widodo last month[123]. These costs have risen dramatically as a result of rising global crude oil prices and widespread public use of subsidized fuel and LPG. If the situation between Russia and Ukraine is not resolved, energy subsidies will be increased. On the one hand, this policy is required to preserve the populace's purchasing power and economic stability in the aftermath of the COVID-19 pandemic. The implementation of the energy subsidy, on the other hand, may have several unintended consequences. As a result, Indonesia's renewable energy reform remains uncertain because the country is still reliant on fuel subsidies.

And these numbers do not yet include the cost of the domestic market obligation in the coal sector, see chapter above.

Recommendations:

EuroCham Indonesia proposes the following recommendations. These recommendations draw on the experience from the European success story in becoming the world leading region in renewable energy generation and expertise, as well as our members' long-standing experience in Indonesia. These recommendations are stated in our 2022 Energy Position Paper, which available in our website.

[120] Retrieved https://www.oecd.org/fossil-fuels/publication/Indonesia%20G20%20Self-Report%20IFFS.pdf
[121] Ibid.
[122] Retrieved https://thedocs.worldbank.org/en/doc/9ef37aadd64d2804fd42171bedf9e1b2-0070012021/related/IEP-Presentation-Dec-2021-Part-B.pdf.
[123] Ibid.

Financial Perspective

- Provide a clear and predictable path to international level carbon pricing – the most efficient way to reduce the cheapest emissions first and to put a price on externalities.
- Provide incentives for private sector energy efficiency projects or the purchase of energy efficient industrial or consumer products (certified EE-Products). This is especially useful in regions with subsidised electricity. Otherwise, there is no reason for facility- or home owners to purchase higher-cost energy efficiency products when the financial returns are so poor due to the often artificially low energy cost.
- Exempt interest payments from withholding taxes for all foreign infrastructure loans. Granting this exemption to foreign infrastructure loans will level the playing field, provide cheaper finance, and allow for more competitive bidders as withholding taxes are usually considered non-recoverable cost by foreign financing institutions.
- Embrace the Energy Transition Mechanism that has been presented by ADB which aims to find a mechanism to acquire and transition coal fired power plants to a net zero Scenario.

Regulatory Perspective

- Establish a strong and independent electricity regulator to organise tenders for power generation systematically and transparently as well as to settle disputes between PLN, IPPs and users. Through this mechanism, PLN will still be responsible and free to plan demand and supply, but the type of power generation and tender will be controlled by an independent regulator. PLN will also be free to participate directly or through its subsidiaries in such tenders.
- Provide PLN decision-makers with clear guidelines and targets to encourage decisions that support government targets or find a way to remove the conflict of interest PLN is currently facing.
- Allow corporate PPA's for renewable and hybrid on-site power generation projects as well as off-site power wheeling structures.
- Provide clarity to coal-fired power stations (PLTU) about possibilities to reduce or offset carbon emissions. Make this as flexible as possible to promote competition for the best ideas and lowest-hanging fruit. Do not limit PLTU operators to biomass co-firing and grid-connected renewable power offsets.
- Unlock energy efficiency potential in the government sector by mandating energy consumption reduction across all government-owned facilities (including SOEs) by a minimum of 17% by 2025 in line with the national target[124]. And mobilise private capital investment, e.g., through Energy Savings Companies (ESCOs), by allowing budgeting for multi-year contracts between government entities and ESCOs to share the savings from such private investment in government energy efficiency projects.

[124] Draft Rencana Umum Energi Nasional 2016, KESDM and Draft Energy Conservation Master Plan (RIKEN), 2013

Contracting Perspective for IPPs

- Simplify and clarify procurement processes with predictable pricing mechanisms and PPA terms to reduce costs and attract investment: the current framework requires costly and time-consuming vendor qualifications, and extremely costly PPA negotiations due to unclear tender procedures. The current unpredictability and complicated processes deter investors from participating and render smaller projects too costly as a result of disproportional overhead expenses.
- Provide higher prices or incentives for non-intermittent (i.e., dispatchable) renewable power generation over intermittent sources.
- Remove shareholder composition requirements and especially the participation of PLN or its subsidiaries in IPPs from being a requirement in IPP tendering. The "assignment scheme," and to a lesser extent the "mandatory participation scheme" wherein private investors are forced to accept a PLN equity and governance participation, lead to substantially higher costs, risks as well as potential conflicts of interest.

General Perspective

- **Improve PLN's financial position**
  Electricity prices should be increased to reflect PLN's actual costs (production, transmission, distribution, cash collection) to foster energy savings and investments in renewable energy. Targeted subsidies could still be provided to those in need.

- **Equal support for all biofuels**
  Use the Palm Oil Estate Crop Fund to support compressed biogas ("bioCNG") and power generation from the sustainable palm oil industry's unused biomass potential. This would be like the biodiesel mechanism and will directly benefit oil palm growers, while making more valuable CPO available for export.

- **Unbundling energy supply and generation**
  We recommend attracting private investment through unbundling. "Unbundling" is the separation of energy supply and generation from energy transmission and distribution grids by having them operated in separate independent entities. This will improve transparency and reduce conflict of interest between grid operation and power generation.

- **Affordable energy in remote areas**
  Many remote locations are currently supplied through very expensive local off-grid diesel generation, or through short-term solutions such as solar home packs. Many international companies have developed solar + battery mini-grids that can be integrated at a much lower cost. These grids provide more stable and sustainable electricity to the villages and help the Government fulfil its objectives. To realise such opportunities, a particular regulatory framework and revenue certainty is required.

While the acceptability of private parties electrifying remote areas remains a question, we believe that IPPs or PPP schemes are the most beneficial and competitive option, while allowing PLN to still manage the last meter electricity supply.

- **Carbon Pricing Mechanism**
  Introduce clear and transparent implementing regulations for the existing laws on emission pricing and offsetting. These rules should provide a clear outlook on staged cost increase of carbon to immediately trigger long-term investment in emission reduction projects and Indonesia's energy transition.

- **Prioritise low-carbon power generation**
  Implement a CO2-based merit order to prioritise electricity dispatch from efficient low-emitting power plants.

ANNEX III: MALAYSIA

This Chapter on Energy Transition in Malaysia has been prepared by the European Chamber of Commerce in Malaysia (EuroCham Malaysia).

Executive Summary

Malaysia has seen consistent growth in both its population and GDP which has increased its position as a regional player both politically and economically. However, together with that growth, Malaysia's energy needs have dramatically increased with predictable impacts on the immediate environment and climate. Therefore, one of the critical problems facing Malaysian policymakers is how to provide for the future energy needs of the country in a sustainable and carbon-neutral way?

This paper acknowledges the significant steps that Malaysia has taken in this direction while also pointing out the major pitfalls in Malaysia's current energy mix, green financing ecosystem and policy strategies. We advocate for a greater political commitment to actions that can directly impact Malaysia's path to a carbon-neutral economy. Moreover, we call upon the government to make the most of public-private partnerships in the future to leverage all necessary tools to solve one of the most significant challenges in Malaysia's history.

The policy needs are far-ranging and any actions will need to take a holistic approach toward the multidimensional problem of climate change. However, the critical issues of concern include:

- Transitioning away from Malaysia's fossil fuel-reliant energy mix
- Further developing the green-financing ecosystem through reducing risks and unleashing private capital
- Reassessing the current fossil fuel subsidy regime to ensure that renewable energy systems can operate on a level-playing field
- Exploring and developing alternate forms of raising capital for green investments such as carbon pricing and emission trading

1. Malaysia's energy needs for the future

Since 1965, Malaysia's energy use per capita has grown tenfold from 3,473 kWh to 35,518 kWh in 2021[125]. This has been driven by strong economic growth with Malaysia averaging annual GDP growth of 5.4%[126]. This increase in energy demand will continue to grow as Malaysia proceeds toward its stated goal to be a high-income nation before 2030[127]. Current estimates by the national energy authority Suruhanjaya Tenaga state that the country's net energy[128] demand will grow from 18,808 MW in 2020 to 24,050 MW in 2039[129]. This will largely be driven by recovering from the COVID-19 pandemic alongside the growth of the services sector and energy-intensive manufacturing. Moreover, as this growth takes hold, Malaysia's aspirations to become a high-income nation will also create a middle class with greater disposable income and increased expectations regarding their quality of life. This will inevitably lead to higher energy usage as electric cars, high-tech equipment and travelling emerge as facets of Malaysian daily life. The temporary ease of growth following the COVID-19 pandemic provides a useful opportunity for the government to take stock and assess future energy policies that tackle future energy demands.

Malaysia's current energy mix is still too dependent on fossil fuels. As demonstrated in Figure 1, the nation's total energy supply has historically relied on natural gas, oil and coal[130]. Most concerning is the gradual replacement of oil with dirtier coal as (nearly) the second most important source of energy in the Malaysian economy. Moreover, the category "Wind, solar etc." is negligible as it only generated 0.1% of the total energy supply in 2019.

This energy mix should be a major source of concern for businesses and private citizens of Malaysia. First and foremost, this energy mix is not sustainable. The increased use of coal and the reliance on fossil fuels for 96% of the energy supply will have devastating impacts on the immediate environment and the climate as a whole. The devastating extent of this will be explored later in this paper.

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[125] Hannah Ritchie, Max Roser, and Pablo Rosado, "Malaysia: Energy Country Profile," Our World in Data, November 28, 2020, https://ourworldindata.org/energy/country/malaysia#per-capita-what-is-the-average-energy-consumption-per-person.
[126] "The World Bank in Malaysia," The World Bank in Malaysia (World Bank, April 21, 2021), https://www.worldbank.org/en/country/malaysia/overview.
[127] "Malaysia to Achieve a Transition to High-Income Economy in 2024-2028 ...," Malaysia to achieve a transition to high-income economy in 2024-2028 – World Bank (Official Portal of Ministry of Finance Malaysia, May 15, 2021), https://www.kwsp.gov.my/en/web/guest/w/malaysia-to-achieve-a-transition-to-high-income-economy-in-2024-2028-world-bank.
[128] Net demand is the total electricity demand minus utility-scale solar and wind generation at a given time, and the net demand peak (the "net peak" for short) typically occurs later in the evening than the total demand peak.
[129] "Peninsular Malaysia Generation Development Plan 2020 (2021-2039)." Kuala Lumpur: Suruhanjaya Tenaga, March 2021.
[130] IEA, "Energy Statistics Data Browser – Data Tools," Energy Statistics Data Browser (IEA, October 3, 2022), https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser?country=MALAYSIA&fuel=Energy+supply&indicator=TESbySource.

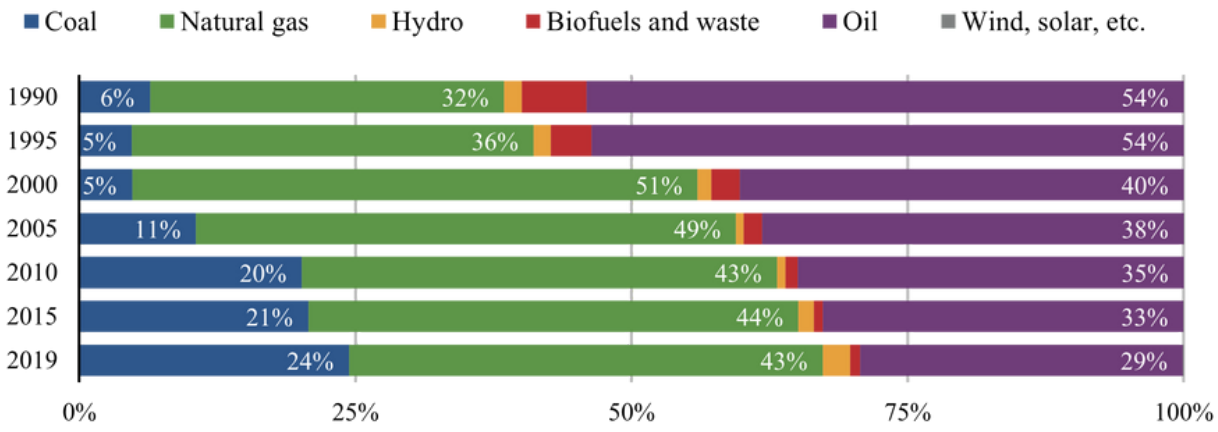

Figure 1 - International Energy Agency Total energy supply (TES) by source, Malaysia 1990-2019

Moreover, as nations take steps to dismantle subsidy systems combined with the ongoing unpredictability of the fossil fuel market, the prices of these commodities will increase. This would be in stark contrast to a gradual shift to renewable energy which has seen major cost reductions in the past decade. The cost of electricity from utility-scale solar PV has fallen by 85%, concentrating solar power (CSP) by 68%, onshore wind by 56% and 48% for offshore wind[131]. Therefore, a shift to renewable energy would be necessary for Malaysia to maintain its competitive edge in a world economy seeking cheaper alternatives of energy.

Critically, shifting this energy mix would also work towards maintaining Malaysia's position as a country which is inviting to businesses and foreign investment. In 2020, Malaysia ranked 12th out of 190 countries in the World Bank's "Ease of doing Business Index". A major part of this position was its ease of accessing electricity where Malaysia was placed 4th internationally[132]. This was ahead of major world economies such as France and the UK. Therefore, energy security and reliability are greatly prized by foreign and domestic businesses alike. This reliability would be bolstered by diversifying the country's energy mix as well as taking advantage of the nation's solar and hydro capacity.

Lastly, large companies around the world are increasingly committing to net carbon-zero operations. Malaysia would therefore do well to shift towards clean energy to ensure that it is an appealing place for domestic and foreign investments.

Based on the above concerns, this paper aims to reiterate why Malaysia needs to accelerate its transition towards renewable energy and ensure a net carbon-zero economy. Additionally, this paper aims to provide concrete recommendations on how European businesses can work with Malaysian stakeholders to push towards ensuring a healthy and more sustainable Malaysia for both its business and its people.

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[131] "As Fossil Fuel Prices Skyrocket Globally, Renewables Grow Steadily Cheaper," IEEFA (IEEFA, September 27, 2021), https://ieefa.org/resources/ieefa-fossil-fuel-prices-skyrocket-globally-renewables-grow-steadily-cheaper.
[132] "Doing Business Index." Washington DC: World Bank, 2020.

2. International and domestic commitments

EuroCham Malaysia commends Malaysia's current domestic and international commitments to combat climate change. Nevertheless, Malaysia would do well to adopt more ambitious policy commitments.

2.1 Domestic Commitments

Malaysia has made a series of domestic pledges either through international agreements such as the UNFCCC Nationally Determined Contributions (NDCs) or through domestic legislation such as the 12th Malaysia plan.

Malaysia has stated that it will grow its portion of renewable energy (excluding hydro) to 20% by 2025. It has also pledged to cut carbon intensity against GDP by 45% (compared to 2005 levels) by 2030[133]. The critical headline of the 12th Malaysia plan was the goal to be carbon neutral by 2050[134].

Concretely, Malaysia has also committed to preserving its natural forest as a proportion of 50% of its total land mass. It will also do this by planting 100 million trees by 2025[135]. The government also pledged that it would not build any additional coal-fired power plants in line with the development of a National Energy Policy that would provide a long-term strategic direction for the nation's energy ambitions. The environment minister has further detailed how a Domestic Emissions Trading Scheme (DETS)[136] was being developed by the Environment and Water Ministry. It will also push through measures to support the electric vehicle ecosystem and the development of the "blue economic blueprint" which aims to protect and develop coastal and marine areas[137].

2.2 International Commitments

As well as domestic commitments, Malaysia is bound to UNFCCC and ASEAN commitments. Through ASEAN, Malaysia has made pledges in the ASEAN Plan of action and Energy Cooperation (APAEC) in addition to other policy initiatives.

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[133] "Malaysia Aims 31% Re Capacity by 2025," MIDA (MIDA, June 28, 2021), https://www.mida.gov.my/mida-news/malaysia-aims-31-re-capacity-by-2025/.
[134] "Executive Summary - Twelfth Malaysia Plan." Kuala Lumpur: Prime Minister's Office, September 2021.
[135] "Malaysia Successfully Plants 33 Million Trees | New Straits Times." New Straits Times. New Straits Times, May 29, 2022. https://www.nst.com.my/news/nation/2022/05/800495/PIXELATE_URL_MACRO.
[136] "Malaysia Plans to Develop an Emissions Trading Scheme (ETS)." Publications. Enerdata, September 22, 2021. https://www.enerdata.net/publications/daily-energy-news/malaysia-plans-develop-emissions-trading-scheme-ets.html.
[137] Amirul. "Revitalising the Maritime Industry through Blue Economy." MIDA. MIDA, July 26, 2021. https://www.mida.gov.my/revitalising-the-maritime-industry-through-blue-economy/.

Agreement	Theme	Aim
2016 Paris Agreement	Holistic climate change policy	Limit global warming to well below 2 compared to pre-industrial levels.
ASEAN Plan of Action for Energy Cooperation Phase II (2021 – 2025)	Energy Planning	The development of an ASEAN Power Grid to strengthen regional energy resilience and increase capacity to trade electricity. The development of a regional energy policy to accelerate ASEAN's renewable energy transition.
	Energy Efficiency	A reduction of energy intensity by 32% by 2025 based on 2005 levels.
	Power Sources	ASEAN aims to develop a new raft of power sources. The stated aim is to increase renewable energy to 23% of the energy mix by 2025. Nuclear energy will also play a role with ASEAN aiming to grow the technology required for nuclear power generation.
ASEAN Comprehensive Recovery Framework	Holistic climate change policy	"Advancing towards a more sustainable and resilient future" This includes steps towards sustainable development, energy, green infrastructure and sustainable financing.

Malaysia's domestic net emissions policies are also ambitious when compared to the other ASEAN Member States (AMS). For example, Indonesia has only pledged to achieve net emissions by 2060[138] while Thailand has placed its goal for 2065-2070[139]. Nevertheless, other nations are more ambitious regarding their renewable energy growth. Thailand aims to have 49% of renewables in the energy mix by 2037 and Indonesia aims to have 23% by 2025.

Nevertheless, Malaysia needs to step up its policy and legislative efforts to reach its stated aims. The 12th Malaysia Plan states plans for climate legislation which is urgently necessary to make policy promises legally binding[140]. Current laws are either outdated or need to be further refined and improved. These include the Clean Air Regulations of 2014, the Renewable Energy Act of 2011 and the Environmental Quality Act of 1974[141]. Malaysia is also currently running behind the stated aims of the ASEAN Plan of Action for Energy Cooperation (APAEC)[142] and the Paris agreement of keeping warming to "well below 2 degrees".

[138] IEA. "Indonesia's Push to Reach Net Zero Emissions Can Help Power a New Phase in Its Economic Development - News." Press Release. IEA, September 1, 2022. https://www.iea.org/news/indonesia-s-push-to-reach-net-zero-emissions-can-help-power-a-new-phase-in-its-economic-development.
[139] "Thailand Will Raise Its 2030 Net-Zero Target." Thailand will raise its 2030 netzero target Comments. Royal Thai Embassy, September 8, 2022. https://thaiembdc.org/2022/09/08/thailand-will-raise-its-2030-net-zero-target/.
[140] "Executive Summary - Twelfth Malaysia Plan." Kuala Lumpur: Prime Minister's Office, September 2021.
[141] "The Laws Relating to Zero Emissions in Malaysia." Azmilaw newsletter. Azmi & Associates, August 12, 2022. https://www.azmilaw.com/insights/the-laws-relating-to-zero-emissions-in-malaysia/.
[142] ACE, "The 6th ASEAN Energy Outlook (AEO6)" (Jakarta: ASEAN Centre for Energy, 2020), p. 18.

3. Future risk of climate change for Malaysia

Malaysia will see major changes to its climate which will have critical human, economic and environmental impacts.

3.1 Temperature

Malaysia will see increased temperatures leading to a larger number of heatwaves and droughts. Between 1970-2013, peninsular Malaysia, Sabah and Sarawak experienced a surface mean temperature increase of 0.14°C-0.25°C per decade. If Malaysia were to continue on the highest emissions pathway, the average temperatures are expected to increase by 3.11°C by 2090. Increased temperatures will have extended impacts on the well-being of citizens, extreme weather events and agricultural production.

Malaysia will also see an alarming increase in the number of heatwaves and droughts. If the path of highest emissions is followed, the median probability of a heatwave[143] is expected to increase to 93% by 2090 compared to the current median of 2%. These heatwaves could be accompanied by an increased number of droughts. While Southeast Asia is less likely to experience droughts, under the path of most emissions, the probability of severe droughts will double from 4% to 8% by 2090. Major droughts have already caused major damage to agriculture such as in 2014 when a severe drought affected 8,000 paddy farmers and caused USD 22 million in crop losses[144].

3.2 Precipitation

The climate change would also result in increased precipitation levels in Sabah, Sarawak and Peninsular Malaysia. Under the highest emissions pathway, average annual precipitation will increase by 12% by 2090 (to 3,061 mm) compared to the historical median of 2,723.3 mm. This threat has already been acknowledged by the Malaysian government with the development of a Flood disaster risk assessment by 2024[145]. This increased level of precipitation will have an impact on infrastructure, agricultural production and urban areas.

The increased precipitation will also result in a greater risk of floods and cyclones. Malaysia is ranked 41st internationally for risk of exposure to floods and 50th for cyclone hazards according to the INFORM 2023 index for risk management for Malaysia. For flooding and tropical cyclones, Malaysia is ranked in the top 33% of countries at risk. This is reflected in other data such as a study conducted by Paltan et al. (2018) showing that what would historically have been a 1 in 100-year flow, could become a 1 in 50-year or 1 in 25-year event in most of Southeast Asia. This will have a major impact on civilians. The population anticipated to be exposed to extreme floods in 2035-44 will increase to 433,042 (from 245,505 in 1971-2004). Cyclone frequency is also expected to increase which will increase the intensity and frequency of storm surge events in Malaysia.

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[143] This is defined as a period of three or more days where the daily temperature is above the long-term 95th percentile of daily mean temperature.
[144] "Climate Risk Country Profile: Malaysia." Washington DC & Mandaluyong: World Bank & Asian Development Bank, 2021.
[145] Tan, Vincent, and Bookmark Bookmark Share WhatsApp Telegram Face. "Malaysia to Develop Flood Disaster Risk Assessment Based on Climate Change Forecasts: Environment Minister." CNA, March 10, 2022. https://www.channelnewsasia.com/asia/malaysias-flood-disaster-risk-assessment-system-2554801.

This is expected to impact around 34% of the population by the end of the 21st century. This combined with anticipated sea-level rise means that the risks of flooding in coastal cities will dramatically increase[146].

3.3 Economic impact

As alluded to before, the above changes in temperature and precipitation will cause major changes to a large variety of economic sectors. Tourism, which currently contributes indirectly to 11.8% of jobs, will be negatively impacted as coastal cities come under threat from rising sea levels and increasingly extreme weather. Climate change efforts in other countries might also reduce Malaysia's attractiveness as a destination. One manifestation of this is the possibility that long-haul flying might become more expensive due to increased penalties in the aviation industry.

Agriculture will likewise be affected as climate change could influence food production. Current agricultural models show that the presence of droughts and floods early in the rice growing season could reduce yields by 60%. Drought conditions may likewise impact the ability to cultivate rubber, palm oil and cocoa. Palm oil is a critical commodity to the Malaysian economy. Subsequently, any impact on agriculture and in particular palm oil will have long-standing consequences on the national economy.

Finally, urban spaces will increasingly become more hostile to the citizens of Malaysia. Urban Heat Island (UHI), which is the phenomenon where urban surfaces absorb and emit heat, will be exacerbated along with rising temperatures. Research suggests that a one-degree increase in ambient temperature can also result in a 0.5-8.5% increase in electricity demand and therefore greater emissions. Moreover, if more steps are not taken to tackle air pollution, then haze pollution damage will also be compounded. In 1997, the estimated aggregate value of haze damage in Kuala Lumpur was USD 321 million[147].

Subsequently, there are a variety of reasons why Malaysia should actively pursue an ambitious climate change agenda for businesses and civilian communities.

[146] "Climate Risk Country Profile: Malaysia." Washington DC & Mandaluyong: World Bank & Asian Development Bank, 2021.
[147] Ibid

4. Role of fossil fuels in Malaysia's energy transition

While Malaysia should pursue all efforts to decarbonise its energy mix, EuroCham does acknowledge the role that fossil fuels still have to play in reaching a carbon-neutral economy. Currently, Malaysia's national energy mix means that fossil fuels make up 96% of Malaysia's energy supply. Consequently, building the necessary renewable capacity will take significant time and resources to completely replace the domination by fossil fuels. Most concerning is the dominant position that coal and oil occupy within the Malaysian energy mix, combined those two are responsible for 53% of Malaysia's energy.

Besides as a source of electricity, Malaysia cannot easily wean itself off fossil fuels in its industry. Many critical industries will be directly or indirectly impacted as Malaysia transitions toward a carbon-neutral economy.

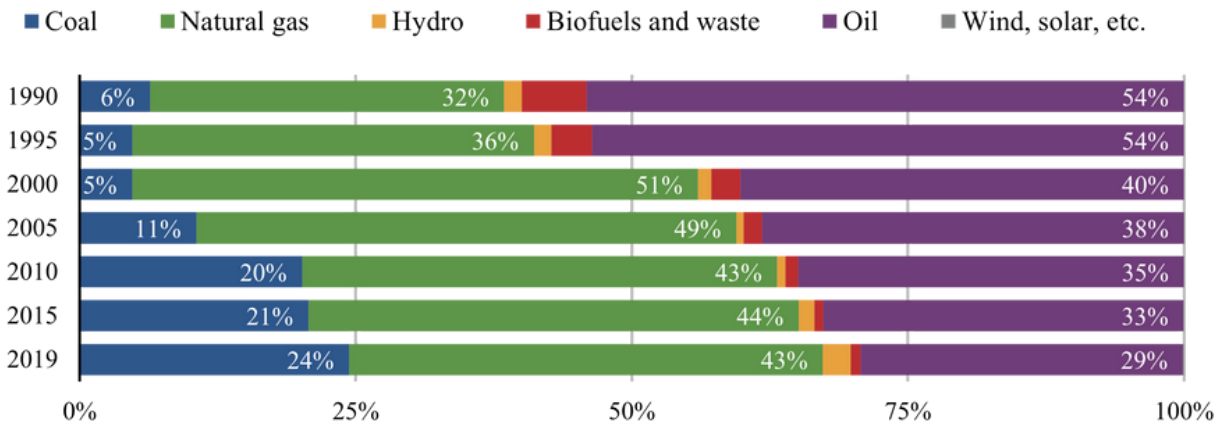

Figure 1 - International Energy Agency Total energy supply (TES) by source, Malaysia 1990-2019

Firstly, the petrochemical industry is responsible for a significant proportion of the national economy and any negative impact will likely cause a domino effect throughout the whole Malaysian economy. Currently, refined petroleum, crude petroleum and petroleum gas account for 10.96% of Malaysia's exports[148]. Furthermore, the national petrochemical producer, Petronas, employs around 50,000 people[149] and accounts for 15% of the Malaysian government's revenue between 2015-2020[150]. This reliance on oil and gas means that any tinkering with the current energy ecosystem means that it will not only impact the Malaysian economy, but will also impact the government's finances and, paradoxically, its ability to tackle climate change.

Apart from the direct impact on the fossil fuel economy, attempts to curb carbon emissions will inevitably impact other major sectors namely construction, maritime and manufacturing industries. In the construction sector, Malaysia produces 33Mt of cement which is a carbon-intense process releasing greenhouse gases, NOx, SO2 and mercury vapours[151].

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[148] "Malaysia (MYS) Exports, Imports, and Trade Partners." Malaysia. OEC, 2020. https://oec.world/en/profile/country/mys.
[149] "Petronas's Competitors, Revenue, Number of Employees, Funding ... - Owler." Petronas. Owler, 2022. https://www.owler.com/company/petronas.
[150] "Petroliam Nasional Berhad (PETRONAS)." Rating Report. Fitch Ratings: Credit Ratings & Analysis for Financial Markets, December 11, 2020. https://www.fitchratings.com/research/corporate-finance/petroliam-nasional-berhad-petronas-11-12-2020.
[151] "Environmental Impact Assessment Guidelines For Cement Industry." Kuala Lumpur: Department of Environment Ministry of Environment and Water, 2019.

Furthermore, the maritime industry has acknowledged that "zero-discharge" objectives are not cost-effective and may "result in excessive economic burdens to society"[152]. Finally, Malaysia's semiconductor sector, which takes up 13% of the global chip assembly and testing market share[153], presents a major burden on the country's energy resources. A pertinent case study is TSMC in Taiwan which uses 5% of the island's energy[154]. Any attempt to curb fossil fuel use through carbon pricing or carbon credits in the short to medium term will have a negative impact if alternative energy sources are not found. Thus, while EuroCham commends the policy goals in the 12th Malaysia plan, making a sudden complete switch is not feasible for the above industries as Malaysia does not have the renewable capacity to do so.

Further from the reliance on traditional fossil fuels, establishing the necessary infrastructure for renewable energy will produce many hurdles. Renewable energy plants often have variable energy outputs depending on wind, solar and water levels[155] which means that energy storage systems will be crucial. The establishment of renewable energy facilities also produces a significant carbon debt (due to the environmental damage of establishing these systems) as well as a significant financial investment. It is estimated that Malaysia would require RM350 billion to RM400 billion in cumulative investments, mainly in the energy sector, representing 0.8 per cent of the gross domestic product (GDP) every year until 2050[156]. Moreover, if Malaysia were to engage with renewable energy at an ASEAN level, as EuroCham believes it should, investments in the ASEAN energy grid will cause debates around responsibility and financing within ASEAN.

Nevertheless, while renewable energy will require time and investment, it is important to note that Malaysia operates a dirty energy mix. As aforementioned, coal and oil make up 53% of Malaysia's energy. Coal itself is considered the dirtiest fossil fuel and is responsible for over 0.3C-1C of the global temperature rise. Oil is itself further responsible for a third of the world's emissions which does not include the impact that oil spills have on the environment[157]. It is also concerning that gas, the least dirty fossil fuel has been reduced as a portion of the energy mix since 2000 in favour of coal and oil.

Referring to the above, it is clear that Malaysia urgently needs to move away from coal which is nearly two times more polluting than natural gas. Malaysia should view natural gas as a bridge fuel allowing it to dismantle coal plants and develop gas plants as an intermediate measure.

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[152] "Port Klang Initial Risk Assessment." Shah Alam: Selangor Waters Management Authority, March 2005.
[153] Online, The Star. "Malaysia's Semiconductor Industry to Benefit from Chips and Science Act." The Star. The Star, August 15, 2022. https://www.thestar.com.my/business/business-news/2022/08/15/malaysia039s-semiconductor-industry-to-benefit-from-chips-and-science-act.
[154] "The Computer Chip Industry Has a Dirty Climate Secret." The Guardian. Guardian News and Media, September 18, 2021. https://www.theguardian.com/environment/2021/sep/18/semiconductor-silicon-chips-carbon-footprint-climate.
[155] Gautam Gowrisankaran, Stanley S. Reynolds, and Mario Samano, "Intermittency and the Value of Renewables Energy" (Cambridge, Massachusetts: National Bureau of Economic Research, 2011), 1.
[156] "RM300BIL-rm400bil In Investments Needed for Malaysia to Achieve Net ..." NST Business. NST, September 13, 2022. https://www.nst.com.my/business/2022/09/831170/rm300bil-rm400bil-investments-needed-malaysia-achieve-net-zero-greenhouse.
[157] "Fossil Fuels and Climate Change: The Facts." ClientEarth Communications. ClientEarth, February 18, 2022. https://www.clientearth.org/latest/latest-updates/stories/fossil-fuels-and-climate-change-the-facts/.

This would provide the country with the necessary time to implement the more time-consuming roll-out of newer, renewable alternatives. Moreover, natural gas can be made less environmentally damaging by way of mitigation technologies such as input and output filters through fabric filtration[158].

Alternatively, Malaysia can work towards developing its hydrogen economy. The state government of Sarawak is currently implementing their hydrogen road map 2005-2030 to become a large-scale hydrogen exporter by 2027[159]. This is a partnership between the state government and SEDC engineering, Samsung engineering, Lotte chemicals and Posco holdings. Titled the H2biscus project, it aims to develop the use of hydrogen for both industry and private use and is a prime example of a public-private partnership. Such a case study can prove to be pivotal for the rest of Malaysia as it could act as a proof of concept and encourage similar projects in other states. Therefore, EuroCham commends Sarawak's willingness to invest in new and emerging technologies.

5. Malaysia's challenges with the energy transition

5.1 Impact of COVID-19 and other economic recovery programs on the fiscal capacity to support a green agenda

To tackle the COVID-19 pandemic, Malaysia engaged in economic recovery programs which have meant that its foreign reserves have been reduced along with fiscal deficit expansion. Malaysia provided 27.81 billion USD of support in 2020 which constituted 7.93% of its GDP (2019)[160]. As a majority of the initial green financing has and will come from government institutions, this means that obtaining the necessary financing will provide a significant hurdle to Malaysia's ambitions.

5.2 A limited "Green Financing" ecosystem

Malaysia has steadily been working on a "Green Financing" ecosystem and is one of the frontrunners in the region. Nevertheless, steps do need to be taken to provide greater resources for SMEs and other businesses to fund their green transition.

The Malaysian government currently operates the following green incentives[161]:

- MyHIJAU Mark - This is the official green recognition scheme endorsed by the Malaysian government.
- Green Income Tax Exemption (GITE) - This is applicable to green technology service providers listed under the MyHIJAU directory.
- Green Investment Tax Allowance (GITA) Assets - These apply to companies that acquire qualifying green technology assets that are used to reduce emissions, conserve energy, water or recycle waste. These assets must also be listed under the MyHIJAU directory.

[158] Power Engineering International. "Power Plant Filtration Technology to Achieve Environmental Performance." Power Engineering International. Power Engineering International, October 21, 2015. https://www.powerengineeringint.com/coal-fired/filtering-out-power-plant-emissions/.
[159] Ling, Sharon. "Sarawak on Course to Become Hydrogen Economy, Says Abang Jo." The Star. The Star, September 7, 2022. https://www.thestar.com.my/news/nation/2022/09/07/sarawak-on-course-to-become-hydrogen-economy-says-abang-jo.
[160] DBS Bank, "Green Finance Opportunities in ASEAN" (Singapore: DBS Bank & UNEP, 2020), p 13.
[161] "Green Financing and Incentives in Malaysia." The Edge Markets, July 20, 2022. https://www.theedgemarkets.com/article/green-financing-and-incentives-malaysia.

- GITA Projects - These apply to companies that undertake qualifying green technology projects for business or their consumption.

Apart from the above, the 2022 Budget also announced green incentives and funding to reduce CO2 and greenhouse gas emissions (e.g. RM12 million matching grant for research into LEDs and EVs). Malaysia has also set up a RM 1 billion fund to support SMEs in reducing their carbon footprint and they have created Bursa Malaysia's Voluntary Carbon Market (VCM) platform to support the trading of carbon credits.

Financial institutions in Malaysia are actively pursuing green financial instruments and products with 91% of the banking sector now having at least one or more 'green products' on offer[162]. Malaysia is also making strides in the green and Sustainable Responsible Investment (SRI) Sukuk Framework which facilitates the financing of investment initiatives through a shariah-compliant financial instrument.

The private sector, together with Bank Negara, has made moves to codify the "Climate change and Principle-based taxonomy" (CCPT). Their first draft, published in April 2021, demonstrates a willingness and preparedness to tackle the growing industry of green-financing head-on[163]. The CCPT was developed with the risk management sub-committee of the Joint Committee on Climate Change (JC3) along with the World Wide Fund for Nature. The document codifies terms such as "climate change mitigation" and "climate change adaptation" which will serve to assess and categorise economic activities according to their climate objectives. EuroCham welcomes such efforts as they are important steps in clarifying the current government position towards businesses operating in Malaysia, as well as towards future Foreign Direct Investment opportunities.

Nevertheless, while Malaysia has taken significant steps to work towards a "Green Financing" ecosystem, one cannot ignore the pitfalls that are still prevalent.

- Lack of adequate capital: Before the COVID-19 pandemic, Malaysia had a considerably small investment pool according to the DBS bank due to a lack of personal financial assets and the role that banks play in the financing ecosystem[164]. The drain that the pandemic had on both public and private capital undoubtedly means that these resources will be even more scarce.
- Lack of adequate analytical data: Malaysia does not currently have the full gambit of necessary tools to provide investors with the necessary information to make informed investment decisions. Plans to do so have been highlighted in the 12th Malaysia Plan but this will take time.

[162] "Green Financing and Incentives in Malaysia." The Edge Markets, July 20, 2022. https://www.theedgemarkets.com/article/green-financing-and-incentives-malaysia.
[163] "Joint Committee on Climate Change (JC3) Report on the Sustainable Finance Landscape in Malaysia." Kuala Lumpur: Bank Negara Malaysia, April 2022.
[164] "Green Finance Opportunities in ASEAN." Singapore: DBS, November 2017.

Another broader issue is the lack of alignment at the ASEAN level. Due to the transnational nature and scarcity of green investments, coordination at the ASEAN level is critical in ensuring a uniform understanding of 'green financing' and access to capital markets. EuroCham acknowledges ASEAN's efforts in this area through the attempts by Central Bank Governors to develop an ASEAN Taxonomy for Sustainable Finance. Nevertheless, ASEAN must take further steps to develop a common taxonomy before its member states develop conflicting taxonomies. Further to issues of taxonomy, ASEAN also has a role to ensure political stability in transnational projects to keep these infrastructure projects desirable as a place for foreign capital.

This will have to be done through efforts from ASEAN but also via events such as the 2019 International Platform for Sustainable Finance (IPSF). The IPSF is a multilateral forum that was created with the support of the World Bank, the EU, and 16 other partner countries to share and align sustainable finance regulatory measures. Through the forum, members can exchange and disseminate information to promote best practices, compare their different initiatives, and identify barriers and opportunities for sustainable finance, while respecting national and regional contexts. EuroCham would support broader Malaysian and ASEAN participation in the initiative to generate greater alignment on sustainable finance initiatives and approaches.

5.3 Conflicting priorities to enable the growth of renewable energy and low-carbon energy solutions

Malaysia's transition towards renewable energy and carbon neutrality will face many policy conflicts. Thus, it is the task of the Malaysian government to ensure that policy priorities are well-balanced and that public policy decisions remain effective and targeted. In the 12th Malaysia Plan, "Theme 3: Advancing sustainability" serves to embrace the circular economy as well as accelerate the adoption of integrated water resources management. While these are critical policy priorities, it is noticeable that this could come into conflict with the other core themes of the 12th Malaysia Plan, specifically "Theme 1: Resetting the Economy" and "Theme 2: Strengthening Security, Wellbeing and Inclusivity"[165]. The adoption of these themes and the mobilisation of the necessary resources to achieve them could mean that the push to advance sustainability could be neglected as the more politically sensitive election topics of economic growth and security take precedence.

While we understand the political necessity of certain policy proposals, one cannot underestimate the political salience of renewable energy and a sustainable economy. EuroCham would like to stress that these measures are critical for long-term political stability as well as for harnessing the immediate climate challenges.

Further to the policy proposals developed in the 12th Malaysia plan, other more detailed policy issues might cause conflicting priorities for businesses and public entities. A useful example is the current power purchasing agreement frameworks.

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[164] "Climate Change and Principle-Based Taxonomy." Kuala Lumpur: Bank Negara Malaysia, April 30, 2021.
[165] "Executive Summary - Twelfth Malaysia Plan." Kuala Lumpur: Prime Minister's Office, September 2021.

In Malaysia, *Tenaga Nasional* oversees and regulates the power market and sets agreements with power producers. This has resulted in *Tenaga Nasional* paying a fixed payment to the independent power producer regardless of the quantity of electricity generated. This incentivises the utility provider to use the independent power producer even if they use fossil fuels. Thus, policymakers should take steps to reassess the current power purchasing system to allow for a more competitive ecosystem ensuring renewable energy can take a prime position in the energy mix. Thus, Malaysia's policies can be improved through stronger regulations and incentives along with clearer and less complicated processes.

5.4 Continued subsidy of fossil fuels

Malaysia continues to provide significant subsidies for fossil fuels. Many ASEAN countries have adopted this economic policy, however, these subsidies do account for 0.6% of Malaysia's GDP, equivalent to 2.2 billion USD. Spending these scarce funds, particularly following the COVID pandemic, on encouraging the use of harmful fossil fuels works against the growth of a green economy as stipulated in the 12th Malaysia Plan. Moreover, these funds could and should be shifted to encourage the use of renewable energy sources and other forms of mobility. If Malaysia chooses not to invest in renewable energy, this further compounds the upfront cost of adopting these alternative energy systems and thus, ensures that renewable energy remains the more expensive energy source in the long term.

A large concern regarding the dismantling of fossil fuels is the possible shock to the economy. However, data from a study conducted in France between 2001 and 2016 looked at 8000 manufacturing firms and the impact of a 10% energy price increase. The evidence showed that this price increase resulted in a shift of production and workers to energy-efficient firms, but it did not have an impact on net employment at the industry level in France[166]. A similar study conducted in Indonesia between 1980 to 2015 found similar conclusions showing that despite a very small increase in employment reductions in energy-intensive plants (-0.2%), the overall impact at the industry level was null[167]. Both case studies provide clear examples that policy-induced price changes have little to no impact on the overall employment level. Thus, the Malaysian government should focus on preparing firms for the energy transition while being less concerned about the possible impact on employment.

Nevertheless, it is important to note that any dismantling of subsidy systems will need to be targeted at specific sectors of the economy and the population. Simply making fuel at the pump more expensive will possibly cause major issues such as exacerbating the cost of mobility for low-income households. However, a targeted reduction of subsidies on fossil fuels will motivate businesses and certain sectors of the population to make concrete steps towards renewable energy.

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[166] Dussaux, D. (2020), "The joint effects of energy prices and carbon taxes on environmental and economic performance: Evidence from the French manufacturing sector", OECD Environment Working Papers, No. 154, OECD Publishing, Paris

[167] Brucal, A. and A. Dechezleprêtre (2021), "Assessing the impact of energy prices on plant-level environmental and economic performance: Evidence from Indonesian manufacturers", OECD Environment Working Papers, No. 170, OECD Publishing, Paris

This would reflect the steps that Indonesia has taken towards subsidy reform. The government initially phased out support for the 12 consumer classes with the largest power connections between 2013-2016. The government also ceased the subsidy for premium gasoline. Subsequently, they tackled the two most vulnerable residential classes at the end of 2016 with adequate targeted support. These efforts saw the cost of electricity subsidies drop from USD 8.6 billion in 2014 to USD 3.4 billion in 2017[168]. These policy decisions can provide a suitable example for the Malaysian government in freeing up much needed capital during the transition to renewable energy.

Along with the issues of artificially depressing the price of fossil fuels, studies have demonstrated that subsidies on renewable energy can have a positive impact on the transition to renewable energy. In China, a study from 2007-2016 of 92 renewable energy-listed enterprises demonstrated that government subsidies have had a positive effect on renewable energy investment in China. This same study found that government subsidies are the main force in supporting the development of SME renewable energy enterprises[169]. These conclusions have been reflected in the European Union which provides 73 billion euros in renewable energy support, which is greater than the figure recorded in Japan, the UK, and the USA[170]. A study in the Energy Policy Journal of the EU energy market further demonstrated that "subsidies of energy output are cost-effective for achieving renewable energy targets in the short-run".

Thus, looking at applicable case studies in the European Union and China, it is clear that with the necessary shift in subsidy focus, Malaysia could see a similar progression towards a renewable energy market. Consequently, when analysing the hurdles towards renewable energy, it is clear that Malaysia and the ASEAN region have the necessary financial tools which would allow them to move towards a carbon-neutral economy.

5.5 Underdeveloped power grid capacity for renewable energy integration

Similarly to the debates in Europe, transnational power grids are both desirable and necessary in the push for a green economy in both Malaysia and ASEAN. Power grids will not only have to compensate for the intermittent generation of energy from renewable energy sources, but they will also have to account for the increased demand for electricity. This will occur due to increased economic activity and a shift from fossil fuels to electric power (e.g. petrol cars to electric cars). Such investments in strengthening power grids should happen at both the national and supranational levels as an ASEAN power grid would allow Malaysia to benefit from excess energy production in neighbouring countries and vice versa.

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[168] "Update on the Recent Progress in Reform of Inefficient Fossil-Fuel Subsidies That Encourage Wasteful Consumption 2021." Naples: OECD & IEA, July 23, 2021.
[169] Xiaolei Yang, Lingyun He, Yufei Xia, Yufeng Chen, Effect of government subsidies on renewable energy investments: The threshold effect, Energy Policy, Volume 132, 2019.
[170] "Study on Energy Subsidies for the European Commission (2022 Edition)." Energy Subsidies | Monitoring of energy subsidies in the EU27. Enerdata, October 5, 2022. https://www.enerdata.net/about-us/company-news/energy-subsidies.html.

A study conducted by the International Energy Agency demonstrated that optimising cross-border flows with current infrastructure through multilateral power-sharing agreements can reduce annual operational costs of the ASEAN power sector by USD 1 billion[171]. Therefore, Malaysia should actively pursue an ASEAN Power Grid as it would benefit the nation both economically and environmentally.

Moreover, nationally Malaysia would also have to ensure that access to green energy is spread evenly across all of its states and federal territories. As well as ensuring the development of a green economy throughout the country, it would also allow all provinces to have an equally competitive green edge. One of the major issues facing Malaysia is the technical and logistical issues in uprating the voltage of existing transmission lines across the country to meet the power expectations of its growing population. Most of the existing electrical infrastructure was constructed in the 1950s-1960s which means that it requires significant refurbishment to absorb the increased demand of the upcoming decades[172]. Therefore, along with developments in the ASEAN grid, Malaysia needs urgent investment in its ageing infrastructure to ensure it can maintain its competitive economic edge.

5.6 Protection and support towards communities affected by the transition

As stated throughout the text, Malaysia will need to ensure that low-income and isolated communities are not left behind during the transition of the national economy. The European Union has developed mechanisms to compensate for the negative impacts of both globalisation (European Globalisation Adjustment Fund) and the development of a climate-neutral economy (Just Transition Mechanism).

Malaysia will have to undertake similar efforts to ensure that its communities are not left behind and that progress towards a green economy does not exacerbate existing demographic trends (financial inequality, education, mobility). This will likewise require funding which will most likely have to come from the government as a private industry will not be interested in providing such a public good.

6. Recommendations

Climate change and its subsequent consequences will present one of the most important policy challenges for the Malaysian government in the coming decades. It is therefore of utmost importance that Malaysia adopts an ambitious and binding set of policy commitments that will ensure a stable society and economy for its citizens and businesses. This paper believes there are three policy priorities that Malaysia should actively pursue:

6.1 Changing the Energy Mix

EuroCham thoroughly encourages Malaysia to take major steps towards greening its energy mix.

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[171] "ASEAN Renewable Energy Integration Analysis." Paris: IEA, October 2019.
[172] Nor, Shamsul Fahmi, Mohd Zainal Kadir, Azrul Mohd Ariffin, Miszaina Osman, Muhammad Syahmi Rahman, and Noorlina Mohd Zainuddin. "Issues and Challenges in Voltage Uprating for Sustainable Power Operation: A Case Study of a 132 Kv Transmission Line System in Malaysia." Sustainability 13, no. 19 (2021): 10776. https://doi.org/10.3390/su131910776.

The increasing share that coal is taking within energy production is a concerning trend due to the environmental damage along with increasing international disdain for coal as an energy source.

Therefore, EuroCham was pleased to note the decision in the 12th Malaysian plan to stop the new construction of coal plants in Malaysia. However, EuroCham recommends that this ban be extended to oil and that all new power plants should use natural gas or renewable energy. As previously demonstrated, this is because coal and oil are the most destructive fossil fuels. Moreover, the inclusion of natural gas means that the petrochemical industry will not see a sudden dramatic change in the energy mix of Malaysia. Additionally, if such a ban were to be legislatively bound, this would also provide investors with the necessary legal stability to know that investments in renewable energy will not be superseded by 'dirtier' investments.

EuroCham also acknowledges the work conducted under the Malaysia Renewable Energy Roadmap (MYRER) in defining a path towards the goal of 31% RE share by 2025. The proposition of the 4 strategic pillars - solar, bioenergy, hydro and new technology - demonstrates the steps the government has taken towards making a carbon-neutral economy real[173]. However, Malaysia needs to find solutions to the various issues that come with the development of renewable energy capacity namely land for solar panels, environmental damage of bioenergy and the high development costs associated with hydroelectricity. While around 17% of electricity[174] in Malaysia is generated through hydroelectric (and other renewables), the difficulty of increasing electricity capacity to 31% cannot be underestimated. Consequently, EuroCham appreciates the planning highlighted under the "Enabling initiatives" sections in the MYRER and is eager to work with the government to implement such proposals[175].

Along with the legislation, the Malaysian government could take inspiration from platforms that include the Finance to Accelerate the Sustainable Transition-Infrastructure (FAST-Infra), which was developed by the Climate Policy Initiative (CPI), HSBC, the International Finance Corporation (IFC), OECD and the Global Infrastructure Facility[176]. This programme aims to motivate private investment in sustainability projects in the developing world. The FAST-Infra is supported by standards for sustainable infrastructure which are originally based on the EU taxonomy for climate change. Malaysia could take such an infrastructure labelling system and adapt it to its domestic taxonomy system. This security and reliable model could free up much-needed financial capital which will help Malaysia to build the necessary infrastructure to move away from its fossil fuel-dependent energy mix.

[173] "Malaysia Renewable Energy Roadmap." Putrajaya: SEDA, 2021.
[174] IEA. "Energy Statistics Data Browser – Data Tools." IEA, October 3, 2022. https://www.iea.org/data-and-statistics/data-tools/energy-statistics-data-browser?country=MALAYSIA&fuel=Energy+supply&indicator=ElecGenByFuel.
[175] "Malaysia Renewable Energy Roadmap." Putrajaya: SEDA, 2021. p. 91.
[176] Ridley, Michael, "FAST-Infra; a public-private initiative to raise private investment in developing world sustainable infrastructure," HSBC Centre of Sustainable Finance, p.3.

Finally, further to the recommendations developed by the EU-ABC in their 2022 document, EuroCham advocates for an Energy Transition Mechanism (ETM) as a practical recommendation in helping Malaysia and other ASEAN member states to transition to renewable energy and other low-carbon solutions. The ETM is a financial mechanism promoted by Prudential that aims to close carbon-intensive fossil fuel-run power plants earlier than their lifespan[177]. This facility would be funded by long-term investors with the potential to blend public sources of capital with private-sector investment. This system would also be overseen by multilateral development banks and would ensure commitment to an agreed schedule for the replacement of carbon-intensive power. Moreover, the ETM would allow owners of carbon-intensive power assets to contribute their assets to the carbon reduction facility (CRF - subsection of ETM) in exchange for cash or equity in the ETM. This could be a practical way to retire a significant amount of the carbon-intensive assets currently in Malaysia's power grid.

6.2 Pushing forward "Green Financing"

A further recommendation that EuroCham advocates for are pushing forward with "Green Financing". As detailed previously, Malaysia has taken significant steps through creating a preliminary taxonomy for sustainable financing. However, there are still other obstacles in the green-financing ecosystem that need to be overcome.

Firstly, it should also be understood that there is public support for a greater green financing ecosystem. A study conducted by Mambu Cloud Banking found that 61% of consumers stated that green financial services have become more important to them in the past 5 years. Moreover, 74% of respondents feel that current financial institutions are guilty of green-washing. When asked if they would change financial institutions due to sustainability concerns, 65% of Malaysian consumers stated they would[178]. This demonstrates the clear business rationale for engaging in further green financing schemes which is why EuroCham further encourages the Malaysian government and its financial institutions to push forward with such initiatives.

One of the critical issues to the current ecosystem is that investments in the Malaysian energy market can bring with them significant risks for investors such as political stability, grid access, foreign ownership restrictions and permit hurdles[179]. The combination of financial and administrative barriers to investment may inhibit the flow of foreign capital into the Malaysian energy sector. If no steps are taken, investing will still be considered risky, translating into high start-up costs and therefore high energy costs for the consumer. Malaysia will need to engage in policy proposals that seek to reduce the issues associated with the sector by guaranteeing grid access, easing foreign ownership restrictions and streamlining the current permit approval process.

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[177] Donald Perry Kanak, "How to Accelerate the Energy Transition in Developing Countries," World Economic Forum, January 25, 2021, https://www.weforum.org/agenda/2021/01/how-to-accelerate-the-energy-transition-in- developing-economies
[178] "Malaysians Want Green Finance to Go Mainstream." The Malaysian Reserve, June 1, 2022. https://themalaysianreserve.com/2022/06/01/malaysians-want-green-finance-to-go-mainstream/.
[179] DBS Bank, "Green Finance Opportunities in ASEAN" (Singapore: DBS Bank & UNEP, 2020)

Apart from actions by the government, private institutions and energy operators should also be obligated to disclose economic activity, energy output and performance data of all their infrastructure projects across their respective life cycles. Naturally, the precise nature of this information would need to be discussed, however, this transparency is critical to ensuring a climate of confidence for investors in the Malaysian market.

Moreover, certain financial de-risking instruments can be implemented to transfer financial risks to another actor. ASEAN has previously created the ASEAN Catalytic Green Finance Facility (ACCGF) to provide public loans and technical assistance to green infrastructure projects. This facility aims to use public funds to attract private funds and ensure that economies make a successful transition to green economies[180]. ASEAN has likewise established the ASEAN Capital Market Forum (ACMF) which has published "Green Bond Standards"[181]. Malaysia should take full advantage of such a system and explore the possibilities of developing a domestic version in a bit to overcome the lack of public resources available for the green transition.

Even though ASEAN is commended for its financing of efforts around the ACCGF, significant work still needs to be conducted to generate an ASEAN-wide taxonomy for green financing. Currently, Malaysia and Singapore have developed separate taxonomies to foster their green financing. However, Malaysia should promote its taxonomy at the ASEAN level to ensure that the whole region becomes an attractive area for green investments. As many green infrastructure projects will cross borders, a common understanding and approach around green investments will be to benefit Malaysia and ASEAN as a whole.

6.3 Reassessing subsidies, carbon pricing mechanisms and emissions trading schemes

A further consideration is the development of Carbon Pricing Mechanisms and the reassessment of subsidies. As highlighted in this paper, Malaysia engages in a policy of fossil fuel subsidies to the cost of 0.6% of Malaysia's GDP, equivalent to 2.2 billion USD. This is a significant source of financial capital that artificially reduces the price of fossil fuels and consequently artificially raises the prices of renewable energy. As stipulated in previous sections, shifting the subsidy regime from fossil fuels to renewable energy has and will continue to serve as a motivation for investment in this sector. There is significant economic and political rationale to do so and thus, EuroCham recommends taking steps to shift this regime to help reach a carbon-neutral economy. This would have to be achieved in a gradual way to reduce the shock to the economy and the most vulnerable citizens.

[180] "ASEAN Green Catalytic Facility" ASEAN Green Catalytic Facility (Madaluyong, Philippines: Asian Development Bank, 2020), 4.
[181] Nathan, Kasturi. "Sustainable Financing." Kuala Lumpur: KPMG, 2021.

Carbon Pricing Mechanisms and emission trading schemes are also methods that the Malaysian government is exploring as part of the path to carbon neutrality. EuroCham supports the government's efforts in this direction and points to efforts conducted in the European Union such as the European Emissions Trading System (EETS) and the Carbon Border Adjustment Mechanism (CBAM) as good examples. Moreover, in future discussions on an EU-Malaysia Free trade agreement, such initiatives will be of greater political salience. Current estimates state that Malaysia may lose trade worth more than EUR24 billion to European countries if Malaysian exporters fail to produce goods with a smaller impact on greenhouse gas emissions[182]. Therefore Malaysia must adopt similar initiatives before approaching negotiations with other parties. This would ensure that Malaysia can bolster its negotiating position and minimise the impact of future foreign policy. Overall, the Malaysian government needs to couple such systems with concrete efforts to de-carbonise the economy as otherwise, they would artificially raise prices for their citizens.

[182] Muhammad, Izlawanie. "Challenges in Implementing Carbon Pricing Policy in Malaysia." The Bartlett. UCL, November 8, 2021. https://www.ucl.ac.uk/bartlett/news/2021/nov/challenges-implementing-carbon-pricing-policy-malaysia.

ANNEX IV: PHILIPPINES

This Chapter on Energy Transition in the Philippines has been prepared by the European Chamber of Commerce in the Philippines (ECCP).

Executive Summary

The energy sector has evolved steadily in recent years, with countries increasingly focusing on reducing emissions. In more recent cases, the increase in supply following a recovery in energy demand with the reopening of borders, as well as the Russia-Ukraine crisis, have significantly pushed economies to accelerate their energy transition.

It is evident that various sustainability-centric efforts across countries and sectors have taken place. Nonetheless, there remain areas to be improved to materialise the benefits of the said interventions and energy trajectory.

This paper looks into the recent energy sector developments in the Philippines, as well as presents several policy recommendations including:

- Developing an energy sector that is more competitive and attractive to clean energy players
- Strengthening financing mechanisms to further boost sustainable energy initiatives and projects
- Promoting active collaboration between government and private sector in terms of policy development and implementation

Philippine energy situation and needs for the future, and the role of fossil fuels in the country's energy transition

On data reported by the Department of Energy (DOE), for 2021, on-grid installed capacity is at 26,883 megawatts (MW), with a 43% share for coal, 29% for RE, 14% for oil, and 13% for natural gas. Peak demand was at 16,036 MW with a breakdown of 11,640 MW for Luzon, 2,252 MW for Visayas, and 2,144 MW for Mindanao[183].

Meanwhile, in terms of on-grid power generation, the latest DOE data reported that in 2021, coal maintained the lion's share at 58% or 62,052 Gigawatt hours (GWh), followed by RE at 22% or 23,771 GWh, natural gas at 18% or 18,675 GWh, and oil at 2% or 1,616 GWh. This being imported sources[184].

[183] Lotilla, R. (9 August 2022). Department of Energy Virtual Press Conference [Speech].
[184] Ibid.

On the other hand, 2020 figures on off-grid power or missionary electrification show that oil dominated the mix at 89% for both capacity and generation. RE share was at 9%, and coal, was at 2%[185]. Overall, these data present that the Philippine energy sector, to a great extent, continues to be reliant on coal.

Additionally, in terms of estimated energy requirements, the country's energy agency projects that with the increasing levels of economic activity, as well as the growing population in the Philippines, there is a projected 5% annual increase in energy demand, leading to a total of 49,287 MW demand by 2040[186]. Notwithstanding recent global scenarios, including the escalating volatility of global oil prices, the Philippines seeks to continue to employ measures and programs that prioritise the use of indigenous clean energy resources over imported sources and coal/fossil fuels.

Other crucial factors, which will be presented in the latter part of this paper, will also highlight the increasing need to implement energy transition initiatives.

The international and regional policies and commitments that the Philippines made regarding energy transition

To further support the energy sector, the DOE has laid out the Philippine Energy Plan Targets as follows:[187]

- Boost Indigenous Energy Production
- Install Additional Capacities
- Promote and Expedite Investment
- Promote Consumer Welfare
- Strengthen Partnerships – local and international

Additionally, the Sustainable Finance Framework [188] issued by the country's central bank – Bangko Sentral ng Pilipinas (BSP) – provides the fundamental concepts for incorporating sustainability principles and environmental, social, and governance factors into business and risk governance frameworks, plans, and operations. The BSP targets the full implementation of the said Framework by 2023.The issuance of the said Framework was further strengthened by the release of the Philippine Sustainable Finance Roadmap and Guiding Principles[189] in February 2022. This Roadmap identifies three Pillars:

- Policy Pillar on Creating a Conducive Environment
- Financing Pillar on Mainstreaming Sustainable Finance
- Investment Pillar on Developing a Sustainable Pipeline

[185] Ibid.
[186] Department of Energy. (n.d.) Power Development Plan 2020-2040. Retrieved from https://www.doe.gov.ph/electric-power/greening-grid-report?q=power-development-plan&ckattempt=1.
[187] Tamang, J. (2021). Energy Sector Updates [Virtual Forum]. 2021 Virtual Energy Investment IECs.
[188] Bangko Sentral ng Pilipinas. (February 2022). Circular Letter No. CL 2022-011. Retrieved from https://www.bsp.gov.ph/Regulations/Issuances/2022/CL-2022-011.pdf.
[189] Bangko Sentral ng Pilipinas. (February 2022). Circular Letter No. CL 2022-011. Retrieved from https://www.bsp.gov.ph/Regulations/Issuances/2022/CL-2022-011.pdf.

More recently, in July 2022, the DOE released its **National Renewable Energy Program (NREP) 2020-2040**[190]. **The NREP sets the country's goal for renewable energy to reach a 35% share of its power generation mix by 2030, and a 50% share by 2040**, in accordance with the Renewable Energy Act of 2008.

On the aspect of international commitments in line with the energy transition, the Philippines, through its Nationally Determined Contribution[191] (NDC) submitted in April 2021, highlighted the country's commitment to addressing climate change towards a low-carbon and sustainable future The NDC presented the following commitments and key points:

- A projected reduction and avoidance of **greenhouse gas (GHG) emissions by 75%**, of which 2.71% is unconditional and 72.29% is conditional, which represents the country's ambition for GHG mitigation for the sectors of agriculture, waste, industry, transportation, and energy from 2020 to 2030.
- Seven thematic areas of government action to address climate change were established under the National Climate Change Action Plan 2011 – 2028: food security, water sufficiency, ecological and environmental stability, human security, climate-smart industries and services, sustainable energy, and knowledge and capacity development. All of which are pursued in conjunction with the Sustainability Development Goals and the Sendai Framework for Disaster Risk Reduction.

Finally, under the new administration, the government endeavors to prioritise further promoting the use and development of renewable energy sources, expanding power supply, and maximising the use of technology in the energy sector, as well as enhancing the ease of doing business in the industry. The DOE's thrust is likewise advancing indigenous energy sources, pursuing increased electrification among households, and putting forward investment incentives in the energy sector[192].

The future risk of climate change for the Country? Why energy transition is needed?

The World Risk Report 2022[193] identified the Philippines as the most disaster-risk country worldwide, followed by India and Indonesia. The said report covers various indicators that help identify countries' exposure, vulnerability, susceptibility, lack of coping capacities, and lack of adaptive capacities against extreme natural events and climate change.

In line with this, the World Bank Group, in its 2022 Philippines Country Climate and Development Report,[194] estimated that the economic damage of climate change to the Philippines could reach up to 7.6% of its gross domestic product by 2030, and 13.6% by 2040.

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[190] Department of Energy. (December 2021). National Renewable Energy Program. Retrieved from https://www.doe.gov.ph/announcements/national-renewable-energy-program-nrep-2020-2040.
[191] United Nations Framework Convention on Climate Change. (2021). Republic of the Philippines Nationally Determined Contribution. Retrieved from https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Philippines%20First/Philippines%20-%20NDC.pdf.
[192] Lotilla, R. (26 July 2022). Post-SONA Economic Briefing [Speech]
[193] Bündnis Entwicklung Hilft. (2022). WorldRiskReport 2022. Retrieved from https://weltrisikobericht.de/wp-content/uploads/2022/09/WorldRiskReport-2022_Online.pdf.
[194] The World Bank Group. (25 October 2022). Philippines Country Climate and Development Report. Retrieved from https://www.worldbank.org/en/events/2022/10/25/launch-of-the-philippines-country-climate-and-development-report.

Said scenarios, in addition to the aforementioned projected growth in energy demand, underscore the heightened importance of advancing stability, sustainability, and energy transition efforts in the country.

Country's challenges with energy transition:
Unmaximised green financing ecosystem

The Philippines has taken recent and significant steps to grow the green finance system in the country.

In fact, the Philippines is recognised as one of the key performers in the region in terms of green finance,[195] tapping the international capital markets with its offering USD 2.25 billion triple tranche 5-year, 10.5-year and 25-year Global Bonds. Issued under the Philippines' Sustainable Finance Framework, the 25-year Global Bonds marks the country's debut ESG Global Bonds and first triple tranche USD offering[196].

Nonetheless, closing the financing gap remains to be seen due to a number of factors, including the lack of visibility and awareness on green investment opportunities, as well as the pending incorporation of climate risk exposure into energy infrastructure planning.

Pending integration of major regional grids

With the anticipated energy surplus in the Mindanao region and deficit in Luzon and Visayas,[197] the establishment of an energy sharing system in the Philippines can help mitigate opportunity costs caused by ongoing issues with access to electricity, while also promoting further efficiency in managing energy sources.

However, the Mindanao-Visayas Interconnectivity Project (MVIP), which was launched in November 2018, is yet to be finalised, due to delays in implementation due to COVID-19. Nonetheless, progress has been seen in the execution of the project, with the National Grid Corporation of the Philippines[198] reporting that in the first half of 2022, critical components of the MVIP have been completed and prepared.

[195] Asian Development Bank. (2020). Green Infrastructure Investment Opportunities: Philippines 2020 Report. Retrieved from www.adb.org/sites/default/files/publication/653566/green-infrastructure-investment-Philippines-2020.pdf.
[196] Department of Finance. (22 March 2022). Republic of the Philippines prices 5-Year, 10.5-Year and Debut 25-Year Sustainability Dollar Global Bonds. Retrieved from www.dof.gov.ph/btr-release-republic-of-the-philippines-prices-5-year-10-5-year-and-debut-25-year-sustainability-dollar-global-bonds.
[197] Atty. Fuentabella, F. (2018). Energy Investment Opportunities.
[198] Leading the implementation of the MVIP

Limited access for foreign investors to do business in the Philippine renewable energy sector

At present, the renewable energy activities that have been opened to 100% foreign ownership[199] in the Philippines are geothermal, impoundment hydro, and biomass using waste-to-energy technologies. It has been underscored in more recent engagements, however, that wind and solar energy still have 60% foreign ownership limitation as indicated in the Implementing Rules and Regulations[200] (IRR) of the Renewable Energy Act of 2008[201][202].

This has limited the country's potential to further develop renewable energy projects, despite being recognised as the 2nd best investment destination for renewable energy in Southeast Asia, next to Vietnam, and followed by Thailand, Singapore, Malaysia, and Indonesia, in an April 2021 study[203].

Recommendations

Various measures and policy reforms are being recommended to further advance the country and the region's energy transition agenda. Among those particular to the Philippines are:

Developing an energy sector that is more competitive and attractive to clean energy players

The renewable energy sector not only advances the country's sustainability and electrification agendas, but it also significantly benefits the Philippine economy by generating employment and capital, among other benefits. Mechanisms to attract more investments in the industry should be established, which involves granting more market access to both domestic and international energy players.

In relation to this, the ECCP has expressed its strong support to **relaxing the foreign equity limitations in the renewable energy sector** in different meetings and policy dialogues with government decision-makers. In line with this, the Chamber supports the recent policy development, in which the DOE proposed for amendments to the Renewable Energy Act of 2008[204]. The said proposal seeks to lift the foreign participation limitation in the solar, wind, and ocean renewable energy subsectors. The Chamber and its members look forward to the finalisation and implementation of the said reform, to maximise the country's potential to attract more foreign players in the solar, wind, and ocean/tidal renewable energy sub-sectors, and support its sustainability goals.

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[199] Large-scale or with capital investment of at least USD 50 million.
[200] DOE. (2009). DC No. 2009-05-0008. Retrieved from https://www.doe.gov.ph/sites/default/files/pdf/issuances/dc2009-05-0008.pdf.
[201] Official Gazette. (2008). Republic Act No. 9513. Retrieved from https://www.officialgazette.gov.ph/2008/12/16/republic-act-no-9513/.
[202] Under Part IV, Rule 6, Section 19-A on State Ownership of All Forces of Potential Energy: All forces of potential energy and other natural resources are owned by the State and shall not be alienated. These include potential energy sources such as kinetic energy from water, marine current and wind; thermal energy from solar, ocean, geothermal, and biomass.
[203] Bhatia, R. and Yang, D. (April 2021). *ASEAN NEXT Renewables: All aboard for the second growth wave.*
[204] DOE. (2022). Department Circular Prescribing Amendments to Sections 19 of Department Circular No. DC 2009-05-0008. Retrieved from https://www.doe.gov.ph/sites/default/files/pdf/announcements/Draft%20DC%20Amending%20Section%2019%20of%20the%20RE%20Act%20IRR_Clean_LS10Oct2022.pdf.

Moreover, in pursuit of easing business processes in the country, the Chamber has likewise acknowledged that more work needs to be done in terms o**f streamlining processes and promoting efficiency in services for businesses**. In this light, the ECCP strongly recommends revisiting project application proceedings in the sector by reviewing priority requirements and procedures, as well as application timelines.

In relation to this, the Chamber emphasises the importance of implementing clear, integrated, robust, transparent, and timely leasing and permitting processes, and strongly supports the rationalisation of regulatory permitting processes through the **Energy Virtual One-Stop Shop** to obtain service contracts, environmental, and commercial certifications and licenses.

Strengthening financing mechanisms to further boost sustainable energy initiatives and projects

The opportunities that come along with boosting the clean energy sector can be fully maximised if enabling mechanisms, including financing opportunities, are developed and utilised. To this end, recommendations on boosting the availability of information on green investment and financing opportunities, as well as incorporating climate risk exposure into energy infrastructure planning, are relevant.

Improving access to information on financing and investment mechanisms will help businesses understand the investment opportunities in the energy sector. At the same time, the availability of information on financing mechanisms will support clean and renewable energy companies to gain confidence in undertaking energy projects.

Issuance of green bonds at local and national levels, as well as the provision of incentives, should also continue to be reviewed and implemented. This further encourages investments in the sector, while also supporting the country's objectives in technology- and knowledge transfer, as well as employment and human capital upskilling.

Promoting active collaboration between government and private sector in terms of policy development and implementation

Active collaboration in the development of policy reforms has proven effective in bringing about progress across sectors. For the energy sector, engagement among relevant decision-makers and industry experts provide support in ensuring the availability and development of technologies, programmes and projects, as well as financing mechanisms.

Multi-stakeholder collaboration likewise proves to be significant in aligning and streamlining processes and policies at a regional level.

To this end, the ECCP expresses its continuous commitment to working with the national government policymakers as well as regional partners in further enhancing a sustainable energy ecosystem and an increasingly competitive business environment.

ANNEX V: THAILAND

This Chapter on Energy Transition in Thailand has been prepared by the European Association for Business & Commerce, Thailand (EABC Thailand).

Executive Summary

Thailand is undergoing a transition away from fossil fuels towards renewable energy; however, the speed, depth, and shape of the transition remain uncertain. This uncertainty may arise due to the fact that Thailand has to balance issues of energy security and economic development, with climate change and environmental degradation.

The transition is primarily driven by the global energy outlook, government policy on climate change, and changes in customer behaviour which may impact the future of energy markets. The Thai government has continued to set carbon neutrality targets and signalled substantial shifts in public policy. As a result, there has been an emergence of increasingly complex environmental regulations in recent years.

In the past few years, the reduction of the percentage of total power capacity from coal-fired power plants, the acknowledgment of the adoption of innovative technology, and the willingness to decentralise the overall management of state utilities to a prosumer structure, were the most critical steps towards the government's continuous commitment to transitioning the country to a low-carbon society. These developments should help raise more interest from private investors and facilitate domestic innovation in the renewable energy sector with new methods and business models.

However, some of the key barriers to the energy transition include a lack of support by financial institutions for energy efficiency and renewable energy investments, a lack of domestic technological and technical resources, and effective coordination across different sectorial agencies. Another common barrier, as exists in many developing countries, is that the government may be reluctant to adopt policies associated with environmental protection if they impact economic activity. Further, the weak enforcement of existing environmental regulations could also further delay the transition.

Thailand's energy needs for the future

During the first half of 2022, secondary energy consumption came from oil at 52%, followed by electricity at 22%, then 16% imported coal, and 10% natural gas.

The Energy Policy and Planning Office ("**EPPO**") projects that energy consumption in Thailand will continue to increase across all types of energy[205].

The Power Development Plan 2018-2037 Revision 1 ("**PDP2018**"), which is the national plan for electric power development in Thailand, estimates that electricity demand could rise to 53,997 MW by 2037; accordingly, the PDP2018 foresees an electricity generating capacity of 77,211 MW by 2037 to meet this growing demand. The capacity for alternative energy generation is targeted at 18,696 MW by 2037, pursuant to the Alternative Energy Development Plan 2018-2037 ("**AEDP2018**").

With respect to natural gas, the Gas Plan 2018-2037 projects that the natural gas demand could rise to 5,348 million cubic feet per day by 2037, with a larger portion of which will be sourced from outside Thailand.

As for oil, the Oil Plan 2015-2036 projects that the demand for oil in 2037 will be 65,459 kilotons of oil equivalent (ktoe) on a business-as-usual basis and 49,125 ktoe on an energy efficiency plan basis.

While energy consumption continues to increase overall, the data from EPPO between January to May 2022 show that the domestic production capacity of primary energy has reduced, other than with respect to oil and electricity. Accordingly, Thailand has relied on substantial importation of primary energy, such as natural gas and crude oil. In the future, an increase in domestic production capacity will be needed to serve the nation's demands.

The international and regional commitments that Thailand made regarding energy transition

On an international level, Thailand is a party to the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement. On a regional level, Thailand has endorsed, among others, the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase II: 2021-2025.

Thailand pledged in its nationally determined contributions (NDC) to cut its emission by 30 to 40 percent from projected business-as-usual levels by 2030 in economy-wide sectors, including energy. Following the UNFCCC's Conference of the Parties (COP 27), the prime minister further pledged to achieve carbon neutrality by 2050 and net zero emissions by 2065 which has been reflected in Thailand's NDC Roadmap on Mitigation 2021-2030. Under this plan, the Thai government has outlined its intention to reduce greenhouse gas, including through overt support for the energy transition, as the energy sector has been and continues to be the largest contributor to Thailand's greenhouse gas emissions.

[205] http://www.eppo.go.th/index.php/th/?option=com_k2&view=item&id=18111:situation-info-highlight0600622

The future risk of climate change for Thailand and why energy transition is needed

Thailand is highly vulnerable to the impacts of climate change and is ranked in the top ten countries with the highest long-term climate change risks[206]. This could lead to extreme weather events, e.g. heat waves, extreme precipitation, and flooding, which may result in fatalities, disruption in communities' livelihoods, and extreme economic losses, as Thailand's economy relies on tourism, agriculture, and fisheries.

This risk of long-term climate change is acknowledged by the Thai government under the NDC, where mitigation efforts have focused primarily on the energy and transport sectors. As a result, the energy transition policy has been implemented by Thailand's Ministry of Energy and its departments, as well as the state electricity utilities, i.e. the Electricity Generating Authority of Thailand ("**EGAT**"), the Provincial Electricity Authority ("**PEA**") and the Metropolitan Electricity Authority ("**MEA**"), pursuant to the PDP2018 and AEDP2018 which aim to increase renewable energy in the country's overall energy mix to 30% of total energy consumption by 2037. By 2037, the main sources of power from renewable energy are expected to target solar power, biomass, and wind power.

The role of fossil fuels in Thailand's energy transition

Thailand's households and industries have continuously relied on fossil fuels as a primary source of energy. According to the data from EPPO, the majority of the consumption of primary energy from January to May 2022 was generated by fossil fuels, i.e. oil at 39%, natural gas at 38%, coal at 16%, lignite at 4%, and hydropower and imports at 3%. The transition to renewable energy transition is expected to effectively reduce the use of fossil fuels; however, to date, national policies have not taken an aggressive approach to curb the use of fossil fuels. By way of example, no carbon pricing tools have been imposed on carbon emissions as of yet, though there are now many examples of other jurisdictions around the globe and regionally implementing successful carbon taxes or cap-and-trade schemes. Also, given that a new bidding round for petroleum exploration and production blocks in the Gulf of Thailand was announced in 2022, it can be assumed that the government intends fossil fuels to remain a part of the country's energy mix for the foreseeable future.

However, with domestic reserves quickly depleting, this may provide a great opportunity for Thailand to rethink and pivot to increase investments in renewable energy projects.

Challenges with energy transition:

Impact of COVID-19 and other economic recovery programs on the fiscal capacity to support a green agenda

As citizens continue to face hardships due to the COVID-19 pandemic, the Thai government has invested a significant amount of resources on recovery initiatives to alleviate the economic impacts on individuals and businesses.

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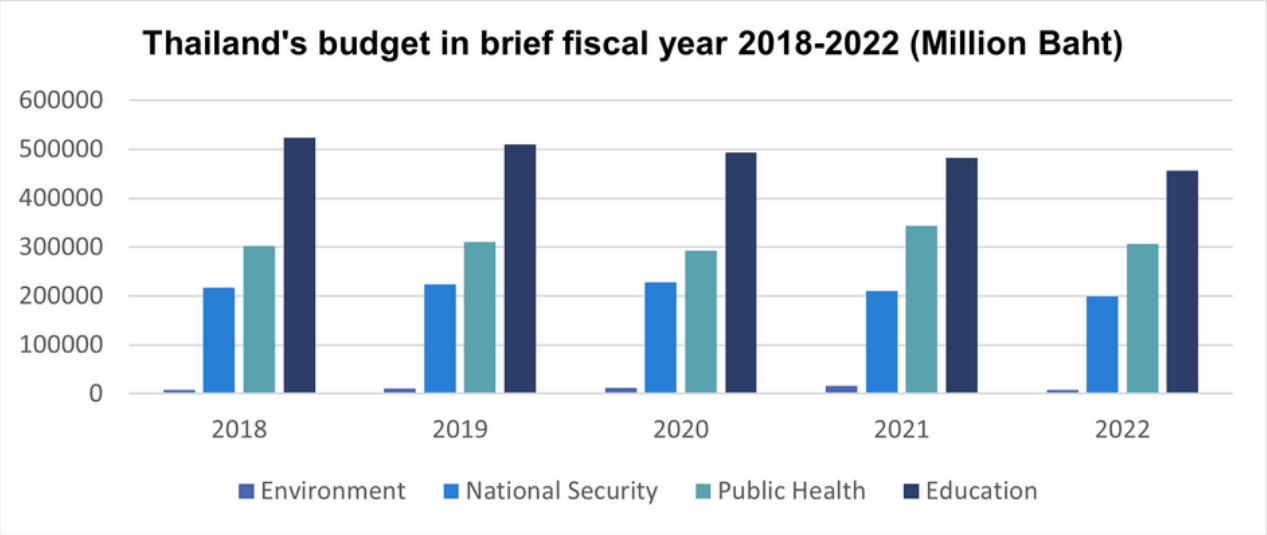
[206] https://germanwatch.org/sites/germanwatch.org/files/publication/20432.pdf

Measures have aimed to alleviate the impacts of COVID-19 on the Thai economy, and have included low-interest loans and debt restructuring initiatives.

Further, the Thai government has expedited various relief measures to support the economy, including an increase in tax-deductibility limits, tax deferrals, discounts on electricity and water bills, and lowering of the rate of contributions to social security funds for employers and employees.

The government's utilisation of funds for financing the response to the COVID-19 pandemic will likely affect the government's ability to allocate funds to other policy priorities. Whilst COVID 19 related budget allocations have been seen as necessary, they unavoidably affect other important planned public expenditures, which may result in an opportunity cost in terms of forgone or delayed projects.

In 2022, according to Thailand's Budget in Brief Fiscal Year 2018-2022 published by the Budget Bureau, the Thai government set out a budget for its appropriation for environmental protection, e.g. waste management, wastewater management, pollution abatement, of a little over THB 8.3 billion; this is the lowest amount allocated in the past five years, and is significantly lower than other agenda items as illustrated in the diagram below[207].



A limited "Green Financing" – ecosystem

As mentioned above, Thailand submitted its updated NDC to the UNFCCC in 2022, where it is committed to reducing its GHG emissions by 30% compared to the projected business-as-usual by 2030, using 2005 as its baseline year. The updated NDC highlights the need for financial support mechanisms for technical assistance in the energy sector. It also emphasises that Thailand aims to use the opportunity from pandemic recovery to build a better ecosystem and economy that is climate resilient and sustainable.

[207] https://www.bb.go.th/topic3.php?gid=549&mid=312. The column on the left denominates millions of THB.

Green financing is one of the drivers of sustainable development as it aims to increase the level of financial flows from banking, micro-credit, insurance, and investment from the public, private and not-for-profit sectors to sustainable development priorities.

As noted by the UNEP, green financing could be promoted through changes in countries' regulatory frameworks, harmonising public financial incentives, increases in green financing from different sectors, alignment of public sector financing decision-making with the environmental dimension of the Sustainable Development Goals (SDGs), increases in investment in clean and green technologies and financing for sustainable natural resource-based green economies and climate-smart blue economy[208].

In order to meet Thailand's commitments to the SDGs and the NDC, the Thai financial regulators, i.e. the Bank of Thailand, the Securities and Exchange Commission of Thailand, the Office of Insurance Commission, and the Stock Exchange of Thailand, have acknowledged their roles in driving Thailand's sustainable growth and have set themselves the goal of developing the ambitious yet practical Sustainable Finance Initiatives for Thailand. This initiative intends to transform the financial sector and limit potential negative impacts on businesses, the environment, and society as a whole. The key objectives of the Sustainable Finance Initiatives are to:

- advance the financial sector's current and future role in supporting Thailand and ASEAN in achieving a sustainable economic development model through a continual focus on the SDGs, and transitioning to a low-carbon economy by accomplishing its NDCs;
- facilitate the development and implementation of decisions and policies relevant to sustainable finance in the financial sector;
- inspire the financial sector authorities, stakeholders, and society at large to value, promote, and require the inclusion of environmental, climate, social, and governance issues and considerations within the financial decision-making processes as a means of fostering sustainable economic development; and
- set forth the implementation of recommendations and goals which advance the sustainable transformation of Thailand's financial sector by December 2025.

In this regard, Thailand's capital markets have made relatively more progress towards a comprehensive sustainable finance framework. The Stock Exchange of Thailand's collaboration with other stakeholders has been instrumental in positioning Thailand among the recognised leaders in sustainable capital markets, not only in ASEAN but around the world. The inclusion of 21 Thai listed companies in the Dow Jones Sustainability Indices Emerging Markets indicates that Thai listed companies are increasingly recognised for their environmental, social, and governance (ESG) efforts. Moreover, several institutions in Thailand have successfully issued green bonds to finance green infrastructure investment, particularly in the transport and energy sectors.

[208] "Vietnam, 2023 – 2026 – Fostering Inclusive, Green, and Private Sector-Led Growth", Asian Development Bank

Since the first issuance in 2018, more Thai companies embarking upon a green transition have issued green bonds to finance various types of investments. For example, in 2018, B. Grimm Power Public Company Limited issued maiden 5-year and 7-year green bonds, the first certified climate bonds issued in Thailand, with proceeds financing renewable energy projects in Thailand. In 2019, Energy Absolute PCL issued its maiden green bond, the first green bond for a wind power project in Thailand, to support the long-term financing of its 260 megawatt (MW) Hanuman wind farm.

In the banking sector, the Bank of Thailand has played a key role in supporting the Thai Bankers' Association (TBA) in the development of the Memorandum of Understanding on Sustainable Banking Guidelines for Responsible Lending, signed by all TBA members in October 2019 and by the Association of International Banks (AIB) members in February 2020. The Memorandum of Understanding focuses on promoting responsible lending, encouraging banks to incorporate ESG risk into their learning strategies, and translating them into implementation.

Moreover, the Siam Commercial Bank Public Company Limited (SCB), one of the leading Thai commercial banks, has officially adopted and become a signatory of the Equator Principles, a benchmark for environmental and social matters used by financial institutions globally which encourages projects across five industries, i.e., project finance advisory services, project finance, project-related corporate loans, bridge loans, project-related refinance, and project-related acquisition finance, to comply with the minimum standard of due diligence and adoption of requirements in supporting ESG principles.

Despite the above, there are still many areas that must be improved. According to the Sustainable Finance Initiatives for Thailand, while Thailand has made progress in the early phases of developing their sustainable finance ecosystem, especially in comparison with regional peers, several key dependencies should be addressed and overcome. These key dependencies include developing a practical sustainable finance taxonomy and improving the data environment.

Conflicting priorities to enable the growth of renewable energy and low-carbon energy solutions

In response to the government's policy to promote the growth of renewable energy, there are several incentivising measures to attract operators and investors to the renewable energy sector, among which are investment promotion activities and policies initiated by the Board of Investment of Thailand ("**BOI**"). The BOI provides corporate income tax holidays for business operators to boost the deployment of electric vehicles (EV), the investment in carbon capture, utilisation, and storage technologies, and for producing of renewable energy from waste, biomass, and biogas.

In contrast, the Thai government has been trying to cushion the impacts of high oil and gas prices by resorting to multiple policy tools to absorb the price shock for consumers. The excise tax rates on diesel have been reduced twice this year to control the diesel price, and the Oil Fuel Fund was drawn heavily to subsidise the retail prices of oil and LPG, resulting in a record-high deficit as of July 2022.

In addition, the promotion of investment in renewable energy and clean technology, and the shift from fossil fuels may, at times, have conflicting interests to certain state-owned entities. One example is the promotion of EV deployment and a shift from fossil fuels may conflict with the state's interest in the national oil company, PTT Public Company Limited (**PTT**), and its subsidiaries. PTT and its affiliates occupy a key position across the oil and gas sector, from upstream exploration and production to refining, transportation, and distribution.

On a positive note, adapting to this energy transition, PTT has recently expanded its business into the EV sector, as demonstrated by a joint venture with Hon Hai Precision Industry Co., Ltd (Foxconn) in early 2021 to open a platform for producing EVs and key components to serve the EV sector in Thailand.

The continued subsidy of fossil fuels

While climate change has far-reaching impacts around the world, fossil fuels are still being subsidised by the Thai government. The size of the subsidies is several times larger than the various forms of renewable energy subsidies, whether in the form of tax incentives, price fixing, compensation via direct subsidies, or other forms of support.

For example, the 'Oil Fuel Fund' was first established in 1973 with the purpose to provide funding to prevent fuel shortages, including maintaining the country's retail fuel prices if the price of oil in the world markets increases, and assisting those who suffered from elevated prices. In 2022, the Russian-Ukrainian war and COVID-19-inflicted economic downturn have resulted in highly volatile and expensive crude oil prices in global markets, resulting in many countries facing recurring inflationary pressures. Thailand is no exception, where inflation is at its highest level since the Asian Financial Crisis (Tom Yum Gung Crisis) of the late 1990s. Energy stabilisation in Thailand uses the Oil Fuel Fund mechanism to cope with the impacts of elevated global energy prices. Currently, the Oil Fuel Fund was drawn to subsidise retail prices of oil and LPG, such that the fund has run a deficit of over 100 billion baht at the end of the second quarter of 2022.

The underdeveloped power grid capacity for renewable energy integration

The current evolution from centralised production to decentralised generation and smart grids offers great opportunities to potentially resolve several problems related to energy efficiency, energy security, and certain disadvantages of energy infrastructure in an aging power system. While power generation from renewable energy and small-scale power plants has increased in Thailand in recent years, updates to the transmission and distribution grids have been somewhat slower to catch up.

In order to meet the growing electricity demand, improve the quality of service, and enhance grid capacity within the country with flexibility for interconnection with decentralised production, EPPO has introduced the master plan on Thailand's Smart Grid Development B.E. 2558-2579 (SGD2015) as a framework for developing a holistic smart grid policy.

The policy requires the relevant public agencies (i.e. EGAT, PEA, and MEA) to set development and investment directions that are consistent with its framework. The SGD2015 aims to enhance the security and efficiency of the power system and the capability of the system to accommodate power from renewable energy sources and reduce detrimental environmental impacts.

The smart grid features five technology initiatives, consisting of 1) the energy management system, 2) demand response, 3) microgrids, 4) energy storage systems, and 5) renewable energy forecasting. In mid-2022, EGAT signed a purchase and construction contract for a smart grid pilot project in Mae Hong Son province with Italthai Engineering Company Limited as part of Thailand's SGD2015. The project integrates many technologies to enhance grid stability in Mae Hong Son which will prevent power outages within the province. The smart grid system will be connected with every power plant in the province via microgrid control center systems that efficiently manage a balance between electricity generation and consumption. The project also includes the construction of a 3MW solar power plant together with a 4 MW / 1 MWh Battery Energy Storage System (BESS) added to Mae Hong Son's power generation facilities. This smart grid pilot project is expected to be completed in December 2022.

The protection and support towards communities affected by the transition

In achieving the ultimate goals of the PDP2018, while preserving environmental quality, resources, health, and welfare of communities near power plants, the power development fund (**"Power Development Fund"**) has been established by the Office of the Energy Regulatory Commission (**"ERC"**) pursuant to the Energy Industry Act B.E. 2550 (2007). This scheme requires energy business operators to contribute to the Power Development Fund at rates varying according to the energy sources and capacity of the electricity generation. Beneficiaries of the Power Development Fund are the communities located within a 1-3-5 km radius of any power plant and other nearby areas as prescribed by the fund management committee.

In addition to the Power Development Fund, the ERC has issued notifications regarding the procurement of electricity from very small power producers aiming to support community-based power plant projects in distributing income to local communities and promoting their participation in local power projects.

The community-based power plant projects involve the development of power plants that require local community partnerships. Operators will be required to jointly invest in projects with local communities where the local communities can hold shares in the project ranging from 10-40%. Local communities will also be entitled to other social and welfare development benefits located near the relevant projects, such as those related to public health, utilities, and education. The operators will be required to enter into a resources purchase agreement with the local communities to maintain the quantity, quality, and price of the resources to be supplied by the local communities.

ANNEX V: VIETNAM

This Chapter on Energy Transition in Vietnam has been prepared by the European Chamber of Commerce in Vietnam (EuroCham Vietnam).

Viet Nam has been on a sustained path of transformation from a low-income to a middle-income country since its Doi Moi (renovation) process was launched in 1986. Rapid growth (averaging more than 6.8% annually during 1990–2019) has transformed the country from one of the poorest nations in Asia into one of the most dynamic economies in the world. Viet Nam achieved lower middle-income status in 2010, and GDP per capita reached $3,684 in 2021[209]. As one of the fast-growing economies in South East Asia, Vietnam has the most significant energy market in the region, with the energy power system of Vietnam being only second to Indonesia in terms of capacity. The power sector mainly uses most of the potential of hydroelectricity and other primary resources: 29% coal, 22% gas, 3% oil[210].

The generating capacity in Viet Nam has increased from 50,0 GW in 2018 to 69,3 GW in 2020, including cross-border imports, which is three times larger than the capacity recorded in 2010 (20,4 GW). Hydroelectricity and thermal power were the primary sources of electricity in the early, with the strong growth of (domestic) natural gas in the last decade. Regarding renewable energy, Vietnam experienced sustained wind and solar power growth, with 17.000 MW of solar power and nearly 4000 MW of wind power (both offshore and onshore) in commercial operation until October 2021[211].

The demand for electricity in Vietnam is rising rapidly to power the growing economy and is drugged by the subsidized price. According to Electricity of Vietnam (EVN), the national utility power demand growth was 10.3%–11.3% per year in 2016–2020, and it is projected to grow by 8.0%–8.5% per year in 2021–2030. Viet Nam has relied on fossil fuels to meet its fast-rising energy demand. As a result, carbon dioxide (CO2) emissions have increased rapidly at 7.9% annually, faster than the real GDP rate (6.5%–7.0% annually)[212]. As a result, Viet Nam's carbon intensity, which measures CO2 emissions per unit of GDP, is higher than that of other countries in the Association of Southeast Asian Nations (ASEAN). Fossil CO2 emissions in Viet Nam in 2019 were also the highest in the ASEAN.

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[209] "Vietnam, 2023 – 2026 – Fostering Inclusive, Green, and Private Sector-Led Growth", Asian Development Bank
[210] TS. David Jacobs (IET - International Energy Transition GmbH), Toby D. Couture (E3 Analytics), Thorsten Schlößer, Leonard Hülsmann, (Energynautics GmbH), TS. Nguyễn Anh Tuấn (Viện Năng lượng),
"Một số nghiên cứu về chuyển dịch cơ cấu năng lượng gắn với phát triển hạ tầng năng lượng hiệu quả và bền vững phục vụ phát triển kinh tế - xã hội Việt Nam, giai đoạn 2030 và tầm nhìn 2045"
[211] Ibid.
[212] OECD. 2022. Forthcoming. OECD Economic Surveys: Viet Nam. Paris: OECD.

On the other hand, climate change, natural hazards, and environmental degradation impede growth. Viet Nam was the sixth country in the world most affected by climate variability and extreme weather events from 1999–2018[213]. As a result, Vietnam's total annual greenhouse gas emissions also rank 21st in the world and 2nd in ASEAN.

The international and regional agreements and commitments Vietnam made regarding energy transition

At the 21st Conference of the Parties (COP21) in 2015, the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Paris Agreement. This is a historic agreement, the first global legal framework binding the responsibilities of all Parties in joint efforts to combat climate change. The implementation of each Party's commitments to climate change response is primarily reflected through the Intended Nationally Determined Contribution (INDC). With domestic resources, by 2030, Viet Nam will have reduced GHG emissions by 8% compared to the BAU projected scenario. However, this contribution can increase by up to 25% with international support through bilateral and multilateral cooperation and implementing new mechanisms in the Paris Agreement[214].

In 2021, the top-ranking delegation of Vietnam participated actively in the UN Climate Change Conference in Glasgow (COP26), demonstrating a very high strategic vision, determination, and political commitment of the Party and the State in accelerating the economic transformation to contribute to solving the climate crisis. During the conference, Prime Minister Pham Minh Chinh committed that Vietnam achieve Net-Zero emissions by 2050 and endorsed the “Coal to clean power transition” statement. The commitment is expected to bring a transcending effect on Vietnam’s national energy security landscape and the structural and regulatory reform the country might need to enable the financial and technological access needed for the energy transition process. On the other hand, Vietnam also signed other multilateral sustainability commitments, including the Glasgow Leaders’ Declaration on Forest and Land Use and the Global Methane Pledge to reduce methane emissions by 30% by 2030 compared to 2020. Furthermore, as a participant, Vietnam committed to implementing best practices set out by the Inter-governmental Panel on Climate Change and improving national greenhouse gas inventory reporting under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement.

During the recent COP27, the Vietnam Delegation, led by Minister of Natural Resources and Environment Tran Hong Ha, reiterated its commitments made in COP26 and sent the message that the issue of green transition and energy transition are consistent policy and an economic model that Vietnam chooses. The three missions of the Vietnam Delegation in COP27 are to work with other United Nations Framework Foundation members to put the commitments into practice, emphasize Vietnam’s pioneering role and mobilise capital resources for Vietnam’s energy transition.

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[213] Intergovernmental Panel on Climate Change. 2022. Climate Change 2022: Impacts, Adaptation, and Vulnerability. Cambridge (Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change).
[214] Vietnam Updated Nationally Determined Contribution (NDC), UNFCCC, July 2020

Viet Nam's net zero carbon emissions commitment, therefore, requires redesigning the strategy for power sector development, including transitioning from coal-fired power generation to more environmentally friendly energy sources.

Regulatory framework

In general, the energy policy in Vietnam is implemented and reinforced through National Energy Development Strategies (NEDS), promulgated by the Resolutions of the Vietnam Communist Party and the Government. These legal documents must align with the national long-term socio-economic development goals. In February 2020, the Political Bureau – Vietnam's highest political decision-making body - issued Resolution 55 – NQ/TW on the Orientation of Vietnam's National Energy Development Strategy to 2030 and outlook to 2045 (Resolution 55). It aims, in particular, at fostering the development of renewable energy sources by easing the regulatory framework and improving the economic structure of the energy sector. The three climate targets in this plan are: (1) Reduce greenhouse gas emissions from energy activities compared to the business-as-usual (BAU) scenario by 15% in 2030 and 20% in 2045, (2) Ratio of energy efficiency to total final energy consumption compared to the business-as-usual (BAU) scenario to reach approximately 7% in 2030 and 14% by 2045, and (3) 15-20% proportion of renewables in the energy mix by 2030, reaching 25-30% by 2045.

To satisfy the energy demand of the growing economy, the Vietnamese government has adopted a mix of strategies. Vietnam launched the solar Feed-in-tariff (FiT) from 1 June 2017 to 30 June 2019, which, by June 30, 2019, delivered 4.46 GW of new capacity for the fast-growing power market. The next phase of market development is a wind FiT program for onshore wind power at 8.5 US cents per kWh and offshore wind power at 9.8 US cents for projects that reach a commercial operation date (COD) before October 31, 2021[215].

Vietnam is also working to create a carbon emission trading market by 2028, which falls within the framework of Degree 06/2022, dated 7 January 2022, on reducing Green House Gas (GHG) emissions and protecting the ozone layer. The Degree forms the backbone of Vietnam's carbon emission commitment, outlining key reduction targets for each ministry and the fields in which these ministries are responsible for GHG emissions.

[215] Decision No.39/2018/QD-TTg

Figure 1: Vietnam's GHG emissions reduction target by Ministries in 2030

Ministry	Field	CO2 million tons
Ministry of Industry and Trade	• Energy production • Energy consumption in industry	268.5
The Ministry of Transportation	• Energy consumption in transportation	37.5
Ministry of Agriculture and Rural Development	• Energy consumption in agriculture • Agricultural production • Forestry	129.8
Ministry of Construction	• Industrial processes • Energy consumption in cement production • Building	74.3
Ministry of Natural Resources and Environment	• Waste treatment	53.7
Total by 2030		563.8

These statistics further strengthen the pressure on the energy sector to reduce emissions, with the heavy work lies with the Ministry of Industry and Trade (MOIT).

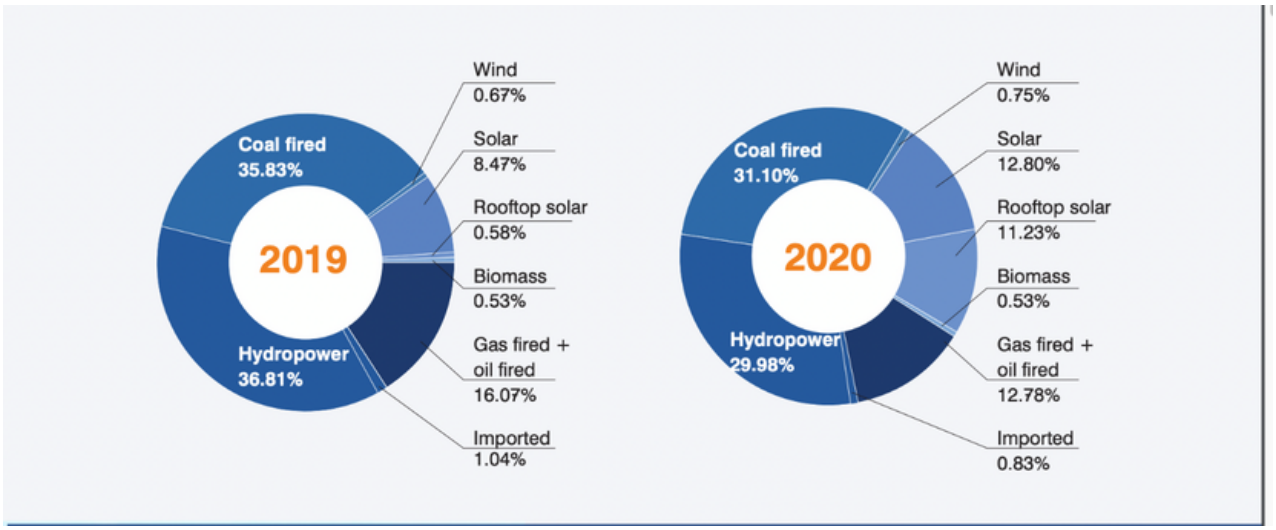
With a top-down planning model, Vietnam needs more efficient coordination between the local and the central government and increased flexibility in the planning process. The most important and most awaited legal document for the energy sector is the Power Development Plan VIII (PDP8) drafted by the MOIT. This document sets the roadmap for Vietnam's national energy development to 2030 with a vision to 2045, including energy mixes for the next five to ten years, investment milestones, and the development of renewable energies with a strategic shift to offshore wind. Up until now, wind and solar are considered the new clean energy source and encouraged to exploitalbeit not to the maximum capacity, while the scale of imported LNG gas power should be reduced by 2030. This is in line with a previous comment that LNG is still a fossil fuel, costly and fluctuating due to ongoing geopolitical tensions and climate change[216]. The master plan shall cover ten years, with a review every five years. This proposed timeline does not allow a flexible planning process, raising concerns about the ability to maintain the least-cost sector development[217].

[216] MOIT's official answer to Deputy Prime Minister Le Van Thanh on 20 May 2022
[217] OECD, Clean Energy Finance and Investment Policy Review Vietnam

Latest PDP8 Draft

Hydro was historically the main source in Vietnam's energy mix. Later, coal began to take a larger role as the most controllable source to help drive the growing national economy due to low price, compatibility with the current energy infrastructure, and capacity as baseload electricity. However, Vietnam has gradually prioritised RE in recent years, becoming a leading regional solar market with 17GW installed by the end of 2020 (between utility size and RTS. Vietnam Energy Outlook Report 2021 shows that Vietnam could deliver on the net zero commitment but would require heavy inclusion of renewable energies, especially solar (71%) and wind (21%)[218].

Figure 2: Energy mix in 2019 and 2020[219]



The orientations serving as the basis for formulating Draft PDP8 are as follows:

- To enhance the autonomy of the power sector, maximum exploitation of the domestic primary energy resource for electricity production to reduce the dependence on foreign countries:
- To promote the development of RE sources (wind power, solar power, etc.) at a reasonable price. Especially the development of renewable energy sources for local consumption or export without transmission of electricity into the national grid (particularly for the production of hydrogen, green ammonia, etc.) will be prioritized;
- To encourage the development of rooftop solar power and solar power at production-business establishments in the form of self-production and self-consumption without transmission of electricity into the national grid;[220] and
- To promote the development of various types of pumped-storage hydroelectricity, hydroelectricity from irrigation reservoirs, and reservoirs for load regulation, capacity backup, and utilization of hydroelectricity sources.

[218] EREA & DEA: Vietnam Energy Outlook Report 2021 (2022)
[219] EVN Annual Report 2021
[220] It is to note that in fact, the PDP8 does not allow new solar project, and the RTF is also not included.

Throughout this year, the MOIT has submitted multiple PDP8 drafts, with the latest dated 11 November 2022. The MOIT is showing stronger determination to cancel coal pipeline and making clearer roadmap toward converting coal-based and gas-based power plants: No coal-fired thermal power plants shall be built after 2030, and coal-based power shall be stopped altogether by 2050. LNG-based power shall not be developed after 2035, start burning with hydro from 2030 with the starting rate of 20% and by 2050 all LNG-powered plants shall convert completely to hydro-powered.

Figure 3: Vietnam Power Mix Plan

(MOIT Report 7194 on the Draft PDP8, dated 11 November 2022)

Installed capacity: 145,989 MW (excluding rooftop solar power and cogeneration)					
		By 2030		**By 2050**	
No	**Category**	**Capacity (MW)**	**Percentage**	**Capacity (MW)**	**Percentage**
1	Coal-fired thermal power*	37,127	20.6%	0	0
2	Domestic gas thermal power	14,930	10.2%	7,900	1.6%
3	LNG thermal power**	24,500	16.8%	0	0
4	Imported power	5,000	3.4%	11,042	2.2%
5	Large-scale solar power	8,736	6.0%	136,573	27.2%
6	Hydropower (including small hydropower)	28,946	19.8%	36,016	7.18%
7	Offshore wind power	7,000	4.8%	87,000	17.3%
8	Onshore wind power	21,480	14.7%	66,050	13.2%
9	Biomass and other RE	2,270	1.6%	6,015	1.2%
10	Pumped-store hydropower and energy storage battery	2,700	1.8%	42,550	8.5%

* From 2040, biomass/ammoniac mix with coal in thermal power plant. From 2050, coal-fired thermal power plant shall convert completely to biomass

** LNG power shall reach 28.500 MW (12,9%) in 2035. By 2050, it's expected to be reduced to 7,500 MW (1,5%) burnt with hydrogen, and 24.500 MW (4,9%) to be converted completely to hydrogen.

The inclusion of a Battery Storage System (BESS) in the energy mix starting with 50MW in 2025 and increased capacity between now and 2050 signals a pragmatic shift of MOIT, potentially paving the way to a new energy industry. However, there is no existing regulatory framework on BESS.

Challenges with energy transition:

Impact of COVID-19 and the international situation

The country weathered the coronavirus disease (COVID-19) pandemic impact relatively well in 2020. However, the Delta variant waves in 2021 had severe impacts on people's lives, employment, and income. Growth slowed to 2,9% in 2020 and further down to 2021 compared with 7% in 2019[221].

The crisis left by COVID-19 has made businesses no longer focus on environmental protection issues. After many months of operating in moderation or suspending production and trade due to the distancing orders from the Government, several businesses still operating so far have sought to maximise profits after a long time facing the situation. A state-of-loss, can lead companies to pay little attention to ensuring environmental targets but instead focus on the production and business process of seeking profit[222].

During the outbreak of the COVID-19 pandemic, many winds and solar power plants - the top priority energy source for maximum capacity - were forced to reduce output many times in 2020 and 2021 because of grid overload and a lack of technical requirements to ensure the safety of the national power system. A report by the Electricity of Vietnam (EVN) shows that in 2020, about 365 million kWh of solar power had to be reduced. In 2021, the untapped power output of renewable energy sources (including wind and solar power) increased to nearly 1.7 billion kWh due to the problem of oversupply at noon and road overload. 500kV super high voltage wire. This situation wastes a large amount of produced clean energy, and the investment in economic and efficient energy use also could not reach the expectation[223]. One hundred forty wind projects were considered eligible for FiT. Still, many of these have been disrupted by the pandemic due to a delay in the transportation and installation of wind turbines. According to EVN, a total of 106 wind power plants submitted dossiers to register for energising and grid connection, testing, and COD before the deadline with a total capacity of 5,655MW; however, as of August 2021, only 24 wind power projects were launched, with a full capacity of 963MW[224].

[221] Vietnam, 2023-2026

[222] ThS. Trần Linh Huân, Lê Phạm Anh Thơ, Trần Minh Thiện, "Cơ hội, thách thức đối với tăng trưởng xanh trong bối cảnh hậu Covid-19 tại Việt Nam và định hướng hoàn thiện", Banking Review. Available at https://tapchinganhang.gov.vn/co-hoi-thach-thuc-doi-voi-tang-truong-xanh-trong-boi-canh-hau-covid-19-tai-viet-nam-va-dinh-huong-ho.htm, last accessed 12 September 2022.

[223] "Covid đã ảnh hưởng thế nào đến hiệu quả năng lượng ở Việt Nam", Voice of Vietnam (VOV). Available at https://vov.vn/kinh-te/covid-19-da-anh-huong-the-nao-toi-su-dung-hieu-qua-nang-luong-o-viet-nam-post927777.vov, last accessed 12 September 2022.

[224] "Looming FiT deadline impels actions". 6 October 2021. Available at < https://vir.com.vn/looming-fit-deadline-impels-action-88229.html>

The war in Ukraine, followed by sanctions on Russia, has and will continue to impact the global economy, especially in the energy sector. Several energy projects between Vietnam and Russia are negatively affected[225]. At the same time, sanctions from Western countries resulted in shortages and increased prices for many commodities such as oil and gas, leading to unpredictable price fluctuations and supply chain disruptions; energy security has become central to the strategic development choices being made by many countries. And as domestic gas supplies declines, the greater reliance on renewables may become the standard bearer of Vietnam's national energy security policy and practice.

Vietnam Wholesale Electricity Market

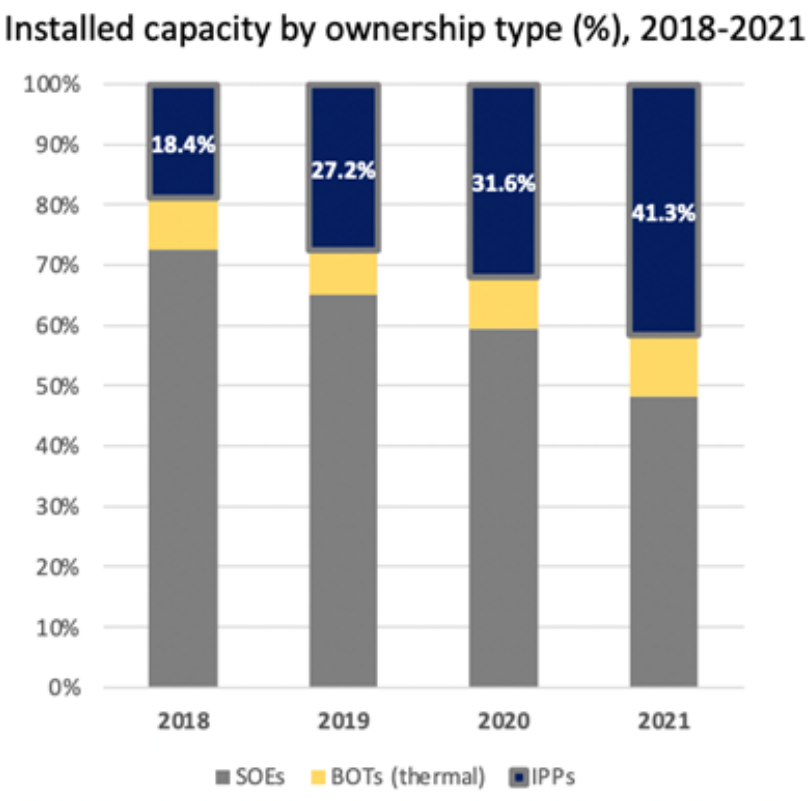
Vietnam's energy sector is mainly state-owned, with State-owned enterprises dominating the coal, oil, gas, and electricity sectors. The Vietnam Power Group or EVN is granted a monopoly over the national power supply chain and infrastructure, even if no more in production. EVN is a barely break even company due to electricity tariffs beung at susidized levels, so every year it needs the governemnt to input the missing capital. Therefore, no significant investments in infrastructure were made in the past five years due to a lack of extra financial allocation. The net-zero emission target set in COP26 presents renewable energy businesses with opportunities to undertake new policy initiatives.

The past few years have observed a new generation of highly diverse and resourceful domestic power producers support Vietnam's growth needs. These local players led market growth thanks to their competitive strengths in local infrastructure project development experience and the modular nature of renewable energy that enabled financing from the domestic capital market[226].

[225] Ảnh hưởng cuộc chiến Nga Ucraina đến các dự án hợp tác năng lượng tại Việt Nam. Available at < https://nangluongvietnam.vn/anh-huong-cuoc-chien-nga-ucraina-den-cac-du-an-hop-tac-nang-luong-tai-viet-nam-28460.html>. Last accessed on 15 September 2022

[226] Thu Vu, "The Quiet Rise to Prominence of Vietnam's Renewable Energy Corporates: Homegrown Businesses on Track to Define Power Sector's Low-Carbon Future", Institute for Energy Economics and Financial Analysis, September 2022.

Figure 4: The Real Privatisation of Vietnam's Power Sector



Source: EVN's National Load Dispatch Center

Nevertheless, the transition requires more than domestic corporates to achieve the targets. The World Bank estimates that Vietnam shall need around 12-14 billion USD per year for the energy transition; timely innovations in the sector-specific investment climate will spur private sector participation, helping to attract the bulk of the required investments.

With the solar FiT expiry in December 2020 and the wind FiT expiry in November 2021, there exists a regulatory vacuum as details of the future auction programme are unavailable.

In light of that, the MOIT has piloted scheme of– the Direct Power Purchase Agreement (DPPA). The pilot scheme, which was expected to run in the period 2021-2023, would, for the first time, enable renewable energy generators to sell clean electricity to private off-takers via a contract for difference (CfD)/virtual power purchase agreement (PPA) arrangement. It is expected to run for two years from 2022-2024, and support Vietnam's transition in the liberation of the wholesale and retail market prices. Under this PPA scheme:

- the generator and EVN will enter into a PPA under which EVN will purchase from the physical generator electricity at the wholesale spot price;
- the off-taker will purchase physical electricity from EVN at the retail spot price (which is marginally higher than the wholesale spot price to take into account EVN's transmission and administrative costs); and

- the generator and the off-taker will enter into a CfD/virtual PPA mainly to document a pre-agreed electricity purchase price (generally referred to as the strike price). The off-taker and generator are at liberty to determine how this CfD pricing mechanism will operate, but in simple terms, if at any given time, the strike price is:
  - higher than the spot price, the off-taker will pay the generator the difference; or
  - lower than the spot price, the generator will pay the off-taker the difference[227].

This mechanism also provides a chance for generators of solar or wind power plants that either (1) have achieved COD but failed to do so before the expiry of the FiT for wind and solar (1 November 2021); or (2) are currently under construction and included in the current Power Development Plan and which can achieve COD within 270 business days from commencement of the DPPA pilot scheme.

However, this PPA model is considered unbankable and hinders investors from investing more in RE projects. As EVN is the sole buyer in Vietnam, project developers have no alternative market available and must factor the risk into the price. Generators also have no security interests if EVN fails to complete the total payment obligation. In case of disputes, the settlement procedures shall be handled by MOIT's agencies, raising concerns about transparency in the process.

The MOIT has prepared several draft DPPA, with the latest dated 20 May 2022, for stakeholder consultation. Until the date of this report, however, no specific launch date for the DPPA pilot scheme has yet to be confirmed by the Prime Minister.

Other regulatory issues

For transitional power projects:

For projects already priced at FiT, the most significant difficulty is having their capacity cut (curtailed). Since FiT expired for solar power projects (31 December 2020) and wind power projects (31 October 2021), for "transitional projects" under active development at the time of FiT expiry but failing to meet the relevant FiT deadline, they have not sold any electricity for the last two years (solar power) and one year (wind power). On 10 October 2022, the MOIT issued Circular 15/2022/TT-BCT providing regulations on formulating power-generating tariff ranges for these projects. This Circular, nevertheless, does not provide any concrete provision on determining the tariff for a specific transitional plant, and MOIT proposed involving EVN in the determination process. Though there is much to discuss between the two agencies, it seems that they both agree that transitional projects have the option to register to participate in the Vietnam Wholesale Electricity Market voluntarily. The contracted tariff, in that case, might need to be within the tariff range in respect of committed capacity. There is much uncertainty in this approach regarding how a specifically contracted tariff would be agreed upon and how committed capacity would be determined for a given plant[228].

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[227] Vietnam's Direct PPA Pilot Scheme| Energy Market Update – June 2022, Mayer Brown. Available at <https://www.mayerbrown.com/en/perspectives-events/publications/2022/06/vietnams-direct-ppa-pilot-scheme-energy-market-update-june-2022>

[228] Giles Cooper, Huong Tran, "Circular 15 issuance a baby step towards resolving orphaned transitional wind and solar projects in Vietnam" 17 October 2022. Available at https://www.allens.com.au/insights-news/insights/2022/10/circular-15-issuance-a-baby-step-towards-resolving-orphaned-transitional-wind-and-solar-projects-in-vietnam/#Footnotes

On 20 November 2022, EVN sent a letter to MOIT and the Electricity Regulatory Authority of Vietnam (ERAV), proposing four methods to calculate the tariff for transitional projects based on the data submitted by 208 investors of these projects. EVN disclaimed that they only used the submitted data for calculation; thus, the figures were only hypotheses and would need further examination and approval from the MOIT. The initial response from the business community seems to be negative, stating that the low ceiling tariff rate proposed shall cause enormous losses for investors, considering that the investment amount increased by 20% - 30% due to the impacted supply chain during COVID time.

Grid network challenges

One of the critical shortcomings existing during the implementation of PDP7 includes the mass development of wind power and solar power. In contrast, the development of the transmission grid has not kept the pace. This private sector propelled bloom outpaced the ability of the grid to integrate the energy flows, resulting in a pause on solar and wind projects earlier this year. The latest Draft PDP8 estimated that for the period 2021-2030, investment for grid transmission shall be around 15,2 – 15,6 billion USD; this amount shall increase to about 21,7 – 35,1 billion USD for the period 2031 – 2050.

The responsibility of managing and operating all transmission lines lies solely on EVN and is becoming a burden not only for the state-owned agency but also a concern for RE investors. The Electricity & Renewable Energy Authority, an agency under the MOIT, is drafting a Decree guiding Article 6, Law No. 03/2022/QH15, on investment in the construction of transmission power grids to attract all economic sectors to invest in connecting to the transmission power grids load to ensure national defence and security.

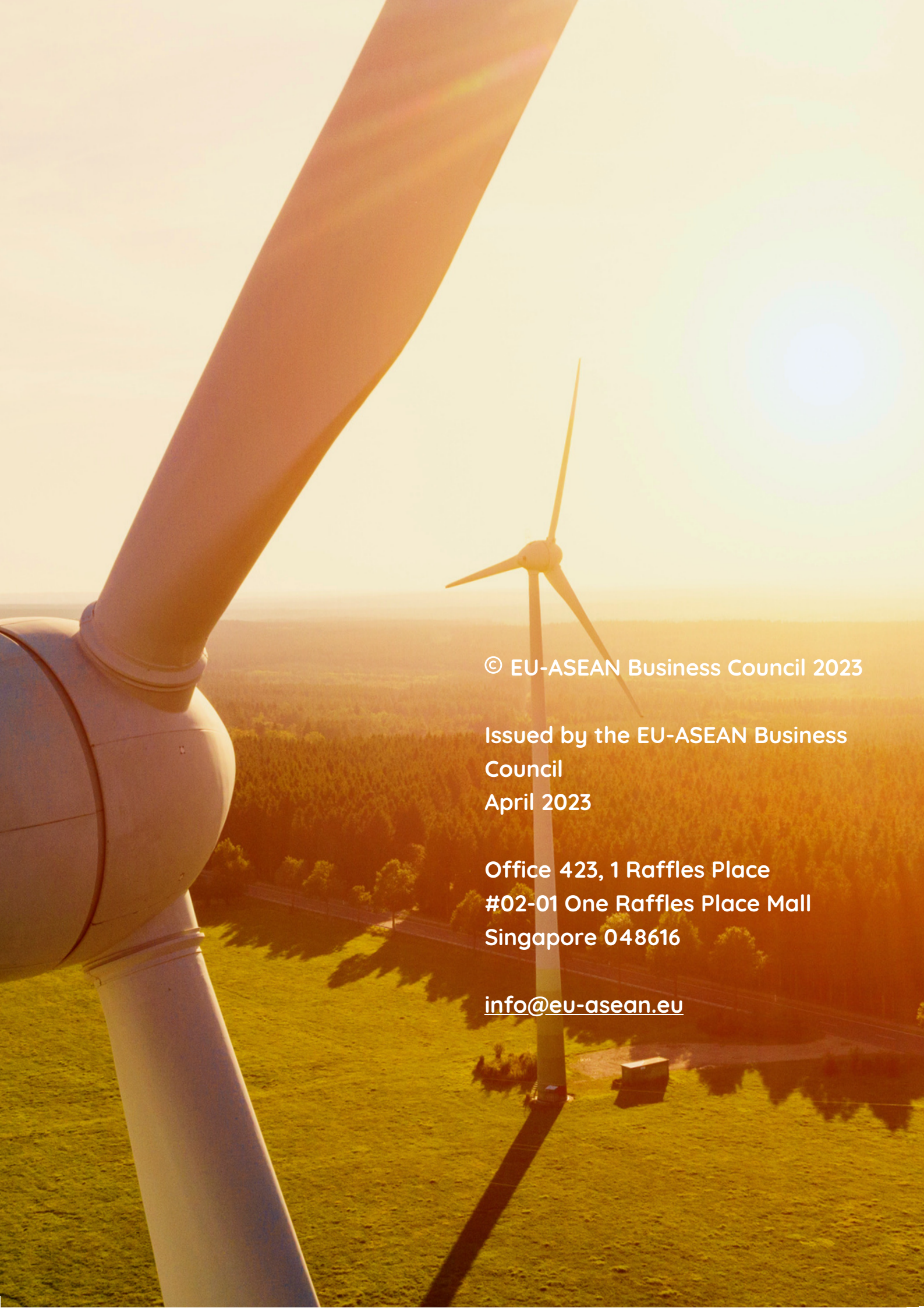
Offshore wind projects

Offshore wind power shall account for 7.000 MW in 2030, according to the latest PDP8, proving the importance of this energy source in the energy mix. The legal framework, however, has not been developed to accompany this growth. The term “offshore wind” is not yet defined in legal documents, and there’s no regulation on pricing and bidding mechanism for these projects yet. The latest Draft PDP8 only states the capacity for offshore wind energy by regions, not by provinces. Offshore wind development also needs to be aligned with the Marine Spatial Plan, which is currently being developed.

Recommendations

- Resolve regulatory uncertainty in the RE procurement mechanism to provide investors and new market entrants confidence.
- Increase the speed of implementation and ambition of the Nationally Determined Contributions (NDCs) greenhouse gas emissions reductions, reflecting increased targets for clean energy and better energy efficiency measures.
- Maximise the contribution of solar, biomass, small hydropower, wind, and especially offshore wind power within the energy system.

- Define the industrial and commercial power tariffs that are likely to be applicable under the PDP8 in a clear Roadmap to Power Tariffs to 2025.
- Offer a temporary tariff to the producers who are ready but do not have a contract
- Clarify security and other rules for RTS, as currently, all facilities are in regulatory limbo.
- Prepare the new auction mechanisms with clear regulatory conditions and transparent and speedy procedures.
- Encourage EVN and the IPPs to investigate the benefits of overall storage capacity at clean energy plants of all types, including rooftop solar power plants.
- Revise the contracts between EVN and clean energy producers to meet international standards to harvest the full cost-reduction benefits of the planned auction processes.
- Expand the DPPA pilot project, encourage private investment in the critical power transmission network, and allow investors who meet the requirements to build 220kv and 500kv transmission lines.



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