

ASEAN GREEN  
FUTURE PROJECT  
PHASE 1 REPORT

# The agenda for decarbonizing ASEAN

NOVEMBER 2021

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## DISCLAIMER

A draft of this report was prepared by ClimateWorks and then elaborated by the participants in the project. The views in the report do not necessarily represent the views of individual country teams, nor of each author on every point. This is a group initiative in its first phase, with a more detailed analysis to come in the second phase of the project.

This research has also been developed independently of the ASEAN Secretariat and Member Governments. As such, views and opinions expressed do not necessarily reflect the views and opinions of the ASEAN Secretariat or ASEAN Member Governments.

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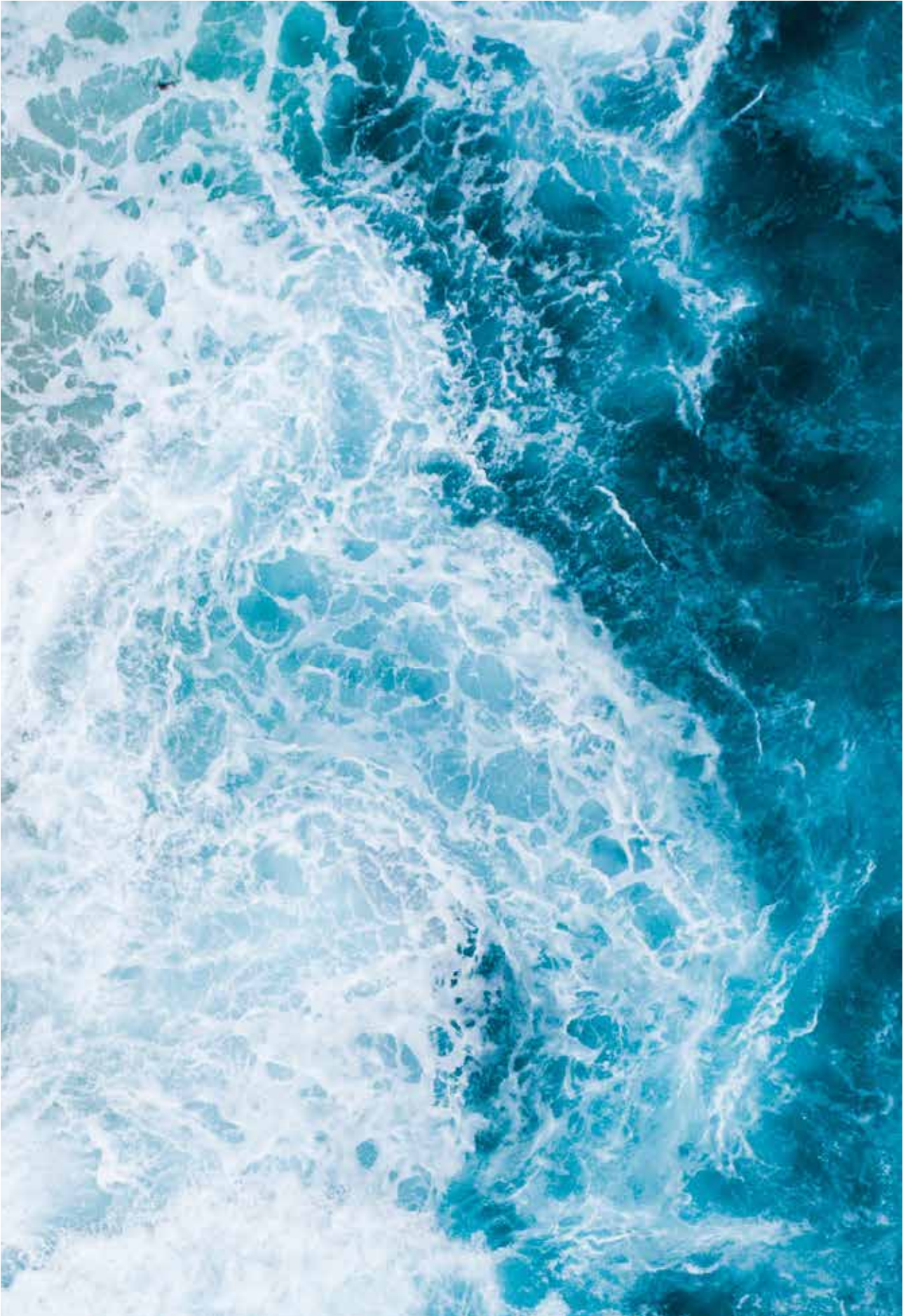
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# Contents

<b>Project partners</b>	<b>6</b>
<b>About this report</b>	<b>7</b>
<b>Executive summary</b>	<b>8</b>
<b>1. We are in a growing global emergency. The dangers are clear.</b>	<b>14</b>
<b>2. The ASEAN region has a critical role to play in global climate action.</b>	<b>18</b>
<b>3. The pathway to stabilize global emissions below 1.5°C is well understood.</b>	<b>29</b>
<b>4. The region has a compelling green economy opportunity waiting to be seized.</b>	<b>39</b>
<b>5. The rapid transformation needed in the ASEAN region won't happen without significant international support.</b>	<b>45</b>
<b>6. ASEAN member states also have a critical role to play in enhancing the enabling environment for investment.</b>	<b>55</b>
<b>7. The ASEAN region can capitalize on key opportunities to fast track the transition and reap the benefits.</b>	<b>64</b>
<b>Bibliography</b>	<b>67</b>



# Project partners

The ASEAN Green Future project is a collaboration between the UN Sustainable Development Solutions Network (SDSN), ClimateWorks Australia, the Jeffrey Sachs Center on Sustainable Development at Sunway University, and research groups from across Southeast Asia.

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# About this report

The ASEAN Green Future project is a collaboration between the Sustainable Development Solutions Network, ClimateWorks Australia, the Jeffrey Sachs Center on Sustainable Development at Sunway University, and research groups from across Southeast Asia (Cambodia, Indonesia, Laos, Malaysia, and Thailand, with potential participation by Brunei, Myanmar, the Philippines, Singapore, and Viet Nam in the future). The project aims to demonstrate how sustainable, decarbonized economies offer enhanced economic development and more resilient futures for the region.

The Phase 1 Report of each country team presents the emissions profiles for each nation and the key technology and policy challenges ahead in its decarbonization journey. This report, *The Agenda for Decarbonizing ASEAN*, discusses the region as a whole, cites global trends, and makes recommendations as to how ASEAN may reach net zero in line with the global goal of stabilising global temperature rise at 1.5 degrees. It highlights the region's compelling green economy opportunities as well as the role of the international community in financing, technology and knowledge transfer. The report draws from a variety of sources, including but not limited to the individual country analyses. As such, views and opinions expressed in this report are that of the authors alone and do not necessarily reflect the views and opinions of the other scholars and institutions involved in the project.

This series of Phase 1 reports, produced through a synthesis of existing research and knowledge, builds the economic and technical case for decarbonization. Phase 2 of the ASEAN Green Future Project will undertake quantitative assessments of the different options for decarbonizing ASEAN countries. This work will be specifically tailored to each country context and build on, facilitate, and complement like-minded efforts that governments may be leading.

# Executive summary

## **We are in a growing global emergency. The dangers are clear.**

**The science is clear: the risks of exceeding 1.5°C are unacceptable.** Although the global COVID-19 pandemic saw a temporary reduction in emissions, atmospheric concentrations of carbon dioxide are now at a level unmatched for at least 2 million years. The latest IPCC analysis shows if the world can reach net zero emissions by 2050, warming could peak at 1.6°C, and even drop thereafter.

**The world is at a tipping point on climate action. More countries are pledging net zero.** If the ASEAN region and its member states are to position themselves to benefit from global economic transformation, raised ambition must be on the table.

**The IEA Net Zero by 2050 report provides a roadmap for the global energy sector.** It shows that achieving net zero is not only possible, it is socioeconomically desirable, showing that global gross domestic product (GDP) increases if the net zero energy pathway is implemented.

**The goals of the Paris Agreement cannot be achieved without significant contributions from agriculture, forestry and other land use (AFOLU), which could contribute 25 percent of the emissions reductions needed.** While eliminating all possible emissions from energy generation and use is critical to stabilizing global temperatures, nature-based solutions play an equally important role in both reducing emissions and sequestering atmospheric carbon.

## **The ASEAN region has a critical role to play in global climate action.**

**ASEAN and its member states have demonstrated strong commitment to climate action.** Region-wide action has been increasing, especially around mitigation-aligned initiatives including renewable energy deployment, energy efficiency, and AFOLU.

**Yet emissions in the region are amongst the fastest growing in the world.** Population growth, rising income levels, and subsequent development gains in Southeast Asia over recent decades have been mirrored by the fastest increases in emissions globally. Rising emissions are being driven in large part by the region's dependence on fossil fuels. Coal use is rising and projected to continue to rise over the next 20 years, in contrast to global trends.

Without concerted effort to transition to clean energy sources, energy-related emissions across ASEAN will almost double by 2040. While Southeast Asia has considerable potential for renewable energy, it currently meets only 15 percent of the region's energy demand. In 2019 and 2020 Viet Nam installed more than 16 gigawatts of renewable energy demonstrating the opportunity for rapid uptake of renewables in the region.

Emissions from AFOLU are also significant across the ASEAN region, driven in large part by deforestation, peatland degradation and agriculture such as rice production. The past two decades have seen the region's forests shift from being a net sink to a source of emissions, releasing almost 500 million tons of (CO<sub>2</sub>e) per year.

**Emissions growth is still closely tied to development gains.** Since 2016, and prior to the pandemic, poverty fell across the region by close to 2 percent and overall GDP per capita grew by 4.5 percent. However, the pandemic has pushed 75 to 80 million people into extreme poverty across developing Asia, including the ASEAN region. Pre-pandemic socioeconomic gains can only be built upon through more sustainable models of growth.

**Development gains are reflected in the region's increasing economic strength.** ASEAN has clear economic clout and privileged access to the world's biggest economies, coupled with its geographical location as a trade hub at the heart of the Indo-Pacific region. ASEAN's ability to fully capitalize on trade opportunities will depend on how it adapts to the global economic transformation to net zero.



**The risks of delaying climate action far outweigh any perceived benefits.** Economic losses from climate change could be 60 percent higher than previously estimated, potentially reducing regional gross domestic product by 11 percent by 2100, or by as much as 37.4 percent as estimated by Swiss Re. By contrast, meeting the Paris Agreement goal of stabilizing global temperature at well below 2 °C would see the region’s adverse GDP impacts limited to just 0.8 percent.

Trade penalties from key trade partners signal the complex risks ASEAN countries face if they are not prepared. The European Union (EU) is planning to introduce a carbon border adjustment mechanism in 2023. Similarly, other key trade partners such as the United States of America (USA), China, Japan, South Korea and Taiwan are all considering or implementing some form of carbon pricing with varying implications.

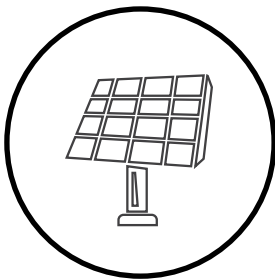
The risk to finance flows relates primarily to the growing trend for international development and private finance to exit fossil fuel investments. The rate at which coal financing is being phased out is accelerating. South Korea and Japan committed to ending coal financing in early 2021 while China, the largest provider of coal financing, has also announced that it will end financing for new coal plants abroad. Moreover, financial institutions are following suit.

## The pathway to stabilize global emissions below 1.5 °C is well understood.

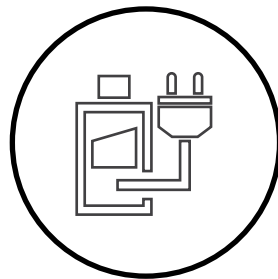
There are effectively four ‘pillars’ of decarbonization that can be universally applied to guide decarbonization planning.

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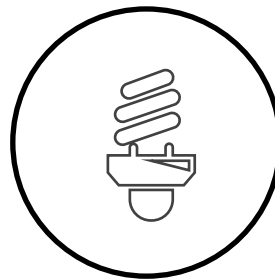
### THE FOUR PILLARS OF DECARBONIZATION.



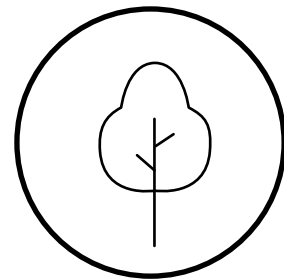
**Decarbonize  
electricity  
generation**



**Shift from  
fossil fuels  
to electricity  
or other  
clean energy  
alternatives**



**Reduce  
energy waste  
in buildings,  
transport and  
industrial  
sectors**



**Preserve  
and increase  
natural  
carbon sinks**

Source: Adapted from ClimateWorks Australia (2014) and The World Bank (2015)

**1. Decarbonize electricity generation.** To stabilize global temperature rise at or below 1.5°C, proposed coal-fired power plants must be shelved in favor of zero-carbon alternatives. Currently, most Southeast Asian countries have plans to expand coal-fired power generation.

The potential for renewable energy remains largely untapped across the region and the pace of renewables adoption across the ASEAN region is not yet on track with the goal of the Paris Agreement. There is a growing trend to displace coal with gas-fired power generation, which presents similar risks in the medium term.

**2. Shift from fossil fuels to electricity or other clean energy alternatives.** This includes electrification of transport and industry, or switching to other zero-emissions fuels where electrification is not possible. While the region's commitment to transport electrification is evident, it must be planned in parallel with clean power infrastructure to ensure that a shift to electric transport does not further lock-in the region's dependence on coal-fired power generation.

Green fuels such as green hydrogen will also have a role to play. ASEAN has ample quantities of the resources required to produce green hydrogen. This provides an opportunity to both green the region's energy supply, and increase the region's own energy production which can, in turn, enhance energy security.

**3. Reduce energy waste in buildings, transport and industrial sectors.** Energy demand has increased by 60 percent over the past 15 years across the ASEAN region and is expected to grow by a further 60 percent by 2040. A shift to smart appliances, improved building design, better materials and other cost-effective energy saving approaches will be key to putting the brakes on the ASEAN region's accelerating energy demand.

Investing in energy efficiency pays off. It is estimated that across six ASEAN member states, increasing total energy investment by 1–4 percent, and directing this toward energy efficiency could reduce the increase in primary energy demand to 2030 by between 8–25 percent.

**4. Preserve and increase natural carbon sinks.** Shifting to more productive, adaptive and regenerative agriculture can strengthen food security and enhance resilience to a changing climate.

Protecting and restoring the region's forests is critical to climate action and sustainable development. The forests of Southeast Asia are amongst the richest and most valuable resources and habitats on earth. Yet Southeast Asia holds the unenviable title for the highest rate of deforestation of any major tropical region. Peatland protection and restoration is an important opportunity for several ASEAN member countries as these naturally store almost twice as much carbon as forests.

## **The region has a compelling green economy opportunity waiting to be seized.**

**Accelerating climate action in line with the 1.5°C global goal is both possible and economically desirable.** Sustainable and green economies offer enhanced economic development, job creation, and a more resilient future for the region. It is estimated that developing Southeast Asia's green economy could provide up to US\$1 trillion in annual economic opportunities by 2030.

Encouraging transformation across the region's industrial and manufacturing sectors can support emissions reduction and enable a shift toward circular economies. Policies that facilitate a shift toward a circular economy are also critical for reducing emissions, minimizing natural resource depletion and addressing waste, as well as improving overall economic benefits.

A transformation to a sustainable and green economy can strengthen longer term competitiveness in a global market that increasingly requires low-carbon products. Rapid deployment of low-carbon infrastructure such as renewable energy and green fuels, building on the ASEAN Plan of Action for Energy Cooperation (APAEC), would also help to meet a dramatic rise in energy demand in ASEAN.

As domestic and international finance increasingly shifts toward sustainable and low-carbon modes of economic development, ASEAN has a unique window of opportunity to build on its commitment to sustainable development by transforming its socioeconomic model into one that focuses on social, environmental and economic sustainability.

**Regional coordination to build and strengthen low-carbon value chains could catalyze the rapid transformation of ASEAN to a global low-carbon hub.** Strong existing trade relationships with global low-carbon leaders position ASEAN well in the low-carbon race. ASEAN member states have an opportunity to accelerate the green industrial transition through these trade relationships, particularly with countries such as China, Japan and South Korea who are already specialized in low-carbon innovation.

As the world pivots toward low-carbon growth, countries that can provide the capabilities and infrastructure to participate in this transition will reap the development benefits.

**The rapid transformation that is required will come with trade-offs that must be managed.** While ASEAN and its member states have much to gain by positioning the region as a low-carbon manufacturing hub, the global transition will come with unavoidable trade-offs. The Just Transition movement provides guidance on how industries and communities can best be supported, to minimize the negative impacts of the transition and maximize the opportunities.

## **The rapid transformation needed in the ASEAN region won't happen without significant international support.**

**High-income countries still have much to do.** The Paris Agreement recognized the urgent need for developed countries to take the lead in reducing emissions and to provide finance, technology and capacity building to support climate mitigation and adaptation in developing countries.

**Global financing pledges must be met and ramped up, and access to finance must be enhanced across ASEAN to bolster mitigation and adaptation needs.** The US\$100 billion climate financing commitment made by developed nations at COP 15 has not fully materialized, and there is an urgent need for a renewed commitment accompanied by improved reporting, transparency and coordination.

**Enhanced coordination between ASEAN member states and development finance institutions (DFI) will be key to unlocking the required scale of sustainable finance.** A selection of the actions required could include:

- Expanded provision of grants and concessional loans for mitigation and adaptation initiatives, starting with the distribution of Special Drawing Rights allocations from developed nations to bolster the US\$100 billion commitment.
- Strengthened participation of DFIs in green bond issuances to support the development of market maturity across ASEAN, and improve credit worthiness.
- Strengthened commitments from DFIs and other multilateral organizations to provide credit enhancement support for and de-risking of low-carbon investments.
- Restructuring of near-term debt obligations by bilateral and multilateral creditors to increase ASEAN member states' capacity to increase investments aligned to the Sustainable Development Goals (SDGs) and the Paris Agreement.

**Low-carbon technology (LCT) transfer and capacity building are key to securing emissions reductions across ASEAN,** and must accompany climate financing in order to ensure conditional nationally determined contributions (NDCs) are met. This will necessitate significant scaling of LCT transfer across sectors such as energy, transport, and AFOLU, especially for low-income ASEAN member states. It is important for capacity building activities to be built into broader long-term processes of international support relating to LCT transfer and financing, rather than the ad hoc project-based approach that has predominated.

## **ASEAN member states also have a critical role to play in enhancing the enabling environment for investment.**

**The region can position itself as a global hub for best practice in blended finance and the marketplace for climate action.** This could provide an impetus to develop cross-regional project pipelines for common mitigation and adaptation priorities, and help to crowd in private sector capital. The Blended Finance and Innovation (BFI) Institute, to be established as a new multilateral entity under the stewardship of the Government of Indonesia, is a promising development to overcome barriers to sustainable financing for sustainable development and climate solution projects in the region.

**The strengthening of measures that improve market transparency will be key,** such as strict disclosure mandates covering environmental performance, climate-related risks, and low-emission investment opportunities.

The adoption of the Taskforce on Climate-related Financial Disclosures (TCFD) in ASEAN has been relatively muted in comparison with global trends, but strengthening disclosure standards will improve market confidence and enhance investment decision-making regarding regional risks and opportunities.

Additionally, the emerging plan to develop an ASEAN taxonomy for sustainable finance represents a vital step in the region's push to attract higher levels of climate financing. While ASEAN's green bond standards are an encouraging early approach, they are voluntary and lack the same detail regarding eligible economic activities, metrics, and thresholds that the European Union (EU) taxonomy has. A detailed ASEAN taxonomy, aligned where possible with the EU taxonomy, will provide greater transparency, and has the potential to unlock climate financing, particularly from investors that align with the EU standards.

**Establishing a national level cross-ministerial governance body can help build political buy-in and strengthen data collection and transparency for climate action.** This should generate broad ownership and serve to maximize development outcomes, promote equity, coordinate key actors and make climate goals a mainstream part of planning. Adopting a cross-ministerial national governance mechanism could also support enhanced regional engagement by promoting the synchronization of priorities across all levels of decision-making.

**Creating an enabling policy environment is equally important.** Developing a long-term, low-emissions development strategy, from a basis of strong cross-ministerial buy-in, is a critical first step for formulating a trajectory for transition.

A focus on ambitious clean energy targets with policy certainty on the one hand, and a phase-out on fossil fuel incentives on the other, reduces financial and stranded asset risks, while encouraging investment in renewable energy projects.

Refining industry and trade incentives to encourage low-carbon industries and value chains can fast-track growth in green jobs and industry transformation. This includes encouraging growth in low-carbon industries, as well as supporting existing industries to decarbonize or diversify.

Actions to link natural climate solutions with international carbon markets are important to ensure that efforts to protect, manage and restore the region's extensive natural carbon sinks can deliver mitigation and adaptation co-benefits while generating revenues for local populations. The adoption of nature-related financial disclosures will bring further awareness of the value of ASEAN's ecosystem services within the region and globally.

The introduction of carbon pricing based on the 'polluter pays' principle will also be instrumental in facilitating ASEAN's transition, by incentivizing emissions intensity reductions while raising revenues that can be directed to low-carbon and climate-resilient projects.

## **The ASEAN region can capitalize on key opportunities to fast track the transition and reap the benefits.**

**Building on its foundations for solving common problems collectively, the region will benefit from an integrated strategy to address the biggest challenge of our time.** ASEAN has already set a strong vision for itself in terms of sustainable development and climate ambition. This is a fundamental milestone in steering the direction of future policy and action.

**Collaborating to identify and act on common challenges can accelerate ASEAN's low-carbon transition while facilitating the development of region-wide project priorities.** The establishment of a regional climate fund, carbon market, and power grid are the top three common opportunities the ASEAN member states highlighted to fast track the low-carbon transition.

Blue carbon ecosystems are highly significant globally as carbon sinks, sequestering and storing carbon at significantly higher rates than forests per unit area. Nowhere is this more important than in Southeast Asia.

2022 can be a pivotal year in recovering from the pandemic and taking action on climate change. Indonesia will host the G20 in 2022, providing the ASEAN region as a whole the opportunity to progress issues that can ensure that the global economic recovery moves toward a more equitable global financial system and a net zero economic transition to advance sustainable development.

A number of partners globally and regionally stand ready to support the region in this endeavor, including partners of the ASEAN Green Future project. As such, following COP 26, this project will shift into its second phase, where the seven country research teams will aim to work alongside governments and the region to develop decarbonization modelling and pathways that are 1.5 °C aligned, practical, and socioeconomically desirable.



# 1. We are in a growing global emergency. The dangers are clear.

## **[a] The science is clear: the risks of exceeding 1.5°C are unacceptable.**

### **The IPCC 6th Assessment Report provides a stark assessment of the current state of the climate.**

The Intergovernmental Panel on Climate Change (IPCC), in its sixth assessment report on the state of the climate system (August 2021), confirms how quickly and profoundly human-induced climate change is affecting the planet. Assessed every seven years, IPCC reports are the world's most authoritative sources of climate science. The 2021 IPCC report was authored by 234 scientists and endorsed by 195 countries, underpinning the report's authority.

In what has been coined a 'code red alert' for humanity (UN 2021), the report outlines how key climate systems are hurtling toward irreversible new states. Human-induced climate change is unequivocal and causes an increase in extreme weather events, sea level rises unprecedented in human history, ocean acidification and warming, glacial retreat, and decline in summer Arctic ice coverage. Under scenarios with increasing emissions, the ocean and land carbon sinks are also projected to be less effective.

Critically, it finds that the world may reach or exceed an average temperature increase of 1.5°C by the early 2030s, a decade earlier than previously forecast. Under a high emissions scenario, the world may warm by up to 4.4°C by 2100, threatening catastrophic environmental, social and economic impacts that far outweigh the impacts incurred from COVID-19. The consensus is that there is a narrow path to avoiding climate catastrophe, but only through immediate, deep and sustained emissions reductions. Changes in climatic impact drivers would be more widespread at 2°C compared to 1.5°C global warming, and even more widespread and pronounced for higher warming levels. Ultimately, the IPCC report concludes that to reach net zero by 2050, global net anthropogenic CO<sub>2</sub> emissions must decline by about 45 percent from 2010 levels by 2030, then roughly half again by 2040, and should allow for no or limited overshoot of 1.5°C.

### **The timeline for the necessary action is also clear.**

Although the global COVID-19 pandemic saw a temporary reduction in emissions, they have since bounced back quickly as countries work to recover economic growth. While there have been some efforts to build back better and green the recovery, overall the economic response to COVID-19 by most governments has reinforced negative environmental trends (Vivid Economics 2021). Concentrations of carbon dioxide are now at a level unmatched for at least two million years.

Emissions cuts must be ambitious and aggressive to keep global temperature rise to 1.5°C. If we take rapid steps toward actioning transformational change today, there is still a pathway to limit temperature rise to 1.6°C by mid-century and reduce to 1.4°C by 2100. But the critical decade is upon us and the actions taken today will have impacts across every region of the world for millennia to come. While the challenge will be difficult, this transformation can also lead to more jobs and improved livelihood and health outcomes.

### **The world must work collectively to address the challenge.**

Every fraction of a degree of warming that the world is able to avoid makes a significant difference to, among other factors, the frequency of extreme weather events and global sea level rise.

Despite this stark assessment, there is reason for optimism. The latest IPCC analysis shows if the world can reach net zero emissions by 2050, warming could peak at 1.5°C, and even drop thereafter. But the window for action is narrowing. Technology alone will not suffice, but if combined with strong policy action, support from business and behavior shifts from individuals, 1.5°C is still on the table.

The IPCC report amplifies pressure for stronger commitment at the 2021 COP 26 climate conference in Glasgow – that means stronger targets for 2030 and a commitment to achieving net zero by 2050 or sooner.

## The relationship between ‘net zero’ and ‘1.5°C’

Net zero emissions is achieved by reducing human-caused emissions (such as from fossil fuels) to as close to zero as possible. Any residual emissions then need to be ‘offset’ by removing an equivalent amount of carbon dioxide from the atmosphere, through activities like restoring forests or using direct air capture and storage (World Resources Institute 2019).

Because carbon dioxide emissions stay in the atmosphere for an indefinite period of time (with other greenhouse gases often more short-lived, but more potent), the pace of transition to net zero is equally important. The faster every country transitions, the greater the chance we have of limiting global temperature rise to 1.5°C and avoiding the catastrophic impacts of exceeding this target. The slower we move, the greater the likelihood that this temperature target will be exceeded.

But how fast or slowly we act on climate change may also have implications for some climate ‘tipping points’, where a small incremental increase in temperature causes a dramatic and irreversible change in a natural system (McSweeney 2020). Tipping points include phenomena such as the collapse of polar ice sheets which would cause significant sea level rise – a key vulnerability for Southeast Asia’s vast coastal populations (Hicks 2021).

## [b] The world is at a tipping point on climate action.

### More countries are pledging net zero.

The world and its leading economies are affirming the intention to move toward net zero, which will likely have significant impacts on socioeconomic development for all regions of the world in the decades to come. According to the Energy and Climate Intelligence Unit (2021) Net Zero Tracker, close to 140 countries have committed or pledged to carbon neutrality or have a target that is currently under discussion for approval. Most countries have a target of 2050 or earlier, including the US and most European countries, while China is currently targeting 2060.

It should also be noted that there is a growing shift beyond the public sector, with major companies also committing to net zero emissions. Even in the face of COVID-19, corporate commitments under the Race to Zero campaign now cover over 12 percent of the global economy and US\$9.81 trillion in revenue (Adams & Muñoz 2021).

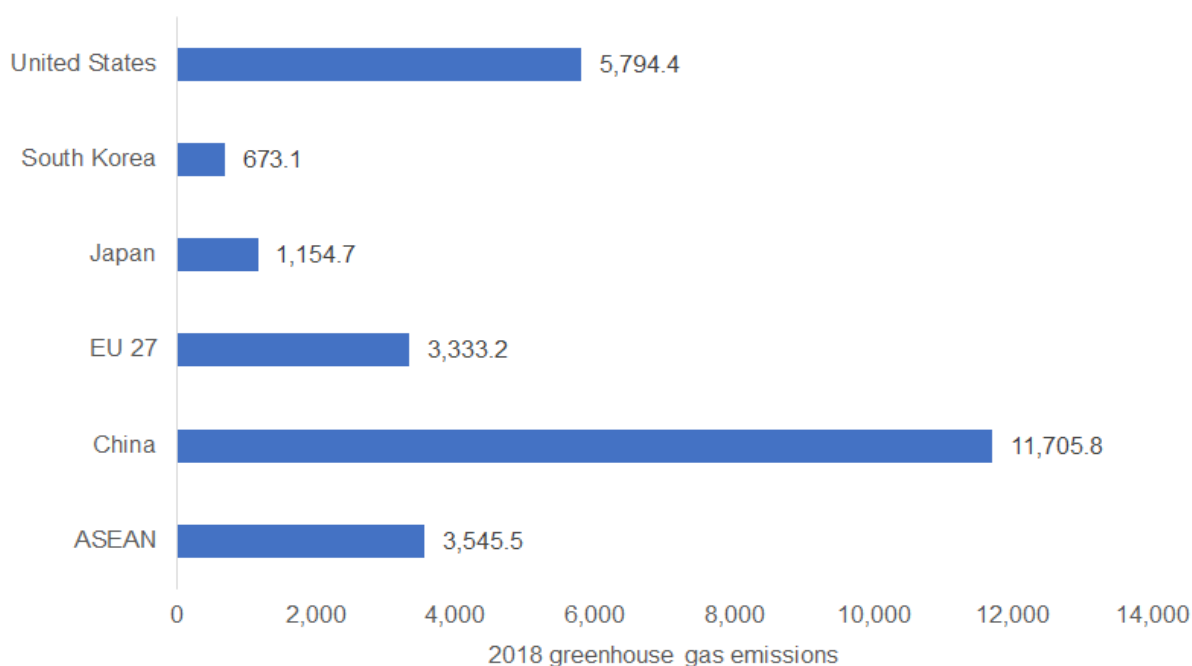
## Movements towards net zero in ASEAN

- Indonesia has set a target of net zero emissions by 2060 or earlier, and Lao PDR by 2050. At COP 26 Viet Nam’s Prime Minister Pham Minh Chinh announced a conditional 2050 net zero target (Murtagh 2021; Vu 2021).
- Thailand has set a target of net zero GHG emissions by 2065, contingent on adequate financing, technology transfer and capacity building (Thampanishvong, Limsakul & Sirison 2021).
- Cambodia and Myanmar currently have 2050 targets under discussion.
- Singapore aims to halve its 2030 peak GHG emissions by 2050, and achieve net zero thereafter (Singapore Ministry of Foreign Affairs 2021).
- Malaysia has recently committed to becoming “carbon neutral by as early as 2050” (Salim 2021). It was further announced that measures to decarbonize will be detailed in Malaysia’s low-carbon long-term development strategy to be finalized by the end of 2022.

According to the Net Zero Tracker, except for the countries highlighted in the box, other countries in the ASEAN region have yet to put forward firm national targets, policy or law to achieve net zero. If the ASEAN region and its member states are to position themselves as beneficiaries of this global economic transformation, raised ambition must be on the table.

But without intermediate targets for carbon neutrality, which are in large part lacking, the impact of these climate commitments or pledges is difficult to measure (Rogelj et al. 2021). In fact, the International Energy Agency (IEA) estimates that in 2021, global carbon dioxide emissions are set for their second-biggest increase in history. Figure 1 shows how ASEAN's greenhouse gas emissions compared to those of major partners and emitters pre-pandemic.

FIGURE 1: 2018 GREENHOUSE GAS EMISSIONS (MT CO<sub>2</sub>E -INCLUDING LAND-USE CHANGE AND FORESTRY) OF ASEAN AND MAJOR PARTNERS



Source: Climate Watch Data.

## **[c] The IEA Net Zero by 2050 report provides a roadmap for the global energy sector.**

### **Achieving net zero is not only possible, it is socioeconomically desirable.**

The International Energy Agency (IEA) Roadmap outlines a global pathway toward net zero emission energy by 2050. The 2021 report indicates that there are “no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required” (IEA 2021, p.21). It further states that developed economies need to have phased out all coal by 2030.

The IEA report also shows that global gross domestic product (GDP) increases if the net zero energy pathway is implemented. The massive scale-up of clean energy technologies means total annual energy investment surges to US\$5 trillion by 2030, adding an extra 0.4 percent a year to annual global GDP growth. The IEA notes this “brings significant economic benefits as the world emerges from the COVID-19 crisis. The jump in private and government spending creates millions of jobs in clean energy, including energy efficiency, as well as in the engineering, manufacturing and construction industries. All of this puts GDP 4 percent higher in 2030 than it would be based on current trends” (IEA 2021, p.22).



The net zero pathway aligns with the 1.5°C global goal of the Paris Agreement, and calls for scaling up solar and wind rapidly this decade – installing four times the annual record levels set in 2020 by 2030, improving energy efficiency at three times the average rate achieved over the last two decades, and increasing electric vehicles from around 5 percent of global car sales to more than 60 percent by 2030. From 2025, bans on new fossil fuel boilers in buildings need to start being introduced globally, driving up sales of electric heat pumps, and most old and all new buildings should comply with zero-carbon-ready building energy codes. From 2030 onwards, the pathway would see three new hydrogen-based industrial plants built every month, and 2 GW of electrolyzer capacity added at industrial sites worldwide each month.

The IEA makes clear that government research and development spending needs to be increased and reprioritized, and that support is also needed to accelerate the rollout of demonstration projects, to leverage private investment in R&D, and to boost overall deployment levels to help reduce costs.

With commitments from the US-led Leaders' Climate Summit currently aligned to 2.4°C global heating, greater ambition will be expected at one of the most important Conferences of the Parties to date. The IEA report has been designed to inform negotiations at COP 26 in Glasgow, where, as Dr. Fatih Birol notes, the “gap between rhetoric and action needs to close if we are to have a fighting chance of reaching net zero by 2050 and limiting the rise in global temperatures to 1.5°C. Doing so requires nothing short of a total transformation of the energy systems that underpin our economies” (IEA 2021, p.3).

## **[d] The goals of the Paris Agreement cannot be achieved without significant contributions from the land sector.**

**While eliminating all possible emissions from energy generation and use is critical to stabilizing global temperatures, nature-based solutions play an equally important role.**

A roadmap developed by Climate Focus and the International Institute for Applied Systems Analysis (Roe et al. 2017) identifies the following actions that are needed at a global level, all of which are relevant for the ASEAN region:

- protecting and restoring forests
- sustainable forest management
- halting peatland burning, and restoring peatlands
- reducing emissions from rice paddies
- reducing livestock emissions (enteric fermentation)
- enhancing soil carbon
- using fertilizers more efficiently
- behavioral changes such as shifting to healthier diets and reducing food waste.

The roadmap finds that the land sector could contribute 25 percent of the emissions reductions needed to achieve the 1.5°C temperature goal. But emissions would need to peak by 2020, become net zero by 2040–2050 globally, and become net negative thereafter.

## 2. The ASEAN region has a critical role to play in global climate action.

### **[a] ASEAN and its member states have demonstrated strong commitment to climate action.**

**Region-wide action has been increasing, especially around mitigation-aligned initiatives including renewable energy deployment, energy efficiency, and agriculture, forestry and other land use (AFOLU).**

Since the turn of the century, ASEAN's regional cooperation on climate-related issues has been steadily expanding.

An early example, established in 2003 and ratified by all ASEAN member states, is the binding ASEAN Agreement on Transboundary Pollution Haze Control, a regional mechanism to prevent, monitor and mitigate transboundary haze caused by forest and peat fires through technical cooperation and shared scientific research, joint emergency response, monitoring and assessment, and cross-border resource deployment. Subsequent to this, the implementation roadmap for the agreement was adopted in 2016, which includes agreed actions to sustainably manage peatlands, forests and agricultural lands and strengthen associated policies, regulations and laws (ASEAN 2021).

Another significant regional development is the ASEAN Plan of Action for Energy Cooperation 2016–2025 (APAEC), led by the ASEAN Centre for Energy as part of the ASEAN Climate Change and Energy Project (ACCEPT) in partnership with the Norwegian Institute of International Affairs. Under Phase II (2021–2025), numerous regional initiatives aimed at reducing energy-related emissions are underway in line with ambitious ASEAN-wide renewable energy targets. One such example is the Long-term Renewable Energy Roadmap, which will chart future pathways for renewable energy uptake across ASEAN and assess the potential for multi-member electricity trading in line with the ASEAN Power Grid Programme (ASEAN Centre For Energy [ACE] 2020a).

Energy efficiency and conservation is a central focus in regional collaboration efforts. Since 2017, three policy documents have been endorsed by the ASEAN Ministers on Energy Meeting, including the Regional Policy Roadmap on Harmonization of Minimum Energy Performance Standards (MEPS) for Air Conditioners; Regional Policy Roadmap on Harmonization of MEPS for Lighting; and Guidelines of Integration of Energy Efficiency into ASEAN Electrical and Electronic Equipment Mutual Recognition Arrangement.

Other regional initiatives include the ongoing ASEAN Initiative on Environmentally Sustainable Cities established in 2005, and the ASEAN Environmental Education Action Plan, among others.

Furthermore, the ASEAN Socio-cultural Community Blueprint 2025 outlines a number of environmental strategic priorities, and several working groups have been established spanning climate change; chemicals and waste; coastal and marine environment; environmental education; environmentally sustainable cities; natural resources and biodiversity; and water resources management (ASEAN 2016). The ASEAN Ministerial Meeting on the Environment plays a key role in coordinating and escalating issues identified by these working groups, and an ASEAN strategic plan on the environment is currently being developed to determine a detailed plan of actions underpinning cooperation on the environment until 2025.

## ASEAN's approach to climate-related disaster response

Reducing disaster risk is one of ASEAN's top priorities, with a focus on achieving the targets of the Sendai Framework for Disaster Risk Reduction (SFDRR) and the Sustainable Development Goals by 2030 (ASEAN 2016).

In its Joint Statement to COP 25 (ASEAN 2019), ASEAN reaffirmed the commitment of its member states to strengthen capacity to manage climate-related disasters, through existing mechanisms such as the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) and Phase 2 of ASEAN Disaster Risk Financing and Insurance (ADRFI) plan. It also committed to establishing the Southeast Asia Disaster Risk Insurance Facility (SEADRIF), to strengthen the financial resilience of member states to climate and disaster risks by improving disaster risk assessment, financing and insurance solutions.

The collective commitment of ASEAN member states is further reinforced through the declaration on 'One ASEAN One Response: ASEAN Responding to Disasters as One in the Region and Outside the Region'. The declaration lays out political commitments to improve disaster responsiveness, boost resource mobilization and establish stronger cross-sectoral and cross-pillar coordination (ASEAN 2020a).

### **At a domestic level, the focus of policy has responded to the unique and varied national circumstances of each country.**

Governments across ASEAN have established overarching climate policy frameworks for climate action, and institutions to coordinate, implement and track agreed national emission reduction targets. Government responses have varied depending on the sources of emissions in each country, as well as technical and financial capacities, resource endowments and exposure to climate impact. Due to the region's vulnerability to the effects of climate change, measures to improve adaptive capacity and resilience have also been at the heart of domestic climate responses.

For example, Thailand has developed a Cabinet-approved NDC Roadmap on Mitigation (2021–2030), to drive and track GHG mitigation actions. This is accompanied by a Climate Change Master Plan that integrates climate-resilient national development measures at all levels of government. Additionally, a national Long-term Low Greenhouse Gas Emissions Development Strategy is in the process of being formulated for submission to the United Nations Framework Convention on Climate Change (UNFCCC), which will allow the country to achieve its existing commitments to climate-resilient and low-carbon development and to enhance its subsequent NDCs (Thampanishvong, Limsakul & Sirison 2021).

## The importance of taking a long-term view

Long-term transformational pathways, such as those outlined in a long-term, low-emissions development strategy (LT-LEDS), provide a clear trajectory of changes required over the long term to achieve climate and development goals.

Sectoral roadmaps further break down the transformation at a sectoral level, and should prioritize actions by considering alignment with SDGs as well as risks (e.g. transition risks such as asset stranding, and climate impact risks such as increased vulnerability to extreme weather events or sea level rise) (Argyriou et al. 2020). These strategies can help to inform the design of policy packages to stimulate investment in sectors of the economy that are critical for the transition.

LT-LEDS can also inform a package of development partner 'asks' that work to accelerate the transition, enhance donor coordination, and ensure that development finance is directed toward areas of greatest impact.

Cambodia, in 2013, adopted a national Climate Change Strategic Plan (2014–2023) that targets climate resilience through eight strategic objectives covering food and energy security, regional and gender vulnerability, biodiversity, and low-carbon technologies (Piseth, Kimlong & Kimly 2021).

Resilience and adaptation are also at the core of the Philippines' key climate policies, including the National Climate Change Action Plan 2011–2028 (NCCAP); the National Framework Strategy on Climate Change 2010–2022 (NFSCC); and the People's Survival Fund (Monsod et. al. 2021). Of the seven priority areas identified in NCCAP, which guides climate policy at all levels of government, six directly relate to adaptation, and the plan's overarching outcomes also cover the enhanced adaptive capacity of communities, sustainability of the built environment to the effects of climate change, and resilience of natural ecosystems (Monsod et. al. 2021). The Climate Change Commission was established alongside these instruments to coordinate, monitor and evaluate the implementation of climate change initiatives at national, local and sectoral levels.

## **[b] Yet emissions in the region are among the fastest growing in the world.**

Population growth, rising income levels, and subsequent development gains in Southeast Asia over recent decades have been mirrored by the fastest increases in GHG emissions globally.

TABLE 1: KEY INDICATORS FOR ASEAN MEMBER STATES.

	Population (millions) 2021	Real GDP per capita* (USD) 2021	Population below poverty line**	tCO <sub>2</sub> emissions per capita*** (2018)
ASEAN	667.393	13,475		
Brunei	0.461	65,670	n/a	16.6
Cambodia	15.836	4,930	16.5%	0.7
Indonesia	280.270	12,970	9.4%	2.2
Lao PDR	7.371	8,440	18.3%	2.7
Malaysia	35.358	29,050	5.6%	7.6
Myanmar	53.545	4,430	24.8%	0.6
Philippines	110.432	8,900	16.7%	1.3
Singapore	5.840	107,680	n/a	8.4
Thailand	70.007	19,030	9.9%	3.7
Viet Nam	100.328	11,610	6.7%	2.7

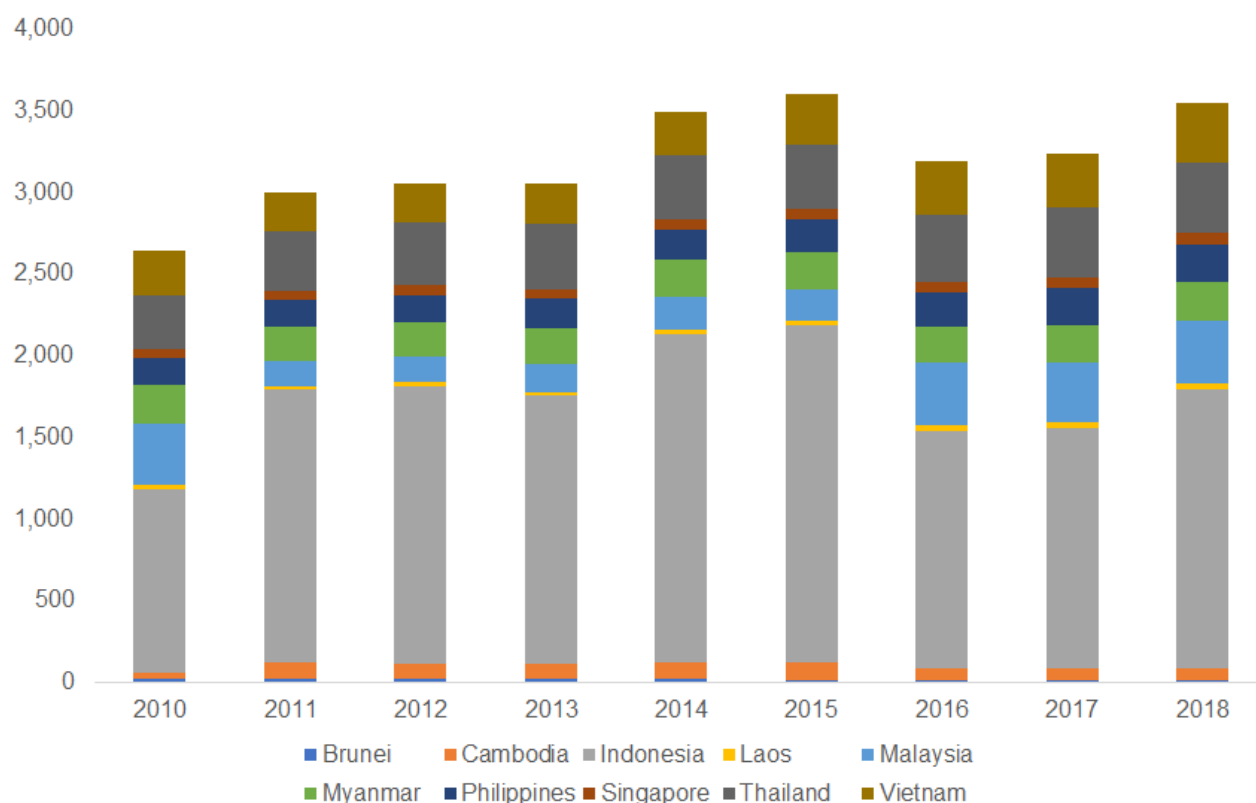
Purchasing power parity, international dollars as at Oct 2021 \*\* Latest available data, various years \*\*\* Comparable data only available for CO<sub>2</sub> emissions.

Source: International Monetary Fund [IMF] 2021a, CIA World Factbook 2021, World Bank Development Indicators 2021

As Table 1 demonstrates, there is significant disparity across the region, both in terms of economic development and emissions. Indonesia is the world's 16th biggest economy with the value of GDP reaching US\$1.1 trillion. It is also among the countries with the largest annual GHG emissions in the world. In 2018, Indonesia emitted 1,703.86 MtCO<sub>2</sub>e, only surpassed by China, the USA, India, and Russia (Halimatussadiah et al. 2021).

However, as Figure 2 demonstrates, greenhouse gas emissions have been growing steadily across ASEAN.

FIGURE 2: GHG EMISSIONS BY ASEAN MEMBER STATE (MT CO<sub>2</sub>E – INCLUDING LAND-USE CHANGE AND FORESTRY): 2010–2018.



Source: Climate Watch 2021

Viet Nam is one of the fastest-growing economies in Southeast Asia, but these development gains have been met with side effects such as increased air and waterway pollution and significant emissions growth. The country is currently the fourth largest GHG emitter in the region (Climate Watch 2021).

But emissions are yet another area of significant diversity across the Southeast Asia region. Lao PDR, by contrast, produced just 4.5 Mt CO<sub>2</sub>e in 2016, or 0.66 tons per capita (Kyophilavong et al. 2021).

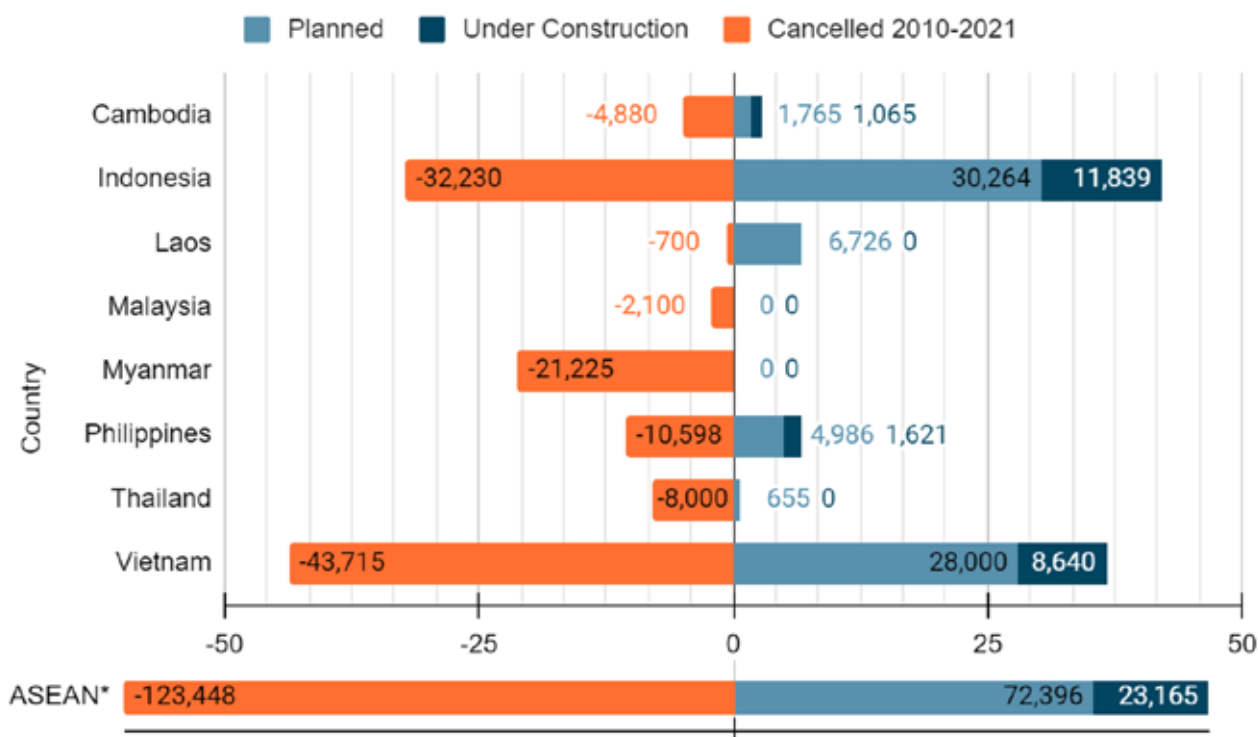
### **Rising GHG emissions are being driven in large part by the region's dependence on fossil fuels.**

Over the period 2010–2016, energy-related emissions grew by 4.1 percent per year across the region, but for some countries the rate of growth was much higher – 8 percent in Viet Nam and the Philippines, 13 percent in Cambodia and 27 percent in Myanmar (Sandu et al. 2019). In many ASEAN countries, energy-related emissions are the largest share of GHG emissions. For example, emissions from the energy sector accounted for 71.65 percent of Thailand's total emissions in 2016 (Thampanishvong, Limsakul & Sirison 2021). Similarly, in Viet Nam, the energy sector is the highest contributor to the country's GHG emissions, and under a BAU scenario will account for 73.1 percent of the total by 2030 (Socialist Republic of Viet Nam 2020). While Malaysia has achieved an impressive 99.9 percent electrification, 82 percent of its electricity and heat comes from coal and gas (Peng 2021).

### **Coal use is continuing to rise across the ASEAN region.**

In contrast to global trends, ASEAN is one of the only regions where the share of coal has steadily risen, and is projected to continue to rise over the next 20 years, by approximately 3 percent per year (ACE 2020b; IEA 2019a; IEA 2020a). The Philippines may be an exception to this as the government announced a moratorium on the development of new greenfield coal power plants in 2020 (Ahmed & Brown 2020); however, an estimated half of new capacity to 2027 will still come from coal plants and the extension of existing facilities from power companies is still permitted under the policy (Power Philippines 2021).

FIGURE 3: COAL-FIRED POWER PLANTS PIPELINE IN EIGHT ASEAN COUNTRIES AS OF JULY 2021



Source: The latest available data from: Global Energy Monitor

Figure 3 shows, positively, that a large share of planned coal-fired power generation has been cancelled over the past decade. However, there is still more than 95,000 MW of new capacity planned or in construction across the region – predominantly in Indonesia and Viet Nam.

Coal will overtake natural gas as the main power source in ASEAN by 2030, and under the APAEC Targets (APS) Scenario detailed in the 6th ASEAN Energy Outlook, which assumes APAEC targets are met, the quantity of coal in ASEAN’s primary energy supply will continue to grow to 2040, despite its share in the mix dropping by 1.6 percent (ACE 2020c). Coal-fired power accounts for approximately 53 percent of total electricity generation in Viet Nam (EIA 2021), while Lao PDR has seen coal-fired power rise from negligible amounts to more than 10,000 GWh in 2017 (Overland et al. 2021). In Indonesia, coal has supplied 60 percent of Indonesia’s total commercial electricity over the past three years (Halimatussadiyah et al. 2021). While the updated 2021–2030 Electricity Procurement Plan (RUPTL) has upgraded targets for new renewable capacity additions to 51.6 percent, fossil fuel powered plants will still comprise 48.4 percent of new capacity (Indonesian Ministry for Energy and Mineral Resources 2021). Thus, instruments, including financing, to phase out coal-fired power plants in early-stage development are still very much needed.

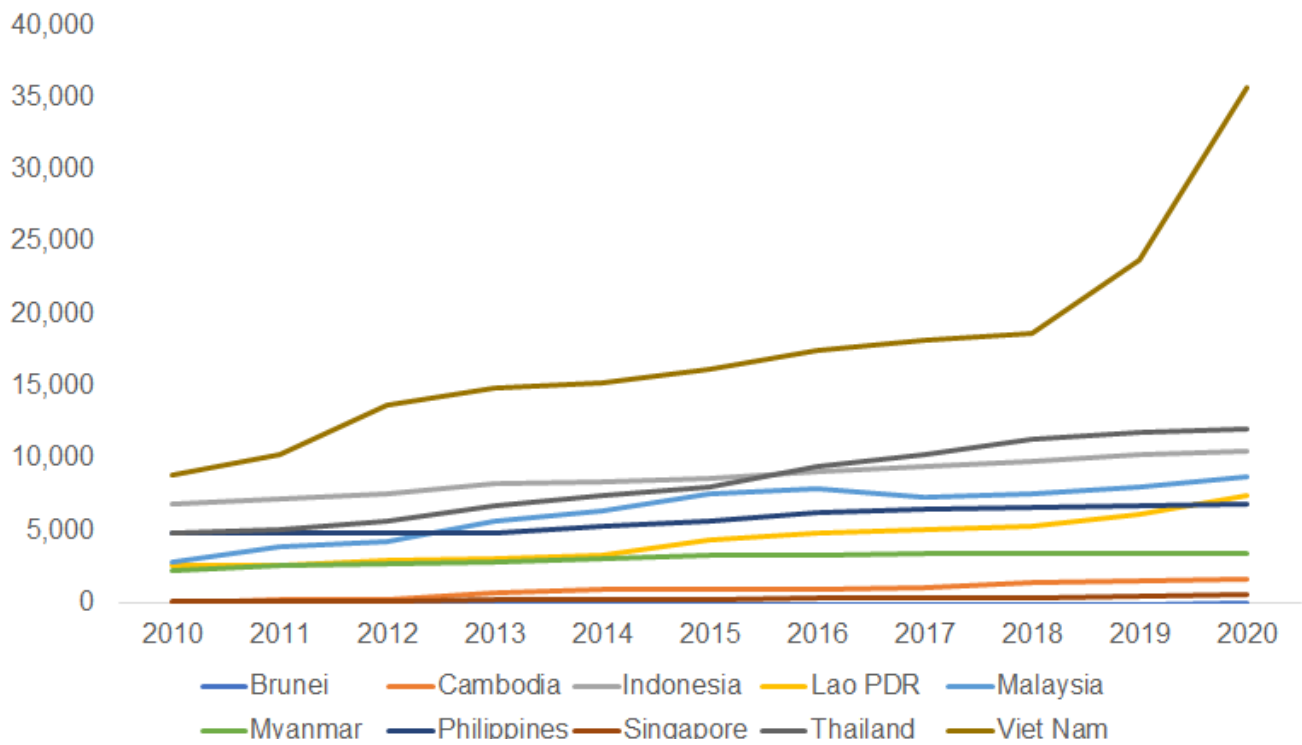
Without concerted effort to transition to clean energy sources, energy-related GHG emissions across ASEAN will almost double by 2040.

The pace of growth in energy demand is also locking in continued reliance on fossil fuels (IEA 2019a), presenting stranded asset risks in the long term. Without significant efforts toward decarbonization, energy-related emissions will almost double by 2040 in the ASEAN region (Sandu et al. 2019). Coal and oil use are the fastest growing energy sources, causing major air pollution risk to human health, driving up emissions and placing the socioeconomic gains of recent decades at risk (IEA 2019a).

ASEAN has significant potential for a range of renewable energy sources, including an estimated 229 GW of wind energy, 158 GW of hydropower (including small hydro), and 200 GW of geothermal, while solar has a gross capacity potential of 8,000 GW (ACE 2021a).

Despite this, renewables only currently meet 15 percent of the region’s energy demand (IEA 2019a). Figure 4 below illustrates that installed capacity for renewables is increasing across ASEAN, particularly in Viet Nam, Thailand and to a lesser extent Indonesia, but at a slower rate than some of the region’s major partners (see figure 5). In 2019 and 2020 Viet Nam installed more than 16 GW of renewable energy, driven by a very attractive feed-in tariff, demonstrating the opportunity for policy to catalyze rapid deployment of renewables in the region.

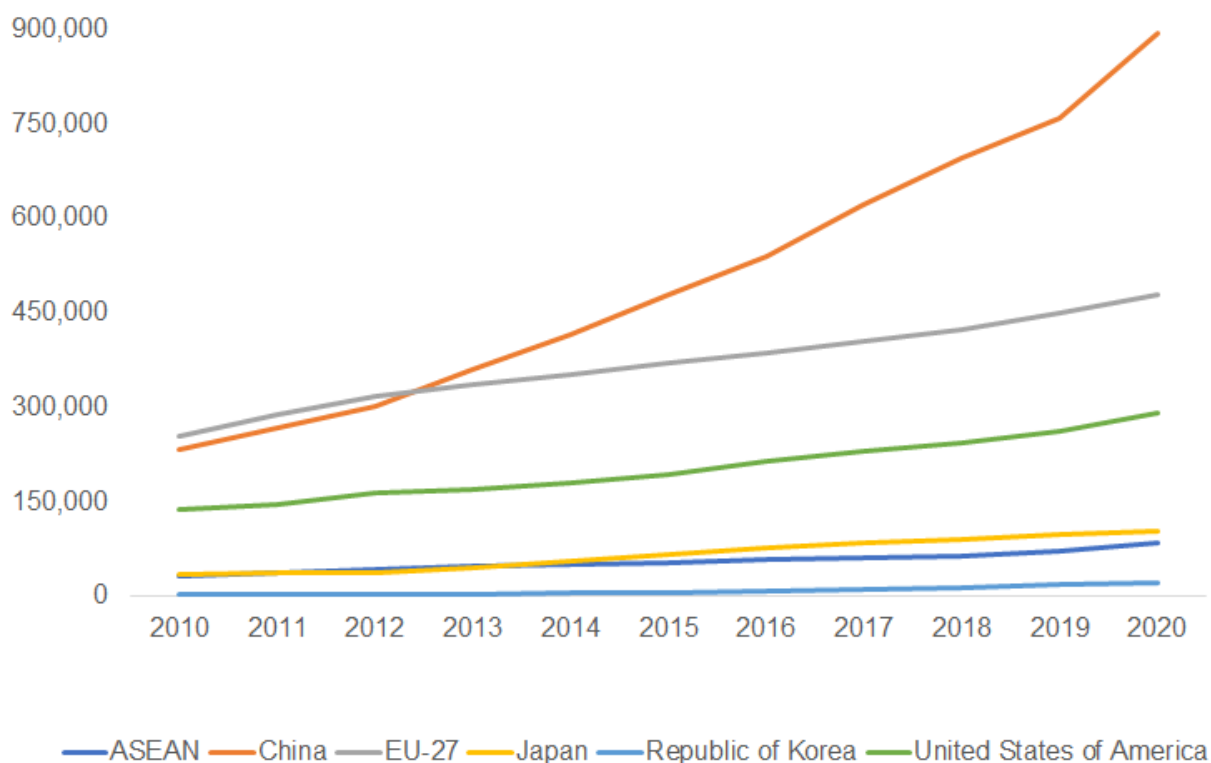
FIGURE 4: AGGREGATE INSTALLED CAPACITY OF RENEWABLE ENERGY SOURCES BY ASEAN MEMBER STATE



Source: IRENA Stats Tool Database 2021. Includes bioenergy, geothermal, hydropower, marine, pumped storage, solar and wind energy; includes on and off-grid



FIGURE 5: AGGREGATE INSTALLED CAPACITY OF RENEWABLE ENERGY SOURCES OF ASEAN AND MAJOR PARTNERS



Source: IRENA Stats Tool Database 2021. Includes bioenergy, geothermal, hydropower, marine, pumped storage, solar and wind energy; includes on and off-grid

**For ASEAN countries, fossil fuel dependence also risks undermining energy security.**

Ensuring a secure, affordable and more sustainable pathway for the energy sector is a common priority for policymakers across ASEAN (IEA 2019a). The IEA (2019b) estimates that developing economies in the Asia-Pacific region will account for almost two-thirds of global energy demand growth between now and 2040, and will increasingly rely on energy imports – in particular oil and gas – to sustain economic growth. In fact, by 2035, all ASEAN countries except for Brunei will be net energy importers (Liu et al. 2019).

Increasing dependence on coal is in contrast to the energy security goals of many ASEAN countries, with only Indonesia having sufficient coal reserves to avoid imports in the long term. In the other ASEAN countries, the rising coal consumption will increasingly also become a burden on the trade balance (Overland et al. 2021).

Similarly, the transport sector in ASEAN is responsible for one-quarter of final energy consumption, and is more than 90 percent dependent on oil (Bakker et al. 2017). Without action, emissions from the transport sector could almost triple to 870 Mt in 2050 while also worsening air quality, energy security, city livability, social equity, traffic safety and economic competitiveness (Bakker et al. 2017).

**Emissions from agriculture, forestry and other land use (AFOLU) are also significant across the ASEAN region.**

While substantial, AFOLU emissions are not as well understood as energy and industrial emissions in the ASEAN region. They were estimated by MIT to have been 47.9 percent of the region’s total emissions in 2010 (Paltsev et al. n.d.), and by USAID to be responsible for 58 percent of the region’s total emissions (USAID LEAF 2016).

The lack of accessible data on AFOLU emissions at the regional level indicates this is an area that warrants greater attention and research. The region’s tropical forests will play an outsized role in efforts to keep global



temperature rise below 1.5°C – either serving the function of a carbon sink, or continuing the trend as a significant source of the region’s GHG emissions.

It is estimated that Southeast Asia is home to 15 percent of the world’s tropical forests and these store roughly 10 percent of global forest carbon stocks, while also providing habitat for some of the world’s richest biodiversity (Estoque et al. 2019). The world’s tropical forests also sequester about four times more carbon than temperate or boreal forests (NASA 2021), making them an important tool in solving climate change. Yet deforestation is occurring at alarming rates, with the region losing 14.5 percent of its forests between 2001 and 2016 (Asian Development Bank [ADB] 2021a). This is affecting the ability of the region’s tropical forests to sequester and store carbon, with the region’s forests shifting from being a net sink to a source of emissions over the past two decades, releasing almost 500 Mt CO<sub>2</sub>e per year (The Economist 2021).

The work of this project’s country teams provides clear evidence to support this. Malaysia was ranked as having the world’s highest rate of tree cover loss (14.4 percent) between 2000 and 2012 (Hansen et al. 2013), driven by population growth and the conversion of forests to plantations (Clements & Leong 2021). Similarly, Cambodia’s total forest cover decreased by 14.6 percent between 2006 and 2016, with the largest losses occurring in deciduous and evergreen forests (Cambodia Ministry of Environment 2018). Lao PDR has rich natural forest cover, but this is rapidly declining due to slash and burn cultivation, illegal logging and development projects (Kyophilavong et al. 2021).

Peatland degradation is a further driver, typically a byproduct of deforestation for land use conversion. It is estimated that the conversion of peat forests for agriculture or other development releases the equivalent of five percent of global fossil fuel emissions (Parish et al. 2020). GHG emissions from land conversion and peat decomposition accounted for almost half of Indonesia’s GHG emissions in 2018, estimated at 830 Mt CO<sub>2</sub>e. Moreover, since 2000, Indonesia has lost 17 percent of its tree cover, or 6.7 percent of global tree cover loss over the period to 2020 (Halimatussadiah et al. 2021).

Using fire for land clearing further exacerbates the problem, releasing significant carbon stores from the peat and contributing to 90 percent of transboundary smoke haze in the southern ASEAN region, negatively affecting human health, biodiversity and socioeconomic development (Parish et al. 2020).

The practices of draining and land clearing for agriculture have caused the fragile ecosystems of the region’s peatlands to turn from carbon sinks to carbon emitters. The importance of conserving these areas is typified by the fact that the ASEAN region’s peatlands are estimated to store up to 5 percent of all carbon stored on the world’s land surface.

Agricultural production is another key contributor to the region’s AFOLU emissions. For example, agriculture in Cambodia is one of its three major GDP sectors and the second largest emitting sector, driven largely by rice cultivation (Piseth, Kimlong & Kimly 2021). In fact, rice cultivation was responsible for 43 percent of all agricultural emissions in Southeast Asia in 2012, due to the methane produced by traditional rice farming practices (Climatelinks n.d.).

A large proportion of the ASEAN population depend on agriculture, fishing, and forestry for their livelihoods, creating a clear tension between the need to reduce the region’s significant land-based emissions and the need to continue to cultivate the abundant natural resources to provide livelihoods, food security and enhanced human wellbeing.

## **[c] Emissions growth is still closely tied to development gains.**

### **ASEAN’s recent socioeconomic gains provide strong foundations for further progress.**

As presented in the ASEAN Sustainable Development Goals (SDGs) Indicators Baseline Report of 2020, since 2016, and prior to the pandemic, poverty fell across the region by close to 2 percent and stood at 13 percent. Overall GDP per capita in the region grew by 4.5 percent, with an unemployment rate averaging at 3.7 percent during the same time period. Southeast Asia is on track to eradicate income poverty in terms of the population living below international or national poverty lines. This is notable progress, coupled with further positive trends in education, gender equality, industry and innovation.

**However, the pandemic has pushed 75 to 80 million people into extreme poverty across developing Asia,** which includes the ASEAN region (ADB 2021b). The 2021 ADB Report on Key Indicators for Asia and the Pacific explains that progress has also stalled in areas such as hunger, health and education, where earlier achievements across the region had been significant, albeit uneven across different countries. COVID–19 has therefore revealed and exacerbated social and economic fault lines that may weaken the Asia Pacific’s sustainable development trajectory.

**Pre-pandemic socioeconomic gains can only be built upon through more sustainable models of growth.**

A 2017 study of ASEAN demonstrates that the “environmental consequences of economic growth are significant for most of the countries [...] and that energy consumption is the key contributing factor toward environmental deterioration in the ASEAN region” (Ahmed et al. 2017, p.530). The study further shows that from 1985 to 2015, energy consumption, economic growth, and trade openness significantly contributed to CO<sub>2</sub> emissions in the ASEAN region.

This is consistent with the UNESCAP Asia and the Pacific Progress Report of 2021, which indicates that the region is regressing on five SDG goals: “Among those are environmental goals on climate action (Goal 13), where emissions of greenhouse gases are still increasing for most countries in the subregion, and life below water (Goal 14) where the subregion is affected by worsening quality of oceans and slow progress regarding protected marine areas” (UNESCAP 2021a, p.19).

**[d] Development gains are reflected in the region’s increasing economic strength.**

ASEAN plays an increasingly important role globally. The combined economies of ASEAN member states represent the third largest economy in Asia and the fifth largest in the world, only behind the US, China, Japan, and Germany. While COVID-19 has negatively affected the economies of the region, projections point to continued growth in the medium to long term. In part, this growth is facilitated by ASEAN’s active participation in global trade and investment. Notably, the recent Regional Comprehensive Economic Partnership (RCEP) free-trade agreement among the Asia-Pacific nations will give ASEAN increased access to its key trading partners, including China, Japan, South Korea, Australia and New Zealand.

In addition to RCEP partners, the European Union (EU) is ASEAN’s third largest trading partner after China and the US, accounting for around 10.6 percent of ASEAN trade, and the largest investor in ASEAN countries (European Commission 2021). A number of EU trade deals with ASEAN countries are being negotiated or have come into effect. These are meant to serve as a foundation for an agreement on a bloc-to-bloc trade deal. Likewise, ASEAN is the USA’s fourth-largest trading partner, with its foreign direct investment (FDI) also one of the largest in the region (Office of the United States Trade Representative 2021).

ASEAN has clear economic clout and privileged access to the world’s biggest economies. Coupled with its geographical location at the heart of the Indo-Pacific region – a major thoroughfare for global trade – this provides ASEAN with enviable leverage to position the region as a major player globally.

**ASEAN’s ability to fully capitalize on these trade opportunities will depend on how it adapts to the global economic transformation to net zero.**

All of ASEAN’s key trading partners have now pledged to reach net zero by mid-century in one form or another. The ability of the region to fully harness its trade relations with the world’s largest economies will depend on how well ASEAN member states position themselves – both as manufacturing and export hubs for low-carbon goods and commodities, and as attractive investment destinations for low-carbon infrastructure. ASEAN’s capacity to adapt and benefit from the profound and imminent shift in global economic direction and investment will be determined in the next few years.

These risks and opportunities for ASEAN of the global net zero transition are dealt with in more detail in subsequent sections of this report.

## **[e] The risks of delaying climate action far outweigh any perceived benefits.**

### **Climate change poses significant human and economic risks across the ASEAN region.**

The ASEAN Joint statement to COP 25 (ASEAN 2019) expresses member countries collective “grave concern about the multi-faceted impacts of climate change, including those outlined in the Assessment Reports (AR) of the Intergovernmental Panel on Climate Change (IPCC), the IPCC Special Report on the Impacts of Global Warming of 1.5 °C Above Pre-industrial Levels, the IPCC Special Report on Ocean and Cryosphere in a Changing Climate, and the IPCC Special Report on Climate Change and Land.”

Grave concern is warranted. ASEAN is the most natural disaster prone region in the world (ASEAN 2020a), and includes six of the twenty nations most vulnerable to climate change (ASEAN 2017). Myanmar, the Philippines, Thailand, and Viet Nam are “already among the 10 states in the world that have suffered the most in human and material terms from climate-related weather events over the past 20 years” (Overland et al. 2021, p.1).

The increasing frequency and intensity of disasters is resulting in greater economic losses, increased disaster mortality and rising numbers of displaced people in the region. More than 50 percent of global disaster mortalities between 2004 and 2014 occurred in the region (Gnagnasagaran 2018).

The ASEAN Socio-cultural Community Blueprint 2025 (ASEAN 2015) points to the need for enhanced regional cooperation on disaster management and humanitarian assistance to better respond to these alarming risks across the region (ASEAN 2020a).

Increased exposure to lethal heatwaves, a reduced share of outdoor working hours due to extreme heat, humidity and extreme precipitation events, and reduced yields of staple food crops are predicted by 2050. The development gains of recent decades are therefore at risk of being wound back, with lower income groups disproportionately affected by these impacts (McKinsey 2020).

### **Projected economic costs of climate change in Southeast Asia:**

Economic losses from climate change could be 60 percent higher than previously estimated, potentially reducing regional gross domestic product by up to 11 percent by 2100 (ADB 2015).

Global reinsurer Swiss Re (Swiss Re 2021) offers an even more stark assessment of the risks, with recent analysis suggesting the ASEAN economy could lose 37.4 percent of GDP by 2048 under a business-as-usual approach. By contrast, meeting the Paris Agreement goal of stabilizing global temperature at well below 2 °C would see the region’s adverse GDP impacts limited to just 0.8 percent (Swiss Re 2021).

### **Indonesia:**

Without taking into account non-market impacts and disaster risk, Indonesia’s average GDP loss due to climate change is already estimated at 2.5 percent by 2100, four times the global average GDP loss of 0.6 percent. This is driven by Indonesia’s long coastline with high population density, high dependence on agriculture and natural resources, relatively low adaptability, and tropical climate (Halimatussadiah et al. 2021).

**Trade penalties from key trade partners signal the complex risks ASEAN countries face if they are not prepared.** These risks may hit hard if ASEAN does not increase climate ambition and action in line with the Paris Agreement goals and the scientific evidence presented in the UNFCCC 1.5 °C special report.

One of these trade penalties includes the introduction of carbon border taxes, which are used to both minimize carbon 'leakage' (where emissions-intensive activities move offshore to avoid a carbon price) and reduce competitive disadvantage (where the additional costs associated with a carbon price faced by domestic manufacturers makes their products more expensive compared to imports from countries without a carbon price). They also serve to apply geopolitical pressure on countries with weak climate ambition.

The European Union (EU) is planning to introduce a carbon border adjustment mechanism in 2023 which will cover electricity generation and emissions-intensive industrial sectors such as iron, steel, aluminium, cement, chemicals and fertilizers. While the majority of ASEAN's exports to the EU are not currently exposed, the mechanism is likely to be expanded to include all imported goods in the future (Tagliapietra & Wolff 2021). Similarly, the USA has signaled its intention to implement 'polluter import fees' to force importers to pay more for carbon-intensive goods imported from countries with weaker climate policies (Fedor & Williams 2021).

Other ASEAN trade partners with carbon pricing schemes may consider a border adjustment tax in future. China, Japan, South Korea and Taiwan are all considering or implementing some form of carbon pricing with varying implications.

**The risk to finance flows relates primarily to the growing trend for international development and private finance to exit fossil fuel investments.**

The rate at which coal financing is being phased out is accelerating. South Korea and Japan committed to ending coal financing in early 2021 while China, the largest provider of coal financing, announced in September 2021 that it will end financing for new coal plants abroad (Lieu et al. 2021; Schiermeier 2021).

Financial institutions are following suit. For example, since the adoption of the Paris Agreement, 28 banks have stopped providing direct financing for coal-fired power plants in Indonesia, with the majority exiting between 2019 and 2020 and others announcing additional conditionalities and phase-outs (Chan, Merdekawati & Suryadi 2021). A number of major development finance institutions (DFIs) have also announced exits from coal financing, with the Asian Development Bank (ADB) announcing in its new energy policy that financing for coal-fired power and heating plants will be withdrawn (ADB 2021c).

While the initial focus has been on coal investments, there are emerging signs that oil and gas will follow. In August 2021, the US Government announced a new policy targeting an overseas fossil fuel financing phase-out which includes coal, oil and gas. Exceptions for gas financing will only be made in restricted circumstances for least developed countries (LDCs) (E3G 2021). This is potentially significant due to the flow-on effect for DFIs as the US Treasury has stated that it will oppose financing for all fossil fuels through the multilateral financing bodies of which the US is a shareholder (United States Treasury 2021). Similarly, although the ADB under its revised energy policy will continue to finance natural gas projects, a number of conditions must be met, one of which is that the project must demonstrate a cost-effective renewable energy alternative is not available (ADB 2021c).

This movement is in line with recent analysis by the IEA (2021) which shows that to achieve the science-based global target of net zero by 2050, no new fossil fuel development should be approved. Where financing is available to continue to build out the region's fossil fuel pipeline, it may come with either a cost premium or with political 'strings' attached.

By contrast, DFIs are investing significantly more in low-carbon projects, with over three times the amount of financing provided to renewable energy projects than fossil fuel energy projects since the beginning of the pandemic (Energy Policy Tracker 2021). Countries with ambitious clean energy targets flowing through to a robust pipeline of clean energy infrastructure projects will continue to be the beneficiaries of this trend.

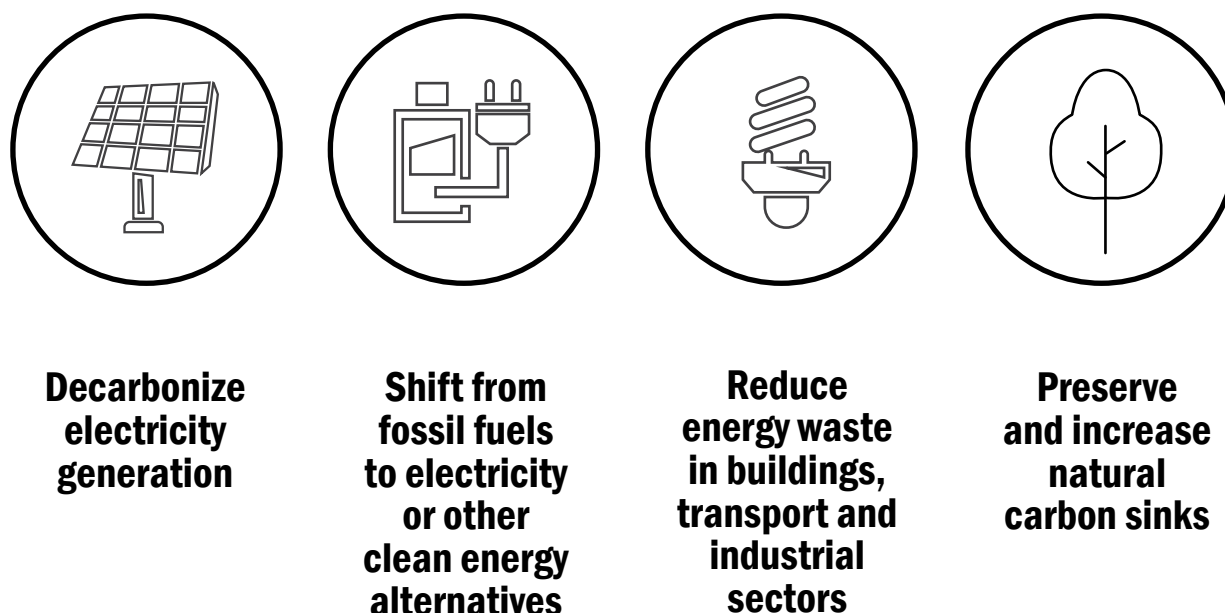
For ASEAN countries, foreign direct investment (FDI) and participation in global value chains can speed up the development process by increasing labor productivity and living standards, and building the capabilities of domestic firms (Dollar 2021). The recently ratified Regional Comprehensive Economic Partnership (RCEP) is expected to strengthen finance flows and lift investment prospects for its members, especially for the smaller and least developed countries (UNESCAP 2020).

# 3. The pathway to stabilize global emissions below 1.5°C is well understood.

Each ASEAN member state will need to develop decarbonization pathways that consider their national circumstances, development objectives and emissions trajectory in line with the global goal of stabilizing temperature rise at 1.5°C.

There are effectively four ‘pillars’ of decarbonization that can be universally applied to guide decarbonization planning.

FIGURE 6: THE FOUR PILLARS OF DECARBONIZATION.



Source: Adapted from ClimateWorks Australia (2014) and The World Bank (2015)

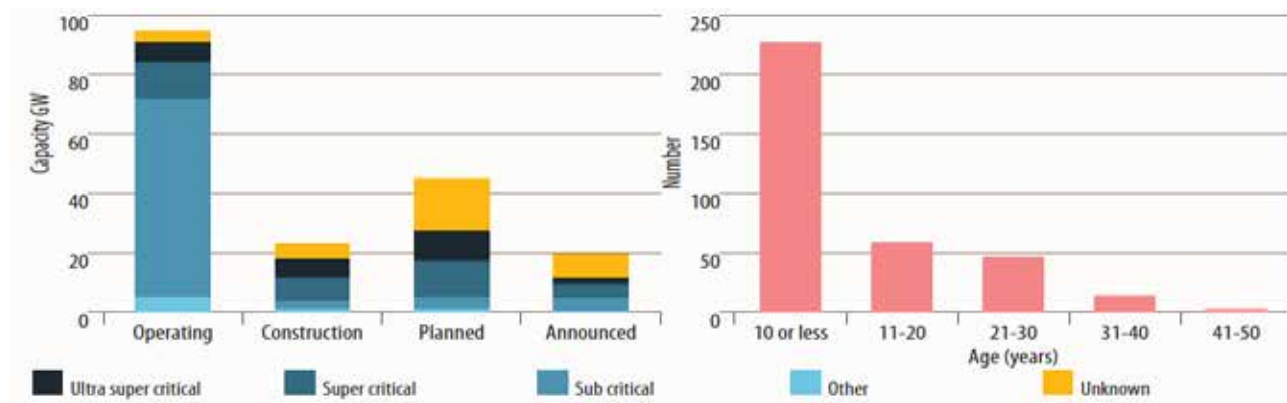
## [a] Decarbonize electricity generation.

To stabilize global temperature rise at or below 1.5°C, proposed coal-fired power plants must be shelved. In addition, increased electricity demand will need to be met by clean sources of power such as wind, solar, hydropower and geothermal. Nuclear, carbon capture and storage (CCS) and bioenergy with CCS may also play a role in the region’s efforts to decarbonize. However, governments should avoid over-reliance on these technologies, as they may face social, technological or environmental challenges that limit their potential.

**Currently, most Southeast Asian countries have plans to expand coal-fired power generation.** In the case of Indonesia, Thailand and Viet Nam, planned expansion builds on an already high capacity of coal-fired power generation (UNESCAP 2021b).

Figure 7 demonstrates that the majority of the existing coal-fired power plants are less than 10 years old, posing a higher risk of asset stranding if the current coal pipeline proceeds. It further shows that current operating capacity is predominantly sub-critical coal technology, generating significant carbon emissions. All planned and announced new coal plants are inconsistent with the 1.5°C carbon budget.

FIGURE 7: COAL CAPACITY BY STATUS AND TECHNOLOGY (LEFT), AND AGE DISTRIBUTION (RIGHT) FOR COUNTRIES IN THE SOUTHEAST ASIAN SUBREGION

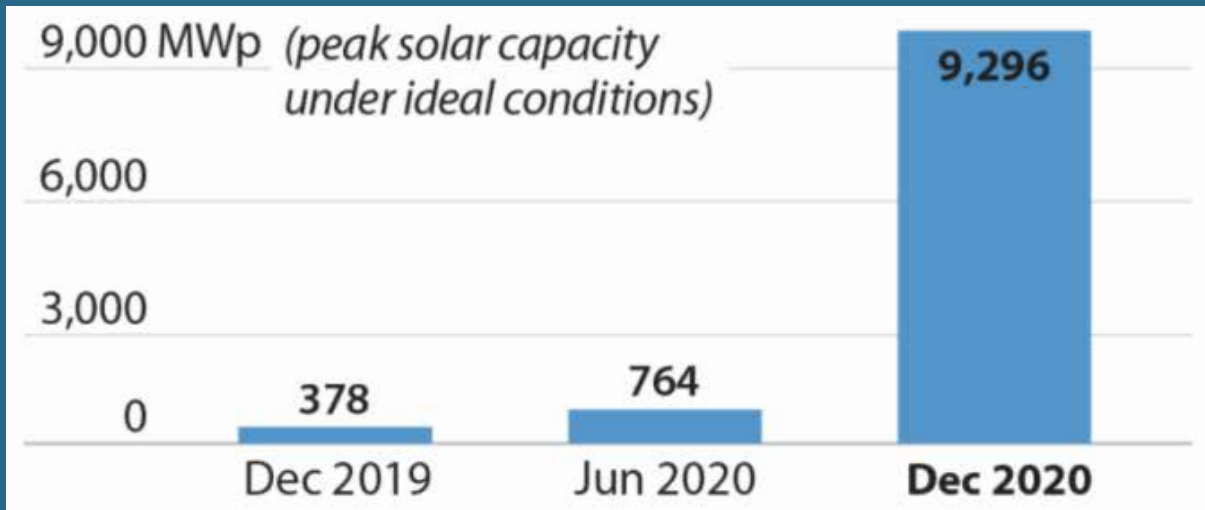


Source: UNESCAP (2021b).

**There are early signals that the clean energy transition is starting across most ASEAN countries. This is driven by the need to strengthen energy security and improve affordability and access, while also reducing energy-related emissions.**

- The ASEAN Power Updates 2021 show that 82 percent of the new installed capacity across the region in 2020 was renewable (ACE 2021b). This builds on a positive trend which saw more renewables than fossil fuel power generation installed in 2019, and will see 60 percent of new installed capacity over the next five years from renewables.
- The Malaysian government’s 2039 Power Generation Plan will see solar increase from 17 percent to 31 percent of generation capacity while coal will decrease from 37 percent to 22 percent (Kau & Peng 2021).
- Viet Nam surpassed all expectations in its deployment of rooftop solar PV, installing a sizable 7.3 GW (or 9,300 MW peak) in less than a year, as seen in Figure 8. The monumental uptake of rooftop solar PV in just six months was driven by the closing date for a highly attractive feed-in tariff (IEEFA 2021a).

FIGURE 8: VIET NAM'S ROOFTOP SOLAR CAPACITY GROWTH,



Source: IEEFA 2021a, drawing on EVN data.

- The Indonesian Government has said no new coal-fired power plants will be approved, only allowing the completion of plants that are already under construction or have reached financial close (Listoriyini & Jiao 2021). While this is a positive step, this will still see more than 100 coal-fired power plants built over the next few years, generating significant emissions over their lifetime (Jong 2021).
- In addition to the moratorium on new coal-fired power generation introduced by the Government of the Philippines, an ambitious national target of 35 percent share of clean energy in the mix by 2030, from 21 percent today, has also been set (IEEFA 2021b).

**Regional cooperation is also underway, which is key to enabling a faster, more affordable clean energy transition.**

- APAEC defines a 2025 target of 23 percent renewable energy share of Total Primary Energy Supply and a 35 percent share of total installed capacity across ASEAN (ACE 2020a).



## A coal retirement mechanism to speed up closure of Asia's coal-fired power plants

The Asian Development Bank is collaborating with financial institutions including British insurer Prudential, lenders Citi and HSBC, and BlackRock Real Assets to fast track the closure of coal-fired power plants across Asia.

The proposed mechanism would create public-private partnerships to buy out plants and wind them down within 15 years – well before the end of their usual life, but allowing sufficient time for workers to retire or find new jobs, and allowing time for countries to shift to renewable energy.

The mechanism would buy and operate the plants at a lower cost of capital than is available to commercial plants, allowing them to run at a wider margin but for less time in order to generate similar returns. The cash flow would then be used to repay debt and investors.

The initiative is expected to be launched at COP 26, and could have its first purchase finalized as early as next year.

Source: Denina & Burton (2021)

**The potential for renewable energy remains largely untapped across the region.** The IEA finds that the primary opportunities for scaling up renewables across the region will come from solar PV, hydropower and wind (IEA 2019a).

**The pace of renewables adoption across the ASEAN region is not yet on track with the goal of the Paris**

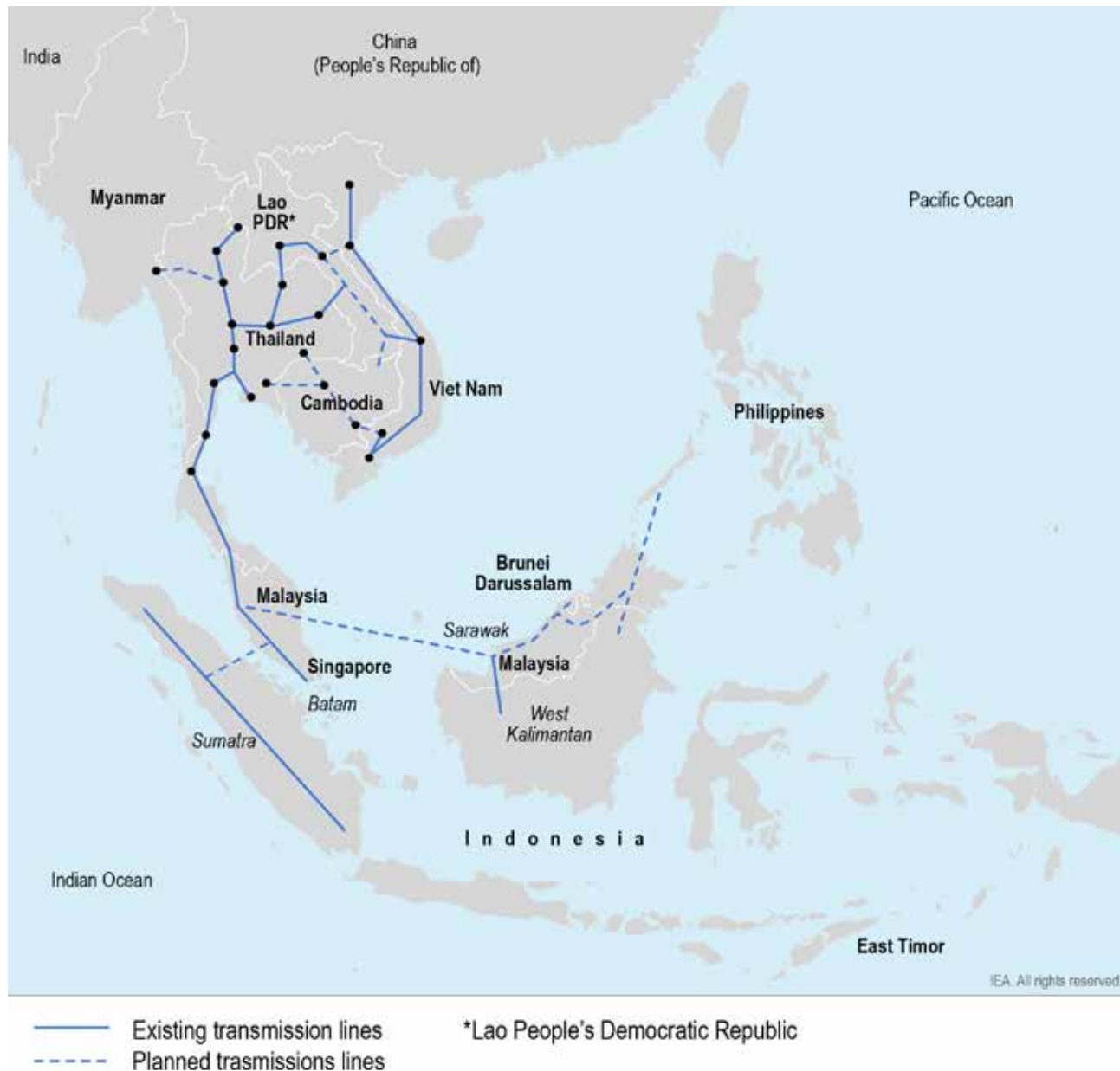
**Agreement.** IRENA's Global Energy Outlook for Southeast Asia (2020) finds that 53 percent of the region's power needs should be met by renewable sources by 2030 and reach 73 percent by 2040 to align with the goals of the Paris Agreement (IRENA 2020). The region currently has a target of 35 percent of installed power capacity from renewable energy by 2025, requiring 35–40 GW of new renewable energy capacity to be added across the region over the next four years (ACE 2021c; McLaren 2021).

**Achieving this share of renewables would require a flexible power system, supported by regional power trade** through the ASEAN Power Grid – an ambitious project to interconnect the power systems of ASEAN member countries and establish multilateral power trading (IEA 2019a) – as illustrated in Figure 9.





FIGURE 9: THE ASEAN POWER GRID.



Source: IEA (2020)

An example would include linking the solar in Malaysia with the hydropower in Thailand, Lao PDR and Indonesia, or scaling up the existing supply of electricity from Malaysia's abundant hydropower in Sarawak to West Kalimantan in Indonesia (Leong, Platts & Sofiyon 2021). Similarly, the significant hydropower resource in Lao PDR could be used to generate income by selling electricity to neighboring countries, helping to reduce their GHG emissions (Kyophilavong et al. 2021).

This is significant given the uneven endowment of renewables potential across the region (IRENA 2020). Transborder grid integration also allows access to a larger and more diverse pool of flexible resources, smoothing intermittency and reducing system variability (IEA 2019a). Further benefits include major cost savings in building and operating the region's power systems, as well as the significant environmental and climate benefits from shifting to renewable power (IEA 2019a).

Grid integration within ASEAN (and possibly also with Australia) has been identified as an important means of strengthening the integration of renewable energy into Indonesia's electricity system (Halimatussadiyah et al. 2021).

**There is a growing trend to displace coal with gas-fired power generation, which presents similar risks in the medium term.** The shift away from coal to gas helps to diversify fuel sources while also achieving emissions reductions. However, for Southeast Asian countries dependent on gas imports, growing dependence on gas or LNG would present a similar energy security and asset stranding risk as coal. The recent gas price spike, driven by an expectation of rising demand across Asia, should trigger the re-evaluation of gas as a transition fuel in ASEAN countries, along with further consideration of the risks of potential asset stranding of long-lived gas infrastructure (ClimateWorks Australia & ASEAN Centre for Energy 2021).

The role of gas-fired power generation, timeline for phase-out and subsequent risk of asset stranding needs to be further assessed at a country level as part of long-term decarbonization analysis.

## **[b] Shift from fossil fuels to electricity or other near-zero emissions alternatives.**

This includes electrification of transport and industry, or switching to other zero-emissions fuels where electrification is not possible.

The transition to electric mobility is already underway globally, with major vehicle producers expected to shift fully from internal combustion engines to battery electric vehicles by around 2035 (Sachs 2021).

The shift to electric vehicles is particularly crucial for Southeast Asia, where road transport is the number one driver of toxic air pollution levels that are a key cause of premature deaths. Tailpipe emissions are a major contributor to climate change, with the transport sector responsible for a quarter of the region's energy emissions (ADB 2015).

Addressing transport pollution also presents a unique opportunity: the region is growing rapidly as a manufacturing hub for cars and light commercial vehicles, and policy intervention could decisively pivot the sector toward electric vehicle technologies, bringing down costs and driving local market demand (Argyriou 2019). This opportunity is discussed in more detail in Chapter 4.

### **Regional cooperation on sustainable land transport has been a strong focus for ASEAN.**

- Sustainable transport is a prerequisite to the achievement of eight of the 17 Sustainable Development Goals (United Nations 2016, in Bakker et al. 2017).
- Commitment to reduce emissions from transport has been cemented through regional agreements such as the ASEAN Regional Strategy on Sustainable Land Transport, the ASEAN Fuel Economy Roadmap for the Transport Sector 2018–2025 (focused on light-duty vehicles), and the Guidelines for Sustainable Land Transport Indicators on Energy Efficiency and GHG Emissions in ASEAN (ASEAN 2019).
- The ASEAN Regional Strategy on Sustainable Land Transport provides recommendations and guidance to member states to help ASEAN achieve its vision of a transport system that is equitable, efficient, safe and clean, in line with global sustainable development and climate change objectives, and provides access to opportunities as well as fosters regional inclusive growth and development. (ASEAN 2019).

### **A shift to electric transport will drive up electricity demand.**

While the region's commitment to transport electrification is evident, it must be planned in parallel with clean power infrastructure to ensure that a shift to electric transport does not further lock-in the region's dependence on coal-fired power generation.

### **Green fuels such as 'green' hydrogen will also have a role to play.**

Green fuels provide a clean alternative to electrification in sectors that cannot be electrified directly. This includes hydrogen produced using zero-carbon electricity or other zero-carbon fuels for use in industrial applications and hard-to-abate sectors such as aviation, shipping and steel production.

ASEAN has ample quantities of the energy resources that are required to produce green hydrogen and, as such, harnessing hydrogen as an energy carrier provides an opportunity to both green the region's energy supply and increase the region's own energy supplies which can, in turn, enhance energy security (ACE 2021a).

In Malaysia, Sarawak's hydropower capacity enables the production of green hydrogen, which can be supplied to Japan and Korea, both betting heavily on the hydrogen economy. The green hydrogen potential, coupled with land availability and proximity to Indonesia's iron ore, could also open a new industrial frontier for Sarawak – green steel – presenting an opportunity to revolutionize Malaysia's coal-based steel industry (Leong, Platts & Sofiyani 2021).

## Biofuels – solution, or problem?

IRENA (2017) estimates that there is significant sustainable resource potential for liquid biofuels in Southeast Asia, without competing with food supplies or causing land use change that could contribute to global warming. This would be achieved through more extensive collection of residues from food crops and forest products, planting high-yielding trees and grasses on land made available through more intensive cultivation of farmland. It finds that up to two-fifths of the region's projected fuel needs for transport could be met by biofuel in 2050.

However, the Food and Agriculture Organization (FAO n.d.) finds that expansion of biofuels in Southeast Asia is happening at a rapid pace, with little coordinated assessment of the potential impact on the region's natural resource base, the environment and food security.

The region's biofuel potential indicates that this clean, renewable fuel has a role to play in the clean energy transition, and may be particularly well suited as a transition fuel for heavy duty vehicles which are difficult to electrify. This must be carefully balanced with the need to manage deforestation as well as food security for a growing regional population, even as climate change creates greater challenges for food security. It must also be balanced with the critical role that nature-based solutions will need to play in addressing climate change – both as a carbon sink and in strengthening resilience to climate impacts.

Consideration of biofuels in the region will necessarily touch on the use of palm oil and its association with deforestation and social welfare outcomes for smallholder farmers. Resolving this will require setting clear and transparent criteria for measuring the environmental and social benefits and impacts of palm oil production for biofuel. It would also benefit from open-minded negotiations (particularly with the European Union and palm oil producing countries) to achieve optimal environmental and social outcomes. Diversifying the biofuel feedstock beyond palm oil and transforming the current incentive scheme (which mostly relies on government subsidies) to encourage innovation and sustainability are also worth exploring.

## **[c] Reduce energy waste in buildings, transport and industrial sectors.**

A shift to smart appliances, improved building design, better materials and other cost-effective energy saving approaches will be key to putting the brakes on the ASEAN region's accelerating energy demand.

Energy demand has increased by 60 percent over the past 15 years across the ASEAN region (Liu & Noor 2020) and is expected to grow by a further 60 percent by 2040 (IEA 2019a). This growth in energy demand will be driven predominantly by the industrial and commercial sectors, with compound annual growth rates of 4.4 percent and 4.8 percent respectively (IEA 2020c).

The built environment already accounts for about 40 percent of total final energy consumption in Southeast Asia (ASEAN Post 2018). Space cooling is the fastest-growing use of electricity, increasing more than seven-fold between 1990 and 2017 – yet only 15 percent of households in Southeast Asia currently own an air conditioner, signaling huge potential future growth in demand (IEA 2021).

In the industrial energy sector, future energy demand across Southeast Asia is expected to be driven by the region's manufacturing industry and growing production of steel, automobiles, cement, petrochemicals and chemicals (ASEAN Post 2018), which may have potential implications as carbon border adjustment mechanisms are introduced.

A number of well-recognized barriers exist that hamper efforts to improve energy efficiency at scale, such as split investments (for example, where a building owner would pay for efficiency improvements, but a tenant benefits through reduced energy bills), high upfront costs (such as insulating a building to improve its efficiency, or purchasing more efficient plant equipment), and a long return on investment (particularly in economies where energy prices are low or subsidized).

**Yet investing in energy efficiency pays off**, through avoided energy system costs and enhanced energy security and affordability, as well as delivering emissions and broader sustainability impacts (such as reduced use of refrigerants for cooling) (IEA 2021). It is estimated that across six ASEAN member states, increasing total energy investment by 1–4 percent, and directing this toward energy efficiency could reduce the increase in primary energy demand to 2030 by between 8–25 percent (Liu & Noor 2020). It also fuels economic growth, enhances economic productivity, creates jobs and improves living standards (IEA 2021). Given these net benefits, prioritizing energy efficiency as part of COVID-19 recovery efforts could deliver double dividends across the region.



## Energy efficiency and conservation measures have emerged as a region-wide priority, and are being addressed in numerous domestic policies.

In 2019, the Philippines' government enacted the Energy Efficiency and Conservation Act (building on earlier initiatives). The Act aims to encourage renewable energy technologies; reinforce related laws to ensure a comprehensive, institutionalized approach; and foster a market-driven approach to energy efficiency, conservation, sufficiency and sustainability. This is consistent with NCCAP's priority to promote and implement energy efficiency and conservation nationwide, and a key objective of the Philippine Energy Plan (2018–2040) to decrease the wasteful utilization of energy through the use of energy efficiency tools and strategies (Monsod et. al. 2021).

Cambodia has implemented the Energy Efficiency and Conservation Master Plan of Cambodia (ERIA 2020). It is estimated that comprehensive energy efficiency policies have the potential to reduce GHG emissions by 43 percent, across buildings, transportation and industry in Cambodia (Piseth, Kimlong & Kimly 2021).

Thailand's Energy Efficiency Plan 2015–2036 is interlinked with the Energy Conservation Act, aiming to reduce cross-sectoral energy intensity by 30 percent by 2036 compared with 2010. (Thampanishvong, Limsakul & Sirison 2021; IEA 2020b).

Malaysia and Thailand have already implemented advanced and innovative financing instruments and specialized financial models to support public and private sector investment in energy efficiency (ADB 2020).

At the regional level, ASEAN committed to a 20 percent reduction in energy intensity by 2020 and 30 percent by 2025 based on 2005 levels (ACE 2020d). By 2017, the 20 percent target had already been met, with energy intensity having reduced by 21.6 percent with a 24.9 percent reduction projected to be reached by the end of 2020 (ACE 2020d; ASEAN 2020b). This has led ASEAN Ministers to upgrade the 2025 target to 32 percent, signaling a deepening region-wide commitment (ASEAN 2020b).

## [d] Preserve and increase natural carbon sinks.

Nature-based solutions increase the amount of carbon dioxide stored in forests and soils. This is typically achieved by protecting primary forests, restoring deforested and degraded land, and by shifting from extensive (land-using) agriculture to intensive (land-saving) agriculture.

**Shifting to more productive, adaptive and regenerative agriculture can strengthen food security and enhance resilience to a changing climate.** These practices also increase soil carbon and reduce dependence on chemical fertilizers, delivering emissions reductions. The ASEAN Regional Guidelines for Promoting Climate Smart Agriculture (CSA) Practices and ASEAN's Good Agricultural and Aquacultural Practices provide good foundations, along with the ASEAN Comprehensive Recovery Framework which calls for promoting climate-smart agriculture.

**Protecting and restoring the region's forests is critical to climate action and sustainable development.**

Southeast Asia's forests are among the richest and most valuable habitats on earth. These ecosystems play a crucial role in addressing climate change, as well as representing significant economic and ecological value – with hundreds of millions of people dependent on the ecosystem services they provide such as clean water, food and fiber (Ardiansyah 2013).

Protecting and restoring tropical rainforests is particularly important for global climate action, as they sequester more carbon from the atmosphere than temperate or boreal forests (Harris & Gibbs 2021).

Yet Southeast Asia holds the unenviable title for the highest rate of deforestation of any major tropical region, with more than 50 percent of its original forest cover already lost (ASEAN Post 2017). This has seen Southeast Asia's forests shift from being a carbon sink to a net source of carbon emissions over the past 20 years (Harris & Gibbs 2021). Approximately 73 percent of the region's deforestation is driven by commodities such as palm oil, sugar, and rubber, 19 percent by logging, and 8 percent by shifting agriculture practices, while urban expansion is responsible for 0.28 percent of tree cover loss (European Parliamentary Research Service 2020).

Reversing this trend will be critical to not only the achievement of the region's climate goals, but also the world's.

**Peatland protection and restoration is an important opportunity for several ASEAN member countries.**

Peatlands naturally store significant amounts of carbon – almost twice as much as forests – estimated at 120 billion tons of carbon or approximately 5 percent of all global terrestrial carbon. However, deforestation, drainage and fire are threatening the stability of this carbon sink (ASEAN Peatland Forests Project [APFP] n.d.; Wulandari & Terzano 2021).

Yet conserving peatlands is described as a “low hanging fruit in tackling climate change” (Cole et al. 2021, p.1). Peatlands cover roughly 24 million hectares across the ASEAN region, predominantly in Indonesia, Malaysia, Brunei Darussalam, Thailand and Viet Nam, with smaller areas in Myanmar, Lao PDR and the Philippines. Peat swamp forests play a critical role in the economy and ecology of the region – providing timber and non-timber forest products, water supply, flood control and many other benefits.

## Member states are implementing nature-based climate actions, but stronger focus is needed.

- Under the 10th Malaysia Plan (2011–2015), forest cover increased from 56.4 percent to 61 percent as various conservation initiatives were undertaken such as the gazetting of 23,264 hectares of forest and planting of 53 million trees. Under the 11th Malaysia Plan (2016–2020), the government aims to gazette 17 percent of terrestrial and inland water areas as protected forest (Malaysian Government 2015).
- In 2011, the Indonesian government introduced a moratorium on issuing new permits for use of primary natural forest and peatlands, with the latter storing up to 20 times more carbon than other types of forest (Dunne 2019). While the moratorium was planned for two years, it has since been extended and has been widely considered a success, evidenced by the achievement of a 45 percent decline in deforestation inside moratorium areas in 2018 compared to 2002–2016 (Wijaya, Samadhi & Juliane 2019).
- Lao PDR has an ambitious plan to grow forest cover to 70 percent of the country's total land area by 2020. Although the plan has not yet been achieved, it has attracted significant funder support for the country (Kyophilavong et al. 2021).

## Region-wide issues relating to agriculture, forestry and other land use are also being addressed collectively through ASEAN.

- The ASEAN Joint Statement to COP25 (ASEAN 2019) reaffirms the commitment of ASEAN member states to promote sustainable management of forests, including through the implementation REDD+ projects, and through enhanced biodiversity conservation, protection and restoration of various terrestrial, coastal and marine ecosystems.
- The ASEAN Peatland Forests Project (APFP), and subsequent ASEAN Programme on Sustainable Management of Peatland Ecosystems 2014–2020 (APSMPE), was implemented across four member states – Indonesia, Malaysia, Philippines, and Viet Nam – and executed by the ASEAN secretariat. It advanced numerous points of collective decision-making, such as the formulation of the ASEAN Peatland Management Strategy, led to the development of national action plans for peatlands, improved policies and regulations, identified new regional peatland areas, and led to the development of a combined project portfolio for APSMPE totaling US\$240 million (APFP 2016).

# 4. The region has a compelling green economy opportunity waiting to be seized.

## **[a] Accelerating climate action in line with the 1.5°C global goal is both possible and economically desirable.**

Sustainable and green economies offer enhanced economic development, job creation, and a more resilient future for the region. It is estimated that developing Southeast Asia's green economy could provide up to US\$1 trillion in annual economic opportunities by 2030 (Hardcastle & Mattios 2020). Recent research by the Asian Development Bank (ADB) also finds that every US\$1 million spent on renewable energy and energy efficiency, would create 7.5 to 7.7 full-time jobs. This is significantly more than the 2.7 jobs generated from the same amount of investment in fossil fuels (ADB 2021a).

ASEAN member states are recognizing the opportunities that economic growth through a green transition will bring. The 2021 mid-term review of the ASEAN Blueprint recommended increased focus on sustainable development. It recognizes that the fundamental objective of ASEAN's economic integration is to improve the wellbeing of the people through economic opportunities that are more equitable, inclusive, and sustainable.

Both Indonesia and Thailand have joined the United Nations Partnership for Action on the Green Economy (PAGE), demonstrating each country's commitment to sustainable development. PAGE aims to support countries and regions to reframe "economic policies and practices around sustainability to foster economic growth, create income and jobs, reduce poverty and inequality, and strengthen the ecological foundations of their economies" (UN PAGE, n.d.).

Recent analysis by Indonesia's Ministry of National Development Planning (Bappenas), found that pursuing a trajectory to net zero by 2045 or 2050 would deliver economic growth of 6.21 percent and 6.06 percent, respectively by 2045 (Halimatussadiah et al. 2021). This growth is stronger than trajectories that achieve net zero on a longer timeframe, with the 2060 and 2070 scenarios only achieving a growth rate of 5.87 percent and 5.82 percent, respectively (Halimatussadiah et al. 2021).

Cambodia's National Strategic Plan on Green Growth prioritizes green incentives for catalyzing investments, including green taxes, green finance, green credit, and green microfinance. Likewise, in Viet Nam, the National Strategy on Green Growth provides a framework for prioritizing investment opportunities and mobilizing public and private finance for green economic recovery projects.

Options for creating new economic value from forests are also available, further enhancing the value of the region's rich biodiversity. For example, the circular forest bio-economy has been identified as Malaysia's next economic wave, with the potential to exceed agriculture, oil and gas. While creating chemicals for use in products (e.g. paints, plastics, pesticides, detergents etc.) is currently dependent on fossil fuel chemistry, this could be shifted to nature-based alternatives derived through bio-refining (Leong, Platts & Sofiyani 2021).

## **Encouraging transformation across the region's industrial and manufacturing sectors can support emissions reduction, and enable a shift toward circular economies.**

Policies that facilitate a shift toward a circular economy are also critical for reducing emissions, minimizing natural resource depletion and addressing waste, as well as improving overall economic benefits. For example, Indonesia has found that implementing a circular economy in five industrial sectors – food and beverage, textiles, wholesale and retail trade, construction, and electronics – will increase GDP by IDR642 trillion (approx. US\$45 billion) and create around 4.4 million new jobs by 2030 (Halimatussadiah et al. 2021). Similarly, Malaysia found that implementing industrial clusters can facilitate greater industrial symbiosis such as the use of waste, bioenergy, and CO<sub>2</sub> as downstream feedstock (Fan & Leong 2021).

**A transformation to a sustainable and green economy can strengthen longer term competitiveness in a global market that increasingly requires low-carbon products.**

Rapid deployment of low-carbon infrastructure such as renewable energy and green fuels, building on the ASEAN Plan of Action for Energy Cooperation (APAEC), would also help to meet a dramatic rise in energy demand in ASEAN, estimated to grow at 233 percent from 2017 to 2040 (ACE 2020d), while maintaining regional energy security. More specifically, this shift would further enable Southeast Asian manufacturers to take advantage of increasing demand for low-carbon technologies and products, such as smart grids, solar photovoltaics, and energy storage; markets that are projected to grow at 11 percent per year between 2020 and 2050 (ClimateWorks Australia & Vivid Economics 2019).

**A stronger focus on sustainable development brings a broad range of benefits.**

As domestic and international finance increasingly shifts toward sustainable and low-carbon modes of economic development, ASEAN has a unique window of opportunity to build on its commitment to sustainable development to transform its socioeconomic model into one that focuses on social, environmental, and economic sustainability. This would not only support the achievement of the region's ambitious sustainable development goals and strengthen climate action, but also better position ASEAN to adapt to this transforming global economic model.

Strengthened supply chains as well as the Master Plan on ASEAN Connectivity (MPAC) 2025, designed to help ASEAN member states prioritize and implement sustainable infrastructure projects in line with international best practices, could facilitate this. For example, the mid-term review of MPAC found that increasing infrastructure productivity could reduce the need for new infrastructure by US\$44–74 billion annually (ASEAN 2020c). This could thus free up resources for targeted investment to facilitate the economic transformation.

Scaled-up investment to both manufacture and deploy climate-smart technologies, such as electrified transport, renewable energy, and energy efficiency, would also deliver a number of socioeconomic benefits, such as:

- addressing air quality and related public health issues
- supporting energy security and energy access
- facilitating the recovery from the COVID-19 pandemic, while also transforming ASEAN's economies toward more sustainable and inclusive models.

**[b] Regional coordination to build and strengthen low-carbon value chains could catalyze the rapid transformation of ASEAN to a global low-carbon hub.**

**Strong existing trade relationships with global low-carbon leaders positions ASEAN well in the low-carbon race.**

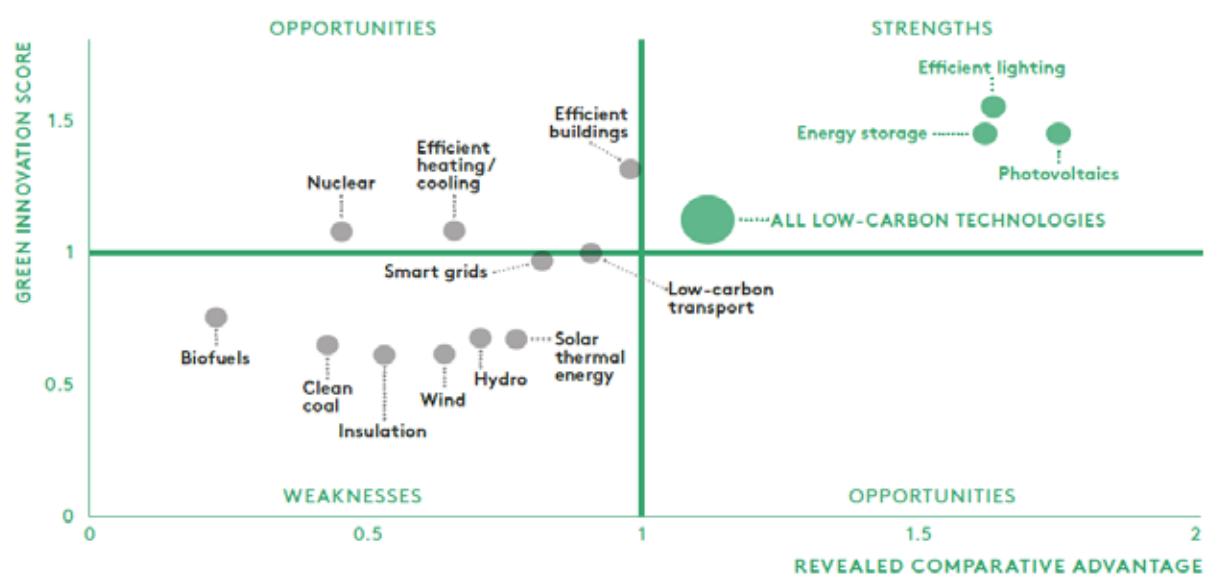
Research by ClimateWorks and Vivid Economics (2019) found that Asia – in particular, China, Japan and South Korea – already leads the global race in low-carbon technologies. But developing Asia is on the cusp of competitiveness.

Figure 10 below shows the strengths in low-carbon technologies across all Asian economies. The vertical axis highlights strengths in innovation, and the horizontal axis strengths in manufacturing and export. Those technologies sitting in the upper right-hand quadrant are areas of comparative advantage – efficient lighting, energy storage and solar PV. The graph also shows that Asian economies overall have an overarching comparative advantage across all low-carbon technologies.



FIGURE 10: ASIAN ECONOMIES HAVE BROAD STRENGTHS ACROSS ALL LOW-CARBON TECHNOLOGIES.

FIGURE 11. ASIAN ECONOMIES HAVE BROAD STRENGTHS ACROSS ALL LOW-CARBON TECHNOLOGIES



Note: GIS is calculated using patents filed between 2009 and 2013; RCA is calculated using average RCA between 2008 and 2012. Source: UN COMTRADE 2012; PATSTAT 2013; Srivastav, Fankhauser and Kazaglis (2018).

Source: ClimateWorks Australia & Vivid Economics (2019)

This approach can be used to help countries understand their strengths to develop low-carbon industries. It can be useful for countries to consider innovation expertise and export specialization in related sectors to consider where to prioritize policy support for low-carbon industries. For example, a country with strong expertise in manufacturing and exporting internal combustion engine vehicles is well-positioned to pivot to electric vehicles. A country with a robust electronics industry is likely already manufacturing some of the componentry required for smart grids. Natural resource endowments provide another area of opportunity, with countries rich in rare earths and minerals needed for low-carbon technologies having a clear opportunity to build capability in value-adding.

The research found that Viet Nam is well placed to gain competitiveness in energy storage, smart grids, photovoltaics and wind power. In the Philippines, significant export strengths already exist in solar PV and efficient lighting, with promising opportunities in geothermal and energy storage. Comparative advantages exist in battery technologies, geothermal and biofuels for Indonesia.

The RCEP trade agreement will give ASEAN's member states increased access to these low-carbon leaders, who, along with the region's other key trade partners the USA and the European Union, have committed or pledged to achieve net zero by mid-century.

Despite not being at the innovation frontier, ASEAN member states have an opportunity to accelerate the green industrial transition through these trade relationships, particularly with countries such as China, Japan and South Korea who are already specialized in low-carbon innovation.

Close trade relations with low-carbon global leaders can benefit ASEAN member states through enhancing access to low-carbon technologies, the costs of which can be expected to rapidly decline as China invests in scaling up production. This will likely mean the cost of renewable energy generation falls faster than anticipated, making clean, accessible, low-cost and secure energy a near-term eventuality that can benefit ASEAN member states in achieving their energy and climate goals.

**As the world pivots toward low-carbon growth, countries that can provide the capabilities and infrastructure to participate in this transition will reap the development benefits.**

In the first half of 2020, ASEAN became China's largest trade partner. This represents an extension of China's industrial chain, with ASEAN-based facilities still relying on raw materials, equipment, expertise and technology from China (Medina 2020).

South Korea and Japan, the other two low-carbon technology leaders, are also expanding their supply chains into Southeast Asia attracted by lower wage structures, improving infrastructure and a supportive legal environment (Medina 2020). These moves are consistent with rising regional trade integration between ASEAN, China, Japan and Korea, both as a counterbalance to the rise of protectionist policies increasingly adopted by the USA, but also to enhance the resilience of these economies to future volatility shocks.

Policies to encourage technology transfer, such as the creation of knowledge hubs through collaborative R&D funding, can ensure positive long-term impacts from inward foreign direct investment (FDI). The geographical proximity of low-carbon economic clusters in East Asia highlights the potential positive impact that existing supply chains can have in attracting investment and business activity into nearby economies. Countries can encourage technology transfer through conventional mechanisms, collaborative R&D with foreign organizations, joint ventures and technology licensing; and more unconventional mechanisms such as foreign R&D and company acquisition.

Given that many of ASEAN's member countries have seen a decline in foreign direct investment (FDI) due to COVID-19, long-term recovery will rely on reviewing and revising FDI policies to enable countries to attract, retain and facilitate investments in areas that are key for sustainable development – green growth, digital transformation as well as social and health outcomes (UNESCAP 2020).

**Fast-tracking the harmonization of standards across ASEAN countries can enhance regional trade in low-carbon technologies, while also maximizing emissions reductions and cost savings.**

Where possible, standards should be harmonized across the ASEAN region – and aligned with international standards on sustainability – to facilitate trade flows of low-carbon technologies across the region. Enabling regional trade flows will be key to rapidly building the industrial capacity of ASEAN member countries to position themselves for success in the global green race.

The ASEAN Centre for Energy is working with the UN Environment Programme to develop harmonized standards for lighting and air conditioners (ACE 2021d), which will be key to enhancing the efficiency of appliances. To most effectively reduce the rapid increase in energy demand, as well as support global trade of ASEAN-produced appliances, efficiency standards should follow the trajectory of global leaders in enhancing energy efficiency.

Similarly, standards for renewable energy technologies should be set to meet the needs and conditions of ASEAN countries.

**Leveraging regional complementarities can strengthen electric vehicle value chains and capitalize on new economic opportunities, while strengthening climate action, reducing air pollution, and increasing energy security.**

Electric vehicles provide a promising example of where strengthening value chains can deliver multiple benefits across the region.

The global market for EVs is expected to grow rapidly over the next decade, making lithium-ion batteries a valuable geostrategic resource (Ng & Dinarto 2021). With the world's largest nickel reserves, the Government of Indonesia is focused on increasing processing of raw materials domestically (Fitch Solutions 2021), and is positioning itself as a major player in electric vehicles and batteries (Halimatussadiyah et al. 2021).

Thailand and Malaysia are also well positioned to respond to this growth in demand for batteries by increasing existing capacity in the assembly of battery packs (Fitch Solutions 2021).

While the focus for capability building in battery manufacturing across ASEAN has largely been on the EV market, lithium-ion batteries can be used in other contexts such as domestic solar PV plus storage systems, and to support renewable microgrids for remote communities. Expanding the focus to these markets can help to fast-track the energy transition while growing green jobs and manufacturing businesses that are in line with the low-carbon transition.

While the benefits of the global shift to electric vehicles are particularly pronounced for economies with established automotive manufacturing hubs, there remains potential for ASEAN economies with less-developed manufacturing industries to catch up (Deloitte 2021).

Given increasing foreign investment in EV battery manufacturing in Southeast Asia, there is also growing demand for tailored logistics solutions for EV battery shipping, due to the complex nature of EV batteries (Zhang 2021). Recent analysis indicates that four Southeast Asian countries – Viet Nam, Indonesia, Thailand and the Philippines – will continue to be among the top 25 global suppliers of lithium-ion batteries in 2025 (Zhang 2021).

**The potential to play in the global ‘green’ hydrogen race is an area that warrants further consideration.** Green hydrogen (produced from renewable energy sources) is considered a potentially key enabler of the clean energy transition.

Currently hydrogen is most commonly used in industrial applications such as oil refining, chemical and fertilizer production, and in production of plastics, fabrics and dyes (Andretich et al. 2021), using hydrogen produced from fossil fuels (grey hydrogen). But ‘green’ hydrogen provides a well-regarded alternative to fossil fuels for supporting decarbonization in hard-to-abate sectors.

- Long haul freight has been identified as a promising sector for green hydrogen, using fuel cell technology (Andretich et al. 2021).
- Shipping and aviation are also contenders for green hydrogen, given the limited alternatives available for decarbonization. These sectors are responsible for around 5 percent of global emissions and are difficult to electrify. Hydrogen, or hydrogen-based fuels such as ammonia, could be crucial for these sectors to achieve their net zero goals (Carbon Brief 2020).

Several of ASEAN’s key trade partners are focused on scaling up green hydrogen, suggesting there may be scope for ASEAN member states to play a role in the value chain.

Japan has plans to realize a ‘hydrogen-based society’ through the creation of a commercial hydrogen fuel supply chain, expansion of the fuel cell vehicle market, and the promotion of hydrogen use in power generation. Given the country’s limited renewable resources, Japan is expected to be one of the top Asian importers of green hydrogen (Andretich et al. 2021).

South Korea has similarly announced a Hydrogen Economy Roadmap, which outlines a plan to increase both production and use of hydrogen, and to promote the development of hydrogen technologies such as fuel cells (Andretich et al. 2021).

China is also increasing investment in ‘clean’ hydrogen (either ‘green’ or ‘blue’, where blue hydrogen is produced using fossil fuels with carbon capture and storage (CCS)), with a focus on heavy transport (Andretich et al. 2021).

To date, there has been only limited discussion of the potential of ‘green’ hydrogen in ASEAN countries – either as part of the energy mix, or as an export commodity. The high cost of ‘green’ hydrogen compared to ‘grey’ or ‘blue’ hydrogen remains a challenge and barrier to its adoption.

Singapore is investing in research and development in hydrogen usage as a green energy source (Andretich et al. 2021). Brunei has successfully explored an alternative way of shipping hydrogen, using a new technology called liquid organic hydrogen carrier (Phoumin 2020; Phoumin 2021), although Brunei produces hydrogen from processed gas, generating GHG emissions.

As highlighted previously in this report, Malaysia has identified excellent potential to produce green hydrogen from its abundant hydropower resources in the Sarawak province, with potential to meet demand in Japan and Korea. It is also looking further along the value chain, identifying the potential to transform the country’s steel industry to produce green steel (Leong, Platts & Sofiyani 2021).

In addition to positioning ASEAN member countries to feed the hydrogen appetite of key trade partners, green hydrogen could also provide a viable means of energy storage in the region, providing value for intermittent renewable energy that might otherwise be curtailed. The stored energy could be transported from regions with higher production and lower demand to areas with lower production and higher demand. Or it could be stored and used during peak demand periods, reducing demand for expensive peak-load technologies (Andretich et al. 2021).

### **[c] The rapid transformation that is required will come with trade-offs that must be managed.**

While ASEAN and its member states have much to gain by positioning the region as a low-carbon manufacturing hub, the global transition will come with unavoidable trade-offs. To avoid the impacts of exceeding 1.5°C, the world must wean itself off fossil fuels over coming decades. The science is unequivocal on this.

This means that the industries that are part of the fossil fuel supply chain must transition over coming decades. Provinces and communities that are dependent on these industries for their economic welfare will require targeted policy and investment support to transition to alternative industries. This cannot be left to chance.

The Just Transition movement provides guidance on how industries and communities can best be supported, to minimize the negative impacts of the transition and maximize the opportunities.

The International Labor Organization (ILO 2019, p.2) describes a just transition as ensuring that the “opportunity offered by sustainable development and green job creation from decarbonization and adaptation also results in better jobs and decent jobs. It also means that those workers, firms, local regions and sectors affected by the need to decarbonize and adapt to climate change receive the support, information, training and capacity they need to successfully transition.” Green jobs will not occur automatically, or at the scale needed, and therefore a just transition must be carefully planned for.



# 5. The rapid transformation needed in the ASEAN region won't happen without significant international support.

## **[a] High-income countries still have much to do.**

The ASEAN region and individual member countries are attracting significant interest from donor countries looking to curb the region's rapid emissions growth, and from the global private finance sector, hoping to benefit from the significant infrastructure investment needs of the region.

While this attention is useful, it is currently not enough. The ASEAN Joint statement to COP 25 (ASEAN 2019) is clear on the areas where effort needs to be stepped up. First, the developed world still has much to do to mitigate their own contribution to climate change, and a commitment to 1.5°C aligned pathways is not yet evident in the Paris commitments of these parties. While ASEAN has more to lose from overshooting 1.5°C, a commitment to scaling up regional action to reduce emissions could be contingent on equivalent commitments in line with 1.5°C by key development partners.

Developed countries are responsible for more than half of the cumulative CO<sub>2</sub> emissions that are driving climate change (Ward & Mahowal 2014). This responsibility and the greater financial resources of developed countries gives rise to the principle of common but differentiated responsibilities in the United Nations Framework Convention on Climate Change (UNFCCC). The Paris Agreement recognized the urgent need for developed countries to take the lead in reducing emissions and to provide finance, technology and capacity building to support climate mitigation and adaptation in developing countries.

## **[b] Global financing pledges must be met and ramped up, and access to finance must be enhanced across ASEAN to bolster mitigation and adaptation needs.**

**The US\$100 billion climate financing commitment made by developed nations at COP 15 has not fully materialized, and there is an urgent need for a renewed commitment accompanied by improved reporting, transparency and coordination.**

Achieving the emissions reduction potential in ASEAN will come at a price, requiring significant international support that must also factor in the region's extreme vulnerability to climate impacts, along with its development aspirations.

The developed world has fallen short in fulfilling the financial commitment made at COP 15 of US\$100 billion per year by 2020 to support developing country parties to implement adaptation and mitigation actions (Independent Expert Group on Climate Finance [IEGCF] 2021). Despite varying calculations due to differing methodologies, reporting by the OECD and developed countries in biennial reports to the UNFCCC demonstrates that total public climate financing to developing nations failed to reach even US\$50 billion per year between 2013 and 2016 (OECD 2020a; UNFCCC 2018).

Reporting on 2017 and 2018 – the most recent years calculated – finds public climate financing to have marginally grown to US\$54.5 billion and US\$62.2 billion respectively (OECD 2020a), demonstrating a trend upward pre-COVID but still well short of the target. COVID-related economic contractions in high-income countries

may have adverse short and medium-term implications for the provision of public climate financing, particularly in cases where Official Development Assistance (ODA) budgets are linked to gross national income (OECD 2020b).

In addition, adaptation financing remains particularly under-resourced, accounting for only 24 percent of total climate financing by multilateral development banks in 2020, which is consistent with other estimates of adaptation financing proportions (Climate Policy Initiative 2020; Joint Report on Multilateral Development Banks' Climate Finance 2021; Timmons Roberts et al. 2021). The OECD (2020a), for example, finds that between 2013–2018, adaptation financing only accounted for 21 percent of total climate financing provided and mobilized by developed countries despite 29 percent growth per year. A key reason for this shortfall is the longer timeframes on investment returns associated with certain adaptation projects compared with mitigation, which impacts on the provision of loans and involvement of the private sector (Timilsina 2021).

Equally concerning and relevant to a number of ASEAN member states, is that such reporting often overestimates the actual climate-related flows to developing nations and does not accurately represent the predominance of non-concessional loans comprising climate financing to least developed countries (LDCs). It is widely contended that the OECD Rio Marker system, under which developed country donors self-categorize the extent to which funds for projects are climate-related, has led to an overcounting of climate financing in OECD calculations as segments of broader development funding are categorized as climate-related (Indian Ministry of Finance; Oxfam 2020a).

Oxfam (2020a) analysis also finds that climate-related grants scarcely changed between 2015 and 2018, and could be less than half of figures reported. Furthermore, the study finds that only approximately 20.5 percent of climate finance has gone to least developed countries, with the share of non-concessional loans, which are provided on less generous terms than concessional loans, also increasing from multilateral development banks, bilateral lenders and private creditors (Oxfam 2020a).

This is overlaid by emerging evidence of the 'climate investment trap' faced by developing nations, whereby the ability to attract cheap capital for low-carbon projects is skewed toward developed economies, while developing nations face higher costs. A number of studies (Ameli et al. 2021; Steffen 2020) highlight this disparity in the cost of capital for green projects, also concluding that these rates are often underestimated in existing projections for the renewable energy transition made by international organizations (Ameli et al. 2021).

Taken together, these elements indicate that public climate financing has not been sufficient and that pledges must be strengthened at COP 26, accompanied by commitments to improve reporting, transparency, and the coordination of public climate financing flows. Action must also be taken to reduce the exposure of developing nations to the climate investment trap.

### **The impacts of COVID–19 have further reduced the fiscal capacity of ASEAN member states to initiate low-carbon and climate-resilient projects.**

Sizable economic impacts related to COVID–19 have been incurred across ASEAN. GDP contracted in 2020 across all member states with the exception of Viet Nam (IMF 2021b), necessitating vast public expenditure to the sum of over US\$730 billion (Martinus & Seah 2021). Short-term stabilization has been prioritized in response to the urgent emergency relief required, targeting tax cuts, direct cash transfers, wage subsidies, loan guarantees and public health spending (Maude 2020).

A substantial jump in fiscal deficits across ASEAN has followed and as all ASEAN governments continue to provide additional fiscal stimulus measures in 2021, the capacity to initiate climate mitigation and adaptation projects is constrained (Center for Strategic and International Studies 2021; RaboBank 2021).

There is a clear need for public climate financing to help ASEAN governments to accelerate the low-carbon transition, as public sector support is essential to initiate scaled ambition and crowd-in private finance. Various estimates have found that more than half of infrastructure investments in the region are not viable without public financial support (Koh 2017; Marsh and MacLennan 2017).

Looking ahead, the financing gaps across ASEAN are stark, which are also partially reflected in the contrast between conditional and unconditional NDC targets. For example, Indonesia's Second Biennial Update Report (BUR) 2018 estimates the need for around US\$247.2 billion in total to achieve its NDC target by 2030 which exceeds, on a per year basis, current levels of spending on education, social security, or health (Halimatussadiah et al. 2021). The total financing required for Cambodia to realize national NDC mitigation targets is approximately US\$5.8 billion, with forestry comprising 60 percent of the total. Adaptation financing requirements are estimated at US\$2 billion, predominantly spread across infrastructure, agriculture, water resources, and livelihoods, poverty and biodiversity (Kingdom of Cambodia 2020). Similarly, Lao PDR faces an acute lack of funding and finances

for NDC implementation: despite receiving significant donor funding for the forestry sector, the country faces shortfalls elsewhere (Kyophilavong et al. 2021).

## **[c] Enhanced coordination between ASEAN member states and development finance institutions will be key to unlocking the required scale of sustainable finance.**

**A range of multilateral and bilateral actors will have different roles to play to support ASEAN nations in meeting NDC targets, through the provision of climate-related grants and concessional loans and enhanced support to lock in private sector investment.**

The ASEAN Joint statement to COP 25 (ASEAN 2019) reaffirms the commitment of ASEAN member states to promote “collaboration with ASEAN dialogue, sectoral dialogue, development partners and other external parties to enhance climate action in the ASEAN region”. One of the key catalysts to accelerate climate action across the region is the increased provision of public climate financing.

There is no single development partner or external actor responsible for this. Instead, it will take a range of organizations playing various roles to open ASEAN’s pathway toward a low-carbon and climate-resilient future.

Key sources of direct public financing and support include:

The Development Finance Institution (DFI) System	<ul style="list-style-type: none"> <li>● Includes multilateral development banks (MDBs) – e.g. Asian Development Bank (ADB), Asian Infrastructure Investment Bank (AIIB), World Bank and International Finance Corporation (IFC); and the International Development Finance Club.</li> <li>● Provide grants, concessional loans, and other forms of direct development and climate financing.</li> <li>● Instrumental in mobilizing and locking in private capital through the provision of co-financing and credit enhancement supports, among others.</li> </ul>
Multilateral concessional funds	<ul style="list-style-type: none"> <li>● E.g. Green Climate Fund (GCF), Global Environment Facility (GEF), Adaptation Fund, Asian Development Fund.</li> <li>● Provide direct grants and concessional loans for mitigation and adaptation projects from a pool of funding mobilized from developed and developing nations, often in partnership with DFIs and the private sector.</li> </ul>
Bilateral government actors	<ul style="list-style-type: none"> <li>● Provide official development assistance (ODA) directly or through DFIs and multilateral concessional funds.</li> <li>● Funding provided in the form of grant or loan.</li> </ul>
Private sector	<ul style="list-style-type: none"> <li>● Includes project developers, commercial financial and non-financial institutions, funds, and institutional investors.</li> <li>● Provides project debt financing (market or low-cost), balance sheet debt financing, project equity, and balance sheet equity.</li> </ul>

Source: IEGCF (2020)

Due to the shortfalls in climate financing over the last decade, there is an urgent need for DFIs, multilateral concessional funds and bilateral actors to increase direct financing support and collaborate to enhance the coordination of grant and loan distribution to developing nations in ASEAN. Additionally, public climate financing is important to lock-in private sector financing, and to reduce the exposure of ASEAN nations to higher costs of capital and other barriers that impede low-carbon investments into the region.

Steps 1 to 4 below summarize a selection of the actions required by financial actors to support increased climate action across ASEAN.

**1. Expanded provision of grants and concessional loans from bilateral partners for mitigation and adaptation initiatives, including the distribution of Special Drawing Rights allocations from developed nations to bolster the US\$100 billion commitment.**

A number of analyses have centered on the importance of concessional loans in reducing barriers to climate financing, which include higher capital costs representative of the climate investment trap, high risk profiles, and a mismatch between loan products and the needs of climate-related investment projects (Institute for Climate Economics 2017). This is particularly relevant for many ASEAN member states, where budgetary constraints reduce the government's ability to act as an investor of first resort.

Key to securing this is a strengthened commitment from existing sources of concessional loans. While the US\$300 million pledged by the Green Climate Fund for ASEAN's green recovery (via the ASEAN Catalytic Green Finance Facility) is an important development (ADB 2021e), further commitments will be needed given the scale of financing required by ASEAN Member States to realize NDCs.

Special Drawing Rights (SDRs) are an international reserve asset created by the IMF to supplement its member countries' official reserves and provide liquidity support when experiencing balance of payments crises (IMF 2021c).

Since the outbreak of COVID-19, there have been increasing calls for SDRs to be mobilized as grants and concessional loans from developed economies to bolster climate action initiatives. On 2 August, 2021, the IMF board of governors approved a general allocation of US\$650 billion in SDRs proportionally to members' quota shares, the largest in the IMF's history, representing 65 times the capitalization of the Green Climate Fund (International Institute for Environment and Development 2021).

The general allocation became effective on 23 August 2021, and ASEAN nations are poised to receive an approximate total of over US\$26 billion, just over 4 percent of the total, in line with quota shares (IMF 2021d).

While these allocations will help ASEAN governments to provide stabilization amid the pandemic and alleviate public spending burdens, they represent a small amount of the total SDRs distributed. Developed nations stand to receive a far higher share, estimated at 67.4 percent of the total compared to 1.08 percent for least developed countries (LDCs) (Munevar & Mariotti 2021).

It is incumbent for developed nations to channel a share of their allocations toward grants and concessional loans to support developed countries, particularly LDCs, to scale climate action. This would reduce the shortfalls in quantity and quality of the US\$100 billion climate financing commitment in the decade past. These allocations should be provided in addition to climate-related ODA, rather than as a substitute. There is a provision for shareholder countries to voluntarily reallocate funds where they are needed most rather than maintaining all of their quota shares, and various mechanisms through which to do so.

One option may be for members to voluntarily channel part of their SDRs through the IMF's Poverty Reduction and Growth Trust, an interest-free concessional loan window for LDCs, although effective implementation of climate tagging and reporting would need to accompany this (IMF 2021e). Another option is for developed countries to channel allocations through the newly proposed Resilience and Sustainability Trust, which, if designed well and without restrictive conditionalities, could help climate-vulnerable nations to respond to climate shocks and provide a channel for low-cost financing (OECD 2021).

Another approach would be for bilateral partners to channel funds through DFIs, including the ADB which has existing relationships within the region, or multilateral concessional funds such as the GCF, GEF and Adaptation Fund, to ensure that the issues relating to the fragmented coordination of public climate financing can be addressed. Of particular importance is ensuring that financing for adaptation projects is increased: having only accounted for approximately 25 percent of public climate financing to date, and attracting far less private sector investment than mitigation initiatives (Timilsina 2021), adaptation is a key element of ASEAN member states' NDCs, and significant funding gaps remain.



## **2. Strengthened participation of DFIs in green bond issuances across ASEAN to enhance capacity and market maturity in the region.**

Debt financing will be particularly instrumental in ASEAN's move toward net zero and achievement of the Sustainable Development Goals (SDGs), especially as applied to infrastructure and renewable energy projects. The typical debt to equity ratio in overall infrastructure project finance, presumably broadly applicable to sustainability-linked infrastructure, is 70:30, while renewable energy financing has an approximately 75:25 ratio, and financing for energy efficiency and low-emissions vehicles sits at an approximate 50:50 (OECD 2017). In order to attract financing, governments will, much like in earlier technological revolutions, need to take a lead role by acting as an investor of first resort to enhance investor confidence in large-scale projects; facilitating R&D through funding initiatives; and providing incentives to attract foreign direct investment from which green technologies can be effectively diffused (Lamperti et al. 2019; Soderholm 2020).

Green bonds and loans are key sustainable financing instruments in this regard, both for private issuers and member states, who can potentially leverage such instruments to a greater extent as a means of obtaining financing. Given current COVID-19 related constraints on fiscal capacity across ASEAN, the expansion of sovereign issuances has the potential to be particularly catalytic.

While other bond instruments such as sustainability bonds, which also incorporate social elements, have emerged, green bonds still account for over 75 percent of ASEAN sustainability-linked issuances. The first green bond issued in ASEAN was from the Philippines in 2016, and since then issuances have proliferated across the region, growing to 30 separate issuers in 2020 from 20 in 2019 (Climate Bonds Initiative [CBI] 2021). The total sum represented by issuances in ASEAN has also grown rapidly, from under US\$2 billion in 2017 to US\$9.3 billion in 2020 (CBI 2021). A high proportion of proceeds – 50 percent compared to the global average of 18 percent – has gone to green buildings, although issuances in Indonesia, Malaysia, Philippines, Thailand and Viet Nam have also been directed toward renewable energy projects and, to a lesser extent, transport.

Yet, despite this, the ASEAN green bond market is relatively small compared to that in the broader Asia-Pacific region and globally, in 2019 comprising approximately 12 percent and 3 percent respectively (CBI 2020a). Additionally, corporate financial and non-financial organizations represent a high proportion of issuances, indicating potential room for growth by governments at national, regional and local levels.

Certain challenges characteristic of most emerging markets constrain growth of ASEAN's green bond markets. The first is a relative lack of adequate standards relating to environmental, social and governance (ESG) and climate-related financial disclosures in Southeast Asia which are often required by large institutional investors (Ernst & Young [EY] 2021; Ntsama et al. 2021; Sustainalytics 2021). Secondly, prospective ASEAN financial and non-financial corporate issuers, and local governments, may face the obstacle of international investors' lack of familiarity with the track record of issuers, which can alter risk perceptions (Oxford Business Group 2020).

Limited green bond issuance, sovereign and private alike, in some contexts may also be explained by lower country credit ratings compared to developed markets, especially for less economically developed member states, as mixed perceptions of credit worthiness effectively increase the cost of capital. For example, sovereign bonds issued by the Philippines and Thailand have in the past been deemed moderately risky by Moody's credit ratings – Baa2 and Baa1 respectively (ADBI 2019). This may also partially account for why Myanmar, Cambodia and Lao PDR have not yet been involved in green bond or loan markets (CBI 2021).



## The promise of green Sukuks in Malaysia and Indonesia

Despite relatively low issuances across ASEAN, there is sizable potential for Malaysia and Indonesia to build on global competitive advantages in pioneering Islamic finance products, having issued 54 percent of all global green Sukuks by value from June 2017 to September 2020 (Azhgaliyeva 2021). Malaysia's Securities Commission has various incentives to attract green Sukuk fundraising through its Sustainable & Responsible Investment (SRI) Sukuk framework, including tax deductions and incentives, as well as other financial incentives under the Green Technology Financing Scheme (Securities Commission Malaysia 2017).

Green Sukuks can also entice Middle Eastern financing, particularly from sovereign wealth funds, reorienting financing toward low-carbon projects. There is a growing global pool of Shariah-compliant capital to fund sustainable projects, but this demand faces a shortage of product (CBI n.d). For example, Malaysia's Sustainability Sukuk issued in April 2021 was oversubscribed by 6.4 times, with demand accompanied by low yields and spreads (2.07 percent for 10 years, 3.075 percent for 30 years) (Malaysia Ministry of Finance 2021).

DFIs such as the ADB, AIIB, IFC and others can play an influential role in the short term to attract private capital on behalf of ASEAN member states.

The ADB has been active in green bond issuances, having raised almost US\$10 billion since its green bond program was launched in 2015, but heightened involvement across ASEAN would bolster the bank's commitment to deliver a cumulative US\$80 billion in climate finance between 2019 and 2030 (ADB 2021f). This is especially necessary for member states with less mature capital markets, as DFIs such as the ADB can leverage high credit ratings to reduce the effective cost of capital that would be otherwise incurred. By doing so, DFIs such as the ADB can help least developed countries (LDCs) and middle-income countries (MICs) in ASEAN avoid the climate investment trap.

An additional benefit is that DFIs can facilitate market maturity by participating in initial issuances, helping new issuers and geographies establish a track record with investors. The IFC has provided support in this regard through issuances of a Philippine peso-denominated green bond (a Mabuhay bond) and an Indonesian rupiah bond (CBI 2020b).

Increased issuance commitments by DFIs could be made in partnership with regional mechanisms such as the ASEAN Catalytic Green Finance Facility or the emerging Blended Finance and Innovation Institute. Additionally, if regional programs of work such as APAEC Phase II can be developed into viable project pipelines, increased DFI commitments could be coherently channeled toward regional priorities.

Similarly, the ADB and other development institutions can deepen involvement in providing anchoring investments in green bond issuances, particularly sovereign issuances, across ASEAN. Doing so improves the risk perceptions of potential investors by demonstrating institutional confidence in the underlying project. The ADB has already done so on two occasions for issuances in Southeast Asia (ADB 2020), but there is scope for further involvement.

The IFC, through its Green Cornerstone Bond Program, can also play a larger role in ASEAN, building on its investments in the Philippines, where an anchor investment of US\$75 million was provided to a renewable energy project (International Finance Corporation [IFC] 2019). This program and its component funds, particularly the Amundi Planet – Emerging Green One Fund and recently established Real Economy Green Investment Opportunity (REGIO) Fund, aim to invest in emerging market green bonds to crowd-in private investors, while also providing capacity building and technical support for private and public institutions.

## A word on transition bonds

Transition bonds allow 'brown' issuers from high emissions sectors who are not eligible to make issuances in the traditional green bond market to raise capital for emissions-reducing projects. Given the projected reliance across ASEAN on coal and other fossil fuels in the coming decades, transition bonds may support emissions-intensive industries to reduce their emissions and diversify their commercial portfolio to reduce transition risk exposure.

The overall transition bond sector is small, and growth has not been as high as expected: a total of 11 transition bonds were issued in 2020, and six so far in 2021 (Oxford Business Group 2021). However, in the context of decisions made by the ADB and other DFIs to eliminate new funding for coal extraction projects, it is important, particularly from a social and environmental perspective, that there are well-designed instruments to help these industries transition.

From a social perspective, transition financing can help to ensure a just transition for emissions-intensive regions. From an environmental perspective, it is important that fossil fuel assets are properly retired and rehabilitated as part of the transition, which can create transition jobs and also enable sites to be repurposed for other activities. For example, offshore oil rigs can be used for offshore wind, in places with sufficient wind resources.

### 3. Strengthened commitments from DFIs and other multilateral organizations to provide credit enhancement support for and de-risking of low-carbon investments.

Beyond bond issuance and cornerstone investments, credit enhancement instruments are also pivotal in de-risking low-carbon investments. This is especially important for renewable energy and energy-efficient infrastructure projects which can pose technological risks, and incur high upfront costs difficult to match with cash flows over project life cycles (International Institute for Sustainable Development [IISD] 2015). Governments are usually unable to bear all risks associated with such projects, likely even less so during ongoing COVID-19 recovery as public spending is social welfare focused and reduced fiscal capacity may adversely impact investor perceptions of sovereign risk.

First-loss provisions are one such way to increase attractiveness, as they shield investors from a predefined amount of financial losses, thus enhancing credit worthiness, and improving the financial profile of an investment. Such provisions directly mitigate a project's financial risks by transferring a portion of the potential loss to the sponsor, through either a funded contribution to the investment (such as a cash injection) or an unfunded guarantee or credit line to be drawn upon when needed (Climate Policy Initiative 2013).

Guarantor mechanisms are another, whereby a third party provides a financial guarantee, either in the form of a partial credit guarantee or political risk guarantee, to stabilize financing and give assurance to investors that debts will be repaid on bonds (IISD 2015). Guarantors play a key role in assessing risk and can leverage a range of tools – such as reinsurance, co-guarantees, or reserve asset transfers – to cover or diversify such risks (OECD 2014). Stronger institutional guarantors signing on can, in turn, improve the credit rating of a bond issuance (Guarantco 2018).

A number of institutions could deploy credit enhancement instruments to greater effect across ASEAN low-carbon investments. The ADB, for example, could deepen its commitment to offer credit enhancement support for green bonds, having done so to good effect in previous instances. In 2015, the ADB, in partnership with the India Infrastructure Finance Company Ltd., provided a guarantee for ReNew Power's US\$68 million green bond, leading to a credit rating improvement from BBB to AA+ (Thuard et al. 2019).

There is also scope for increased involvement of the Credit Guarantee and Investment Facility (CGIF), an ADB mechanism established with contributions from across ASEAN, China, Japan and South Korea. The facility's capitalization is over US\$1 billion, and it recently guaranteed its first green bond for a solar company in South Korea. Furthermore, the ADB and CGIF have previously partnered to guarantee an early green bond issuance in ASEAN, for the development of geothermal facilities by the Philippines-based AP Renewables. The ADB guaranteed 75 percent of principal and interest on the bond, which was risk-participated by CGIF (ADB 2016), providing a blueprint for how credit enhancement support can be bolstered by both organizations and others providing similar functions.

Other DFIs and multilateral agencies will also need to ramp up contributions in this regard if ASEAN is to realize a net zero aligned development trajectory. The IFC plays a large role in providing credit enhancement support to projects in developing nations, notably through the Amundi Planet Emerging Green One Fund, but involvement in ASEAN has so far been limited.

Similarly, the Private Infrastructure Development Group, a multi-donor organization with members including Australia, Germany, the UK and the World Bank, could play a larger guarantor role in ASEAN. Two subsidiaries, Guarantco and Infraco Asia Development, provide guarantees and other de-risking functions for infrastructure projects in Asia. To date, involvement in low-carbon projects has been limited, an exception being Guarantco providing a guarantee on a green bond issuance by a Singapore renewables company (Guarantco 2018).

#### **4. Restructuring of near-term debt obligations by bilateral and multilateral creditors in order to increase ASEAN member states' capacity to increase SDG and Paris Agreement aligned investments.**

It is vital that the public debt obligations incurred through necessary spending to provide short-term socioeconomic relief do not impinge on the ability of ASEAN member states to facilitate the necessary low-carbon transition. Yet emerging analyses indicate there is increasing discourse around fiscal consolidation by multilateral creditors, focused on reducing government expenditure. Oxfam (2020b), assessing IMF loans across 67 countries, finds fiscal consolidation measures included in 87 percent of agreements. The Initiative for Policy Dialogue (2021) finds that budget cuts are set to increase between 2021 and 2025 to counter growing deficits, including the majority of nations in Southeast Asia. While the IMF has not been a significant creditor in the region, other institutions such as the ADB, AIIB and World Bank have. For example, the AIIB provided a US\$1 billion loan to Indonesia in June 2020; \$750m was co-financed with the ADB and the remaining US\$250m with the World Bank (Asian Infrastructure Investment Bank 2020).

The exact conditionalities of bilateral and multilateral loans to Southeast Asian nations are unclear. However, it is clear that it would be counterproductive to the global effort toward net zero and sustainable development if these loan conditions include fiscal consolidation measures that hinder the ability of borrowing countries to provide the vital public investments needed for climate-compatible and sustainable development outcomes.

The adverse impacts of austerity following the 2008 global financial crisis are well understood. It is therefore incumbent on development finance institutions to ensure that loan conditionality does not hinder efforts to reduce emissions or adapt to climate change, nor adversely impact prospects of member states achieving the SDGs (UNCTAD 2021).

A potential solution would be for multilateral and bilateral creditors to the region to consider debt-for-climate swaps. A debt swap describes a scenario where a creditor forgives debt owed to them in exchange for a commitment by the debtor to use the outstanding debt service payments for a particular investment. The climate component implies that vulnerable developing countries can reduce their debt while investing liberated funds in national climate adaptation or mitigation programs (Fuller et al. 2018). A credible debt-for-climate swap also necessitates that the debtor country has fiscal capacity to itself allocate a stable share of its budget equivalent to the loan to environmental projects (OECD 2020c), which is an important precondition for member states pursuing this avenue. Debt-for-climate swaps have three key advantages: they alleviate fiscal pressure of debt repayments; generate stable streams of capital for climate-positive projects; and help to build capacity for the management of public environmental expenditure (OECD 2020c).

Key actors to support debt-for-climate swaps in ASEAN include the most prominent lending bilateral partners, notably China which provides high levels of 'ODA-like' flows into the region (Yoon 2019) as well as DFIs, including ADB, AIIB and the World Bank.

### **[d] Low-carbon technology (LCT) transfer and capacity building are also key to securing emissions reductions across ASEAN.**

**Enhanced efforts to support low-carbon technology transfer and capacity building across ASEAN must accompany climate financing in order to ensure conditional NDCs are met.**

Beyond the provision of public climate financing, Articles 10 and 11 of the Paris Agreement clearly stipulate the requirement for high-income countries to provide LCT transfer and capacity building supports that enhance

adaptation and mitigation contributions of non-Annex 1 countries (UNFCCC 2015). Both are key to low and middle-income nations meeting their common but differentiated responsibilities, and are fundamental to high-income, industrialized nations upholding the underlying principle of historical responsibility (Shabalala 2016).

Of the 136 nations with conditional NDCs, requests for technology transfer (featured in 109 countries' NDCs) and capacity building (featured in 113 countries' NDCs) are the most frequently requested types of support (Pauw et al. 2020). This is consistent with ASEAN's 10 member states' NDCs, in which seven cite requirements of technology transfer and eight request international capacity building support, demonstrating the centrality of both to the region meeting its conditional NDC targets.

There remains a mixed track record of LCT transfer to middle and lower-income countries, indicating a need for strengthened commitments to overcome barriers and accelerate diffusion.

The expanded development and diffusion of LCTs is particularly integral for a global net zero emissions pathway, with the bulk of emissions reductions in IEA's 2050 net zero emissions scenario coming from technologies related to low-carbon electricity generation, low-carbon gases, biofuels, fuel switching, electrification and energy efficiency (IEA 2021). From a development perspective it is also central to the feasibility of aligning with a net zero pathway as there is historically a strong correlation between per-capita income and technological progress which presumably applies to LCTs (Comin & Mestieri 2018).

The adequacy of measures to promote LCT transfer from high-income to low- and middle-income nations has been contested, with long-standing claims that transfer to least developed countries (LDCs) remains lacking (Shabalala 2016). These imbalances can be inferred through LCT-related trade, a central channel of transfer. High-income countries account for over 70 percent of total LCT exports and 62 percent of LCT imports, while low-income countries account for only 0.01 and 0.3 percent respectively, and lower middle-income countries comprise 1.9 percent and 6.2 percent respectively (Pigato et al. 2020). LCT related foreign direct investment (FDI), the other most common channel for LCT transfer, paints a slightly more balanced picture, particularly regarding renewable energy. Approximately 50 percent of all FDI into renewable energy sectors has flowed to middle and low-income countries, primarily for electricity production. While the majority originates from high-income countries, China's increasing investment is largely responsible for growing South-South flows (Pigato et al. 2020).

While these figures indicate the structural LCT challenges facing low-income nations in particular, middle-income ASEAN member states figure prominently in growing LCT flows. Singapore is one of the top 20 high-income LCT exporters, Malaysia, Thailand and Viet Nam are among the top ten middle-income LCT importers and exporters, while Indonesia is the 10th largest importer (Pigato et al. 2020). Additionally, between 2003 and 2018, Indonesia received over a quarter of South-South LCT-related FDI, mostly from China into hydroelectric power (Pigato et al. 2020).

However, the realization of conditional NDCs across the region will necessitate significant scaling of LCT transfer across numerous sectors, in particular energy, transport, and AFOLU, especially for low-income ASEAN member states. For example, country-level analysis from Cambodia highlights the need for renewable energy technologies that can unlock the nation's hydropower potential and low-emissions agricultural technologies (Piseth, Kimlong & Kimly 2021). Land and coastal-based resilience technologies will also be important in light of the effects of climate change expected across Southeast Asia.

The increased provision of measures to catalyze affordable climate financing is an integral part of accelerating LCT transfer, particularly to reduce high costs of capital that can otherwise hinder feasibility. On a bilateral basis, subsidies by high-income nations to LCT providers can incentivize transfer, or joint crediting mechanisms such as that developed between Japan and Thailand (Japan Ministry of Environment 2020). Additionally, increased support from the UNFCCC's Technology Mechanism can help ASEAN member states to expedite the development and implementation of low-carbon and climate-resilient technology policies.

### **Capacity building support is integral to ensuring the effectiveness of climate financing and LCT transfer, and improving institutional capacity across ASEAN.**

Capacity building under the Paris Agreement, largely in line with the Marrakech Capacity Building Framework, is cross-cutting, spanning mitigation and adaptation, and covering education, training, public awareness, institutional capacity, and research and technology development. A study of non-Annex 1 NDCs finds that adaptation capacity building needs are prioritized over mitigation requirements, and that research and technology and institutional capacity needs figure most prominently, including across ASEAN Member States such as Indonesia, Lao PDR, Malaysia and Viet Nam (Khan et al. 2019).

However, often there is a significant overlap between financing, technology transfer, and institutional capacity building activities in particular (OECD 2018). For example, country-level analysis from Indonesia cites the need for institutional capacity building aimed at developing policy signals that stimulate sustained domestic private financing flows into LCT (Halimatussadiah et al. 2021). It is accordingly important for capacity building activities to be built into broader long-term processes of international support relating to LCT transfer and financing, rather than the ad hoc project-based approach that has dominated.

Strengthening policy signals to encourage private sector action is an area of capacity building that would benefit a number of ASEAN countries, particularly to encourage emissions-intensive industries to decarbonize. These industries are often politically influential, and the risk of watering down the potential impact of these policy measures is acute. Finding the right balance between policy measures that catalyze the low-carbon transition, but also support highly affected industries and regions to adjust is a challenging but important priority. Learning from countries who have successfully navigated this challenge would benefit the transition planning process across the region.



## 6. ASEAN member states also have a critical role to play in enhancing the enabling environment for investment.

### **[a] The region can position itself as a global hub for best practice in blended finance and as a marketplace for climate action.**

The scaling of regional approaches to blended finance is a further enabling tool to attract climate financing inflows. Blended finance refers to a structuring mechanism that strategically uses public and/or philanthropic capital to catalyze additional private capital, thus mitigating risk. A functional blended finance vehicle balances the realization of climate impact with the delivery of risk-adjusted financial returns for investors.

Ideally, the provision of public and/or development capital is a temporary short-term measure as the key goal of blended finance is to facilitate sector development through initial formative stages. The aim is to sufficiently build the market and create confidence and technical capacities in a developing market so that private finance will eventually flow unaided (Choi & Seiger 2020).

#### **The Blended Finance and Innovation Institute: A coordinated approach to regional climate financing**

The potential for ASEAN member states to develop a strengthened regional approach to mobilizing sustainable financing by leveraging the blended finance model is significant. The Blended Finance and Innovation (BFI) Institute is therefore a promising development, to be a new multilateral entity under the stewardship of the Government of Indonesia to overcome aforementioned barriers to sustainable financing into SDGs and climate solution projects in the region.

Targeting nature-based solutions, the circular economy and clean energy, the BFI Institute can centralize the mobilization of public, philanthropic and private capital for a range of SDG-aligned projects across ASEAN.

Aims of the newly established multilateral entity include:

- Overcoming barriers (including regulatory) to investing in high-impact sectors in emerging markets.
- Developing a best-practice hub for developing country infrastructure-related finance institutions.
- Accelerating project pipeline development across target areas at a localized, on-the-ground level.
- Convening leaders to promote and deploy catalytic financial instruments that crowd-in and scale private investment.

The BFI Institute will also initially focus on capacity building within finance hubs across ASEAN, such as SDG Indonesia One, and beyond to co-create approaches and market platforms to mobilize funding and develop associated best-practice policies.

Leveraging the expertise of Tri Hita Karana Forum Partners, including the Global Blended Finance Taskforce, World Bank, World Economic Forum and others, the BFI Institute will also aim to lead thought leadership and forge new collaborations between the public, private, civil society and academic sectors.

The ASEAN Catalytic Green Finance Facility (ACGF) also provides ASEAN member states with access to loans combined with ASEAN Infrastructure Fund equity, as well as technical assistance. Current financing, inclusive of the recent US\$300 million commitment from the Green Climate Fund, is over US\$3.5 billion (Green Climate Fund 2021). With concessional loans provided by DFIs including the ADB, European Investment Bank and Government of Korea, the ACGF is well placed to support the region to obtain financing for green infrastructure projects.

The BFI Institute and ACGF constitute mechanisms that can accelerate regional cooperation and unlock finance flows. In addition, they provide a centralized point through which concessional loans, credit enhancement, and green bond issuances and cornerstone investments can be coordinated. There is potential for ASEAN member states to harness such mechanisms as channels through which collectively defined and agreed actions could be developed into a pipeline of investments. Particular opportunities relate to emerging APAEC priorities and increased collaboration around restoring and conserving natural capital. Doing so has the potential to provide visibility and viability to low-carbon investments at a regional level.

A precondition to developing a coherent region-wide approach to climate financing is a strengthened domestic focus on aligning capital inflows with national priorities. The identification and development of domestic low-carbon project pipelines by ASEAN member state governments, and the alignment of such investments with relevant climate and development strategies, including NDCs, will be vital to maintaining the necessary oversight to direct external public and private capital.

Additionally, environmental, social and governance (ESG) standards must be strengthened domestically and regionally to attract public and philanthropic capital as donors, bilateral creditors, and DFIs often require that funds and projects benefiting from their contributions follow strict, transparent reporting standards (Choi & Seiger 2020).

Indonesia's progress in aligning low-carbon and climate-resilient projects with domestic and external climate financing sources represents an example of how domestic cross-institutional coordination can ensure private and public capital is being directed to national climate action priorities.

## Indonesia: Developing a coordinated approach to sustainable financing

- The Financial Services Authority (OJK) launched a sustainable finance roadmap in 2014, followed by regulations on sustainable financing in 2017.
- Indonesian financial institutions have established initiatives around sustainable financing in green finance products, for example, green and Sukuk bonds and sustainability-linked loans. The attractiveness of these products has seen US\$155 billion worth of green bonds issued in 2017, increasing the green bond market by almost 80 percent from 2016 to 2017
- The government launched the Indonesia Climate Change Trust Fund (ICCTF) to coordinate and harmonize climate finance by channeling domestic and international funds to projects aligned with decarbonization objectives.
- It established the Public Service Agency for Environment Fund Management (BPLDH) to become a funding hub for environmental protection and management, coordinating funds from international organizations such as the Green Climate Fund, REDD+ Norway, and the World Bank.
- It established SDG Indonesia One, a blended finance platform which directs public and private funds into SDG-aligned infrastructure projects.

(Source: Halimatussadiyah et al. 2021)

## **[b] Strengthening measures that provide market transparency will be key.**

**Measures need to be taken by member states to enhance market transparency and improve data on environmental performance, climate-related risks and costs, and low-emissions investment opportunities.**

Market transparency can be achieved through governments extending mandatory disclosure policies to include climate-related risk reporting, and exploring and developing best-practice mechanisms. In countries where carbon reporting is mandatory, the government can align reporting with the Task Force on Climate-related



Financial Disclosures (TCFD) recommendations. Doing so ensures that reporting covers both physical risks, which refer to risks posed by climate-related changes in the physical environment, and transition risks, which refer to the legal, policy and regulatory risks related to climate change that can affect investment decision-making, technology risks, market risks, and reputational risks (Johnson et al. 2021).

Although progress is being made, the mandating of such risk disclosures has been fragmented across ASEAN despite the growing significance of doing so in the face of increasing risks, especially for fossil-fuel investments in the region (Johnson et al. 2021). While globally, the number of organizations supporting TCFD has been rapidly growing – by 85 percent in 2020 alone – a select study conducted by WWF Singapore found that uptake in ASEAN has been markedly slower (WWF 2020). EY's Climate Risk Disclosure Barometer ranks climate-related disclosure in Southeast Asia among the lowest globally, rating quality at 19 percent and coverage at 56 percent (EY 2021).

Central banks can play an important role to drive improvement by leveraging their strong institutional position to support analysis of TCFD to assess sectoral risks and opportunities, and incorporation of enhanced risk measures into financial regulations. Increasingly, central banks have developed, and will continue to need to develop, policies that align with domestic climate priorities and accountable implementing institutions (Anwar et al. 2020). In this regard, the high representation of ASEAN member states in the Network for Greening the Financial System (NGFS) is a promising sign that governments recognize the potential for central banks to drive such reforms. To date, the central banks of Cambodia, Indonesia, Malaysia, Philippines, Singapore and Thailand have signed on as members.

However, the purview of central banks ultimately relates to financial and monetary stability, and thus other actors, including financial regulators, stock exchanges and the private sector also have important roles to play in driving adoption. In this regard the recent decision by Thailand's Securities and Exchange Commission to become an official supporter of TCFD is a welcome step, joining counterparts from Malaysia and the Philippines.

**Plans to develop an ASEAN Taxonomy for Sustainable Finance represent a vital step in the region's push to attract higher levels of private investment for climate-related projects.**

The current lack of a common regional sustainable finance taxonomy in ASEAN remains a significant barrier to attracting capital from global institutional investors (Ntsama et al. 2021). Taxonomies, when designed well, provide visibility and clarity around regional, national and sub-national projects by providing a standardized classification system under which activities, assets, and/or project categories can be identified according to key sustainability objectives, and linked to overarching thresholds and targets (International Capital Market Association 2021).

Despite ASEAN having adopted the ASEAN Green Bond Standards, they remain voluntary and enmeshed with differing mechanisms used at domestic levels. In contrast to the EU Taxonomy of Sustainable Activities, which provide detailed guidance around eligible economic activities, metrics, and thresholds attached to projects, the ICMA Green Bond Principles, on which ASEAN Green Bond Standards are based, only indicate project categories at a high level (ASEAN Capital Markets Forum 2018; European Chamber of Commerce in Singapore 2020). This can become a barrier for private institutions across the global financial system who comply with strict green investment governance frameworks, particularly when combined with other challenges facing green bond issuances across the region (DeSchryver & De Mariz 2020).

Plans by ASEAN leaders to create a region-wide ASEAN taxonomy therefore represent a welcome step to scale capital toward the climate transition in the decade ahead. The establishment of technical knowledge partnerships with relevant architects of the EU's taxonomy provides a clear capacity building opportunity, especially as harmonization between them will help to unlock private climate financing from investors that align with the EU's standards.

**[c] Establishing a national level cross-ministerial governance body can help build political buy-in and strengthen data collection and transparency for climate action.**

Building strong and broad political buy-in is key to the success of the transition process. A formal cross-ministerial governance structure is typically seen as the most effective way to achieve this (Elliott et al. 2019, in Argyriou et al. 2020).

Ideally, a cross-ministerial governance structure should generate broad ownership by stakeholders and enable consideration of impacts on affected groups to maximize development outcomes, promote equity, coordinate key actors and make climate goals a mainstream part of sector planning through laws, policies, or regulations.

Several country reports identified enhanced cross-ministerial coordination as a key means for increasing climate ambition:

- Analysis from Lao PDR cites the need to improve coordination between key ministries and invest more heavily in data collection and administration capability (Kyophilavong et al. 2021).
- Similarly, Cambodia identifies that environmental issues are cross-cutting and require close collaboration among government agencies from both the national and sub-national levels, as well as with other key stakeholders (Piseth, Kimlong & Kimly 2021).
- Malaysia finds that a high-level decarbonization framework – also important for measuring, monitoring and reporting GHG emissions – can serve as a key mechanism for enhanced cross-ministerial coordination (Leong, Platts & Sofiyani 2021).

The World Resources Institute (Elliott et al. 2019) identified the following key principles that underpin effective cross-ministerial governance:

- high degree of political leadership
- supportive institutional arrangements
- enabling legal frameworks
- ability to convene the required technical capacity
- effective engagement with key stakeholder groups
- transparency and trust in the process.

Viet Nam's National Climate Change Committee was established to strengthen inter-ministerial collaboration for the development of the country's Intended Nationally Determined Contribution (INDC) to the Paris Agreement. Established as a new governance structure, the committee is chaired by the prime minister and two vice chairmen, and includes representatives from all key ministries, sub-national and local governments, members of civil organizations, National Assembly agencies and experts. The National Climate Change Committee is the highest-level institutional body in charge of climate change policy and has led, coordinated, harmonized and monitored climate change and green growth program implementation, including international cooperation. The committee advises the government on climate change issues and is tasked with coordinating the development and implementation of the country's climate policies. One of the impacts of the National Climate Change Committee on harmonizing climate change and green growth implementation is the establishment of a coordinating board to implement the Viet Nam Green Growth Strategy, which aims to achieve low-carbon growth, greening of production and greening of lifestyles (Strauch, Robiou DuPont & Balanowski 2018 and Viet Nam Ministry of Environment and Natural Resource Management 2015, cited in Argyriou et al. 2020).

**Adopting a cross-ministerial national governance mechanism could also support enhanced regional engagement** to strengthen knowledge and resource sharing, policy coordination and innovation across ASEAN, as well as supporting regional climate resilience. This could help to address a number of negative trends in ASEAN such as rapid growth in CO<sub>2</sub> emissions, risk exposure to climate impacts and associated GDP loss, and challenges in achieving SDGs.

## **[d] Creating an enabling policy environment is equally important.**

Developing a long-term, low-emissions development strategy (LT-LEDS) through a process that builds strong cross-ministerial buy-in is a critical first step to understand the transition trajectory for each country. Countries will then need to translate the long-term thinking into short- and medium-term actions, a process outlined in detail in *Growth through Transformation: An investment vision guide for climate and development* (Argyriou et al. 2020). Understanding priorities over the short to medium term will highlight where a country should focus efforts to create the enabling policy environment to incentivize action by non-government actors.

This section provides a broad introduction to some of the areas for policy focus that ASEAN member states could consider to create clear policy signals that inform where non-state investment is directed. Each country will be different. But at a high level, the following focus areas have proven to be effective in creating an enabling policy context that can attract investment toward the low-carbon transition.

**Setting ambitious targets and backing these with enabling policies can attract increased investment in low-carbon infrastructure.**

Existing policies are not yet driving the energy transition at the pace and scale required in most ASEAN countries. Current policies still favor fossil fuel-based technologies, driving the region's rapid growth in emissions.

For example, policy uncertainties and inconsistencies have been among the major obstacles and challenges for a smooth renewable energy transition in Thailand (Thampanishvong, Limsakul & Sirison 2021).

While Malaysia's National Automotive Policy 2020 promotes energy-efficient vehicles, there is no long-term target and trajectory to phase out internal combustion engine vehicles (Peng 2021).

Cambodia has the potential to make bolder plans for reducing emissions by setting targets to increase the share of renewable energy in the energy mix, drawing on the country's abundant hydropower potential. In addition, it should set energy efficiency goals across transport, buildings and industry to better enable integration of renewable energy (Piseth, Kimlong & Kimly 2021).

In many ASEAN countries, incrementally removing residential electricity subsidies, coupled with stringent energy efficiency standards to reduce the financial burden on households, will also be key to driving the clean energy transition (Sandu et al. 2019).

**Clean energy targets and policy certainty are particularly important for unlocking private sector investment and steering development finance toward areas of greatest impact.**

As demonstrated by Thailand, policy certainty and policy continuity are necessary to create a favorable environment for investment in renewable energy, helping to reduce the investment risks faced by the private sector. Further, financial policies that improve availability and affordability of financial resources should be developed, ranging from providing public finance to incentivizing private sector financing (Thampanishvong, Limsakul & Sirison 2021).

The impacts of policy uncertainty can be seen in Viet Nam, where curtailment of electricity generation from renewable power plants without compensation has placed financial risks on projects, and risks lessening the attractiveness of renewable energy projects to investors (IEEFA 2021c). Policies to reduce financial risk will be key to maintain the level of investment in renewables seen in recent years. In addition, policy should encourage investment in regional interconnection to maximize the use of renewable energy sources.

**A rapid phase-out of investments, incentives and subsidies on carbon-intensive initiatives would help to reverse current trends** and also encourage the retirement of fossil-fuel burning energy forms. For example, in Indonesia, it is projected that by 2038, 47 percent of electricity would still be generated by coal combustion (Halimatussadiyah et al. 2021). But the country has also recently made positive steps, announcing it would stop approving new coal-fired power plants by 2023 (Kontan 2021). These policies are consistent with the ACRF 2020, which calls for moving toward decarbonization pathways that transform energy systems from carbon-intensive to cleaner energy.

**Refining industry and trade incentives to encourage low-carbon industries and value chains can fast track growth in green jobs and industry transformation.**

A rapid transition across the ASEAN region can only be achieved if the region embraces the economic opportunity that the transition offers. This includes encouraging growth in low-carbon industries and supporting existing industries to decarbonize or diversify.

Malaysia's Green Technology Master Plan (2017–2030) provides an example of this. The plan identifies green technology developments to create a low-carbon and resource-efficient economy in five main sectors: energy, transport, buildings, waste and water (Kau 2021).

A more concerted effort to provide a mix of push-pull incentives for localization will be important in driving economic competitiveness and job creation in many Southeast Asian markets. Linking these to existing



capabilities from adjacent sectors, such as raw material sourcing and manufacturing, and fostering research and development (R&D) talent will also be important (Deloitte 2021). Incentives that attract strategic foreign technology partners to collaborate with the domestic private sector to build internationally competitive green industries will also be key (Fan 2021).

The focus on building regional EV manufacturing capability is a case in point. Creating the right regulatory environment will be critical for the financial and operational viability of the EV market, and attracting the investment required for industrialization of the EV sector. In addition to financial incentives, governments could provide greater clarity on the relevant policy frameworks and harmonize fragmented governance structures to simplify the process of investing in and scaling up manufacturing and deployment of EVs (Deloitte 2021).

Nurturing research, development and commercialization across ASEAN countries will also be key. In Malaysia, this will be required to support the transition from adoption and adaptation of non-domestic technologies to creation of its own original intellectual property. As the Ministry of Energy, Green Technology and Water Malaysia (2017) identifies, it is imperative for Malaysia to move quickly to catch up with the rapid pace of technology innovation around the globe. This is best achieved through consultation with the private sector to identify high-priority industries which have the potential to be transformed into internationally competitive green industries. For example, Malaysia is already a leading producer of solar panels, and has the potential to become a global leader along the entire solar equipment and battery value chain (Fan 2021).

In Indonesia, opportunities that would benefit from R&D policy support include the development of waste treatment with hydrogen technology, and domestic patents for solar cell production (Halimatussadiah et al. 2021).

Participation in global value chains in goods and services that can drive economic recovery, such as electric vehicles and batteries, presents an important economic opportunity for the ASEAN region, and could build upon APAEC 2016–2025 (Halimatussadiah et al. 2021).

**Existing renewable energy commitments can be complemented with ambitious energy and resource efficiency targets, to capture largely untapped low-cost emissions reduction opportunities.**

ASEAN has made a commitment to achieve a 21.9 percent reduction in energy intensity compared to 2005 levels, exceeding the 2020 target set by the ASEAN Plan of Action for Energy Cooperation 2016–2025. Other initiatives are being developed that target specific sectors, including the ASEAN Fuel Economy Roadmap for the Transport Sector 2018–2025.

While these existing regional-level energy intensity commitments are positive, more can be done by policymakers at country-level. In most ASEAN member countries, energy efficiency remains a largely untapped and low-cost emissions reduction opportunity.

For example, the recent slowdown in energy efficiency improvement in the Philippines has contributed significantly to the accelerated growth in emissions. Improving efficiency could also ease the country's energy security concerns by reducing the need for energy imports, a key item on the government's policy agenda (Sandu et al. 2019).

Energy efficiency policies in Cambodia could avoid GHG emissions of 43.7 percent in buildings, 29.6 percent in transport and 26.7 percent in industry, and significantly contribute to energy savings (Piseth, Kimlong & Kimly 2021).

As Thailand has progressed to upper middle-income status, demand for household appliances, in particular space cooling has also increased. There has been a doubling of ownership of air conditioning over the past 20 years, putting upward pressure on energy demand (Sandu et al. 2019). Thailand has been working to address this, with most existing efforts being project-based and aimed at promoting the use of energy-efficient electrical appliances and encouraging green consumer lifestyle choices, such as the Energy Efficient Label No. 5, developed by the Energy Generating Authority of Thailand (Thampanishvong, Limsakul & Sirison 2021).

Improvement of energy efficiency and behavior change to minimize the growth of electricity demand have been highlighted as vital pillars of decarbonization in Viet Nam. Key opportunities that can be driven by energy efficiency targets and policy include net zero buildings and households, bringing the most efficient appliances to market, and deploying innovative energy management systems in the industry sector (Son 2020).

In Indonesia, emissions reduction and resource efficiency can be achieved through adoption of a circular economy, especially in the plastics industry. A key policy measure to drive this would be the introduction of carbon and other environmental-related taxes on the petrochemical industry to make recycled plastic prices more competitive. (Halimatussadiah et al. 2021).

**Further protection and restoration of the region's natural carbon sinks is key to reversing regional trends in deforestation and enhancing climate resilience.**

Forest preservation, restoration and reforestation to facilitate removals of CO<sub>2</sub> from the atmosphere are integral parts of most net zero scenarios (IPCC 2021) and are also key to improving resilience to extreme weather events and their impacts – for example, reducing landslides, protecting the region's biodiverse natural wealth, and reducing the risk of new zoonotic pandemics.

Importantly, reversing high deforestation rates protects the region's valuable carbon sinks, and may provide revenue through carbon markets. In this regard, actions to link natural climate solutions with international carbon markets are important, with estimates placing the potential investment size of forest-related sequestration alone – covering protection, management and improvement, and restoration – at US\$1.2 trillion globally by 2050 (Vivid Economics 2021).

However, a number of steps must be taken to improve the viability and transparency of domestic natural climate solutions projects. These include technology and capacity upgrades to improve measurement, reporting, and verification, and policy measures by governments to both protect valuable ecosystems and encourage international investment into natural capital stocks to generate revenue for local populations providing stewardship over those stocks.

For example, Indonesia's moratorium on exploitation of primary natural forest and peatlands (Halimatussadiah et al. 2021), and further efforts in Malaysia to gazette and replant forests are important steps, but in order to generate long-term revenues, efforts must be strengthened to establish greenhouse gas crediting programs, accompanied by transparent governance, clear accounting methodologies, and public participation models to ensure free, prior and informed consent from local beneficiaries (Natural Capital Solutions Alliance 2021).

Another important lever for attracting investors is to strengthen disclosure standards around nature-related risks and opportunities. Following the TCFD, the Taskforce on Nature-related Financial disclosures (TNFD) is an important framework to mainstream and standardize such disclosures, promoting awareness of the dependency of the world's economy on ecosystem services, which has been estimated at US\$44 trillion in value (World Economic Forum 2020). The adoption of TNFD across ASEAN, by governments and the private sector alike, is a particular priority given the importance of ecosystem services in generating livelihoods across the region, and the mitigation and adaptation co-benefits that could be gained.

**Shifting from extensive to adaptive and regenerative agriculture can strengthen food security and enhance resilience to a changing climate.**

These practices also increase soil carbon, boosting agricultural productivity and reducing dependence on chemical fertilizers, delivering emissions reductions. Boosting soil carbon may also create opportunities for land users to participate in carbon markets. The ASEAN Regional Guidelines for Promoting Climate Smart Agriculture (CSA) Practices and ASEAN's Good Agricultural and Aquacultural Practices provide good foundations, as does the ASEAN Comprehensive Recovery Framework, which calls for promoting climate-smart agriculture.

In addition to introducing or extending policies to protect or restore forests, countries should also ensure that other policies designed to reduce fossil fuel use or strengthen food security are complementary to the protection of the natural environment. For example, Indonesia's food estate development plan and the development of a progressive biofuel policy would require one million hectares of land clearing and 15 million hectares of palm oil cultivation, respectively, which may conflict with other sustainable land use objectives (Halimatussadiah et al. 2021).

**Step up plans for national level carbon pricing, and link these through a regional emissions trading scheme to catalyze the regional transition.**

The costs of transition could be funded by adopting a carbon tax for carbon-intensive industries (where revenue raised can be used to support industry transition and reduce the impact of cost pass-through to end users), or by creating an emissions trading system (ETS) by optimizing revenue from the global carbon market and from international collaboration (Halimatussadiah et al. 2021). The emerging Natural Capital, Carbon, Communities (NCCC) Marketplace being developed under the Tri Hita Karana Forum is a potentially valuable focal point for establishing a regional emissions trading and offset market.

The World Bank's Partnership for Market Readiness program supports developing economies to prepare and implement climate change mitigation policies – including carbon pricing instruments – in order to scale-up GHG mitigation. Thailand, Viet Nam and Indonesia are currently participating in the program (Partnership for Market Readiness 2020).

While Indonesia does not yet have carbon-pricing systems in place, it is currently exploring and speeding up efforts to regulate carbon tax and carbon trading to reduce GHG emissions. The Government of Indonesia has been preparing an emissions trading system since last year. The Ministry of Finance is currently considering introducing a carbon tax as a new source of income to support economic recovery from the COVID-19 pandemic. Assuming the carbon tariff would be around US\$5–10 per ton of CO<sub>2</sub>, the government could raise about IDR26–57 trillion (US\$1.8–4 billion) per year (Halimatussadiah et al. 2021).

Funds raised through national-level carbon pricing schemes can also create a much-needed revenue stream to support climate change adaptation and resilience programs.

Building on the potential for creating carbon credits from the region's rich natural carbon sinks is the introduction of a regional emissions trading scheme. This would also be a key regulatory approach to catalyze energy-related emissions reductions.

## The role of carbon pricing policies in enabling the transition

Carbon pricing is a key part of the policy response to climate change. It corrects market distortions by implementing a 'polluter pays' principle. It drives large efficiency gains and goes hand-in-hand with industrial modernization and greater competitiveness. When carbon markets are linked, these efficiency gains are magnified.

Carbon pricing approaches include both carbon taxes (directly setting a tax rate on greenhouse gas emissions or on the carbon content of fossil fuels) and emissions trading schemes (where emitters can trade emissions units to meet their emissions targets, allowing companies to either implement internal abatement measures or to acquire emissions units in the carbon market, if cheaper to do so).

Carbon pricing also raises revenues for governments. In 2018, governments with global carbon pricing mechanisms raised, globally, more than US\$44 billion that could be used for public expenditure (World Bank 2019). Carbon pricing revenues can mitigate the impact of carbon pricing on households and businesses by reducing other taxes, funding efficiency upgrades to reduce energy bills or providing other forms of direct financial support.

Carbon pricing programs have been implemented or scheduled in 46 countries. Once China's carbon trading system is up and running, 20 percent of global emissions will be covered by carbon pricing.

Carbon pricing works best when accompanied by other policies and spending that supports social and developmental goals, guaranteeing a just transition for workers and communities most affected by its introduction.

Source: Argyriou et al. 2020



# 7. The ASEAN region can capitalize on key opportunities to fast track the transition and reap the benefits.

**[a] Building on its foundations for solving common problems collectively, the region will benefit from an integrated strategy to address the biggest challenge of our time.**

**As ASEAN moves forward in this dynamic global and regional context, it has the opportunity to build on its existing frameworks and strategies to strengthen its position.**

ASEAN has already set a strong vision for itself in terms of sustainable development and climate ambition. This is a fundamental milestone in steering the direction of future policy and action. Revisiting and enriching ASEAN's commitments to strengthen the resilience and integration of the region is in line with the ASEAN Community Vision 2025, which calls for “vibrant, sustainable and highly integrated economies, enhanced ASEAN connectivity as well as strengthened efforts in narrowing the development gap”.

Likewise, in the 2020 ASEAN Comprehensive Recovery Framework from COVID-19, ASEAN leaders committed to step up efforts to promote sustainability and socially responsible policymaking at national and regional levels. The framework recognizes that “a return to ‘business as usual’ is no longer an option for ASEAN in the post-pandemic world, and a paradigm shift will be required of governments, businesses, and civil society to work collectively to enable systemic change needed by the region for a sustainable and resilient future. To support the realization of this strategy, it prioritizes achieving sustainability in ASEAN in all dimensions, particularly in investment, energy, agriculture, green infrastructure, disaster management, and sustainable financing.

Recognizing these opportunities, the 2021 Mid-Term Review of the ASEAN Blueprint recommended increased focus on sustainable development, as the fundamental objective of ASEAN economic integration is to improve the wellbeing of the people through economic opportunities that are more equitable and inclusive, and that account for sustainability.

**[b] Collaborating to identify and take action on common challenges can accelerate ASEAN’s low-carbon transition while facilitating the development of region-wide project priorities.**

**The establishment of a regional climate fund, carbon market, and power grid are the top three common opportunities the ASEAN member states highlighted to fast track the low-carbon transition.**

Despite numerous available international financing programs and facilities, the ASEAN Climate Fund is still seen as the top priority across ASEAN (ClimateWorks Australia & ASEAN Centre for Energy 2021). This reflects the common challenges faced by ASEAN member states in adequately accessing private sector and international financing, as well as institutional needs in establishing a regional financing facility that can help overcome barriers related to market, product, and project.



In addition, the establishment of an ASEAN carbon market, such as the Natural Capital, Communities, Carbon (NCCC) Marketplace, could serve to improve and harmonize carbon financing at the regional level through increased liquidity and economies of scale. The regional carbon market will provide opportunities to address cross-border challenges with differences in carbon pricing and carbon policy when most ASEAN member states are experimenting or planning a domestic carbon market. Lastly, regional grid integration and power trading provide a significant opportunity for the region's transmission infrastructure upgrades and modernization.

Leveraging regional cooperation on the acceleration of renewable energy adoption will be critical for a fast, efficient, clean energy transition and solid economic recovery from the global pandemic.

Regional grid interconnection and cross-border power trading are necessary means for ASEAN achieving its target of 23 percent of renewable energy by 2025. This is realized through the ASEAN Power Grid – an initiative to connect the region, initially on cross-border bilateral terms, then gradually expanding to the sub-regional level and finally to an integrated Southeast Asia power grid system. Global evidence suggests that an integrated regional grid will allow ASEAN member states to transition to clean energy faster and more cheaply, and achieve higher reliability from intermittent renewable energy sources.

However, a shift toward an integrated regional grid must be coupled with ambitious national renewable energy targets and an enhanced enabling policy environment in ASEAN Member States. If not, regional energy trading is likely to have the opposite effect of increasing fossil fuel power generation and delaying the clean energy transition. Ambitious renewable energy targets supported by more robust regional power trading can also help avoid locking in fossil fuel-based infrastructure, which risk becoming stranded assets in a Paris-aligned global transition, and risk increasing the energy generation cost if carbon pricing and other environmental externalities are factored in.

**Blue carbon ecosystems are highly significant globally as carbon sinks, sequestering and storing carbon at significantly higher rates than forests per unit area.**

Recent recognition of the importance of oceans in addressing climate change has shifted the marine-climate policy agenda to now include issues of mitigation alongside more traditional adaptation concerns. The ocean has the potential to deliver more than 20 percent of the GHG emissions cuts needed to meet the Paris Agreement aligned 1.5 °C reduction goal. Blue carbon is a significant portion of this. As such, conservation and restoration of mangroves, tidal marshes and seagrass meadows (collectively called coastal blue carbon ecosystems) is key to ocean-based climate mitigation solutions and, alongside seaweed farming, could reduce emissions by as much as 1.4 billion tons of CO<sub>2</sub>e emissions annually by 2050 (Jones 2021).

Nowhere is this more important than in Southeast Asia, where blue carbon ecosystems are heavily concentrated. The region holds 30 percent of the global total of mangroves (Giri et al. 2011), and Indonesia alone holds 17 percent of the world's total blue carbon reserves (Alongi et al. 2016).

In the past 50 years, however, approximately half of the world's mangroves and seagrasses are thought to have been lost to aquaculture, agriculture, coastal development and pollution. Taking into account both lost sequestration opportunity and CO<sub>2</sub> release, the GHG impact from the loss of coastal blue carbon ecosystems, is approximately 450 Mt CO<sub>2</sub>e (Pendleton et al. 2012).

There are now opportunities to bring blue carbon into the mainstream climate and development agenda, with significant existing policy support for designing and implementing a blue carbon economy initiative. Due in part to the transboundary nature of blue carbon ecosystems and many of their threats, regional cooperation and the development of an ASEAN blue carbon roadmap could facilitate the generation of scenarios to improve investment mechanisms to finance blue carbon projects at scale.

**2022 can be a pivotal year in recovering from the pandemic and taking action on climate change.**

Indonesia will host the G20 in 2022, providing the ASEAN region with an opportunity to shape global action around pressing challenges. The COVID-19 pandemic will undoubtedly be at the top of the agenda as evidenced by Indonesia's choice of 'Recover Together, Recover Stronger' as the theme of the summit. Following the momentum of COP 26 in November 2021, climate change and collective action toward net zero are also expected to be high on the agenda for Indonesia. Indonesia's position will therefore benefit from harnessing the influence of the region as a whole to progress issues that can ensure that the global economic recovery moves us toward a more equitable global financial system, and a net zero economic transition to advance sustainable development.

A number of partners globally and regionally stand ready to support the region in this endeavor, including partners of the ASEAN Green Future project. As such, following COP 26, the Green Future project will shift into its second phase, and aim to further build national and regional ownership and consensus. During this phase, the seven country research teams will work alongside governments to develop country-specific decarbonization modelling and pathways that are 1.5°C aligned, practical, and socioeconomically desirable. This will also assist in raising the ambition of long-term low-emissions development strategies (LT-LEDS) and nationally determined contributions (NDCs) under the UNFCCC. This work will be specifically tailored to each country's context and build on, facilitate, and complement like-minded efforts that governments may be leading.



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