On behalf of:

Federal Ministry
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and Nuclear Safety

of the Federal Republic of Germany

CASE
for Southeast Asia

Beyond Net Zero: Empowering Climate Mitigation by Linking to Development Goals

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INSTITUTE FOR CLIMATE AND SUSTAINABLE CITIES

TDRI Thailand Development Research Institute

Energy Research Institute

VIET Vietnam Initiative for Energy Transition

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The programme "Clean, Affordable and Secure Energy for Southeast Asia" (CASE) is jointly implemented by GIZ and international and local expert organisations in the area of sustainable energy transformation and climate change: Agora Energiewende and NewClimate Institute (regional level), the Institute for Essential Services Reform (IESR) in Indonesia, the Institute for Climate and Sustainable Cities (ICSC) in the Philippines, the Energy Research Institute (ERI) and Thailand Development Research Institute (TDRI) in Thailand, and Vietnam Initiative for Energy Transition (VIET) in Vietnam.

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Enablers to Link Development Goals to Empower Climate Mitigation

Global technology and cost trends are making development and decarbonisation outcomes increasingly synergistic in Southeast Asia, unlocking public and political support for new sustainable development avenues.

Climate actions in Southeast Asia have been driven by socioeconomic, not mitigation priorities, as seen in development of solar power in **Vietnam**, moratorium on new coal-fired power plants in the **Philippines**, 2035 roadmap for zero-emission vehicle sales in **Thailand**, and discussions on financing schemes for early coal plant phase-out in **Indonesia**.

Long-term planning and policy coordination is imperative to unlock sector coupling and leap-frogging opportunities for decarbonising industry, transport and building sectors. Pilot projects exploring green hydrogenproduction are expanding across Southeast Asia in anticipation of new business opportunities.

1 UNDERSTAND SYNERGIES

Employ no-regret opportunities to drive climate and development policy

2 ENHANCE MITIGATION

Leverage socioeconomic development, adaptation, and resilience objectives to achieve mitigation

3 UNLOCK CAPITAL

Re-direct and scale up international finance for mitigation and adaptation

4 BUSINESS LEADERSHIP

Champion the vital role of non-state actors in spurring momentum and change

5 AVOID FOSSIL-FUEL LOCK-IN

Understand the economic perils of fossil fuel lock-in

6 ELECTRIFY ECONOMY

Accelerate the rate of electrification to decarbonise energy demand through sector coupling

Indonesia, Vietnam, and the Philippines are planning to cut 60 GW of coal due to growing concerns over stranded assets, energy security, and a narrowing finance pipeline.

Coordinated long-term policies, reformed financial systems and clear sustainable investment criteria are needed to attract growing and diverse portfolio of funds.

Corporations with clean energy and transport commitments in Southeast Asia are applying pressure on governments to accelerate the energy transition.

Executive Summary

This report focuses on how countries that are dealing with climate change planning can ensure that these plans are integrated into their overall development planning to meet the needs of their populations—in other words, how they can go “Beyond Net Zero” to achieve balanced and complementary plans that first and foremost meet their development needs, but also move toward decarbonisation of their energy sectors and their economies. The report focuses on four developing and emerging economies that are participating in the international cooperation program, Clean Affordable and Secure Energy for Southeast Asia (CASE): Indonesia, the Philippines, Thailand and Vietnam.

The discussion presented centres on the power sector transformation, given its technological readiness and political prioritisation within the countries, and on its potential key role in achieving economy-wide net-zero greenhouse gas (GHG) emissions.

The report identifies six ‘bridging concepts’ relevant to Southeast Asia and its net-zero efforts, while detailing their potential to accelerate the transition towards more resilient national economies.

1. UNDERSTAND SYNERGIES: Employ no-regret opportunities to drive climate and development policy

For developing and emerging economies, it is essential to mainstream climate considerations into broader development goals while clarifying win-win synergies between climate policy and sustainable development. This approach can spotlight opportunities for ambitious action in both domains – climate action in the context of developing countries can be understood as measures taken to ensure climate-sensitive coherence in a government’s long-term sustainable development and adaptation agendas, while also contributing to global efforts to limit temperature warming. To enable ambitious climate action, it is helpful to emphasize the mutual benefits between sustainable development and climate policy.

Fortunately, global trends in the energy sector are making development priorities and decarbonisation outcomes increasingly synergistic and compatible with recent technology and structural shifts. Cost reductions in emerging clean technologies are leading a transformation towards sustainable alternatives such as renewable energy, decentralised power systems and battery storage, while global financial flows and investments are moving away from inefficient and inflexible baseload electricity generation technologies and carbon-intensive processes in international trade and supply chains.

2. ENHANCE MITIGATION: Leverage socioeconomic development, adaptation, and resilience objectives to achieve mitigation

In Southeast Asia, the political priorities for most governments are economic growth, boosting productivity and reducing inequality. Yet these priorities, along with the wider Sustainable Development Goals, cannot be achieved without globally coordinated action to address climate change. The suite of policies implemented for effective climate mitigation differs between countries, and may be motivated by a myriad of factors, including the pursuit of resilient economies and long-term development strategies. In Southeast Asia, the pursuit of socioeconomic development and other climate objectives, such as adaptation and resilience, has proven to be a promising enabler of mitigation efforts. Vietnam has made rapid advancement in developing renewable energy in recent years, installing in a short period of time the largest amount of solar power capacity in Southeast Asia.

The Philippines is seeking to achieve a 35% renewables share by 2030. Thailand intends to sell only zero-emission vehicles by 2035 and to become a regional leader for electric vehicle production. In Indonesia, a court recently ordered the president and other government officials to take measures to tackle Jakarta's air pollution after residents filed and won a lawsuit starting in 2019.

These developments have not been driven primarily by mitigation concerns, but rather by underlying socioeconomic priorities, including the desire to promote economic growth, attract foreign investment, improve public health, create jobs, increase the reliability of the power system, and strengthen the technology and service sectors.

3. UNLOCK CAPITAL: Re-direct and scale up international finance for mitigation and adaptation

While international climate finance could help Southeast Asia to transition to a low-carbon economy aligned with development objectives, the volume of such funding mobilised to date has been inadequate. Donors are largely failing to provide predictable, steady levels of resources at the scale required, while the volume of finance being transferred is too focused on the priorities set by donors and remains difficult to access. At the same time, recipient countries often lack coherent long-term policy commitments that include the fiscal and structural reforms necessary to attract investment.

Given a holistic approach that considers the interconnections between socioeconomic development and climate action, a sustainable transition in Southeast Asia could require at least $2 trillion in investment between 2021 to 2030, or $220 billion per year.

Meeting these investment requirements will require mobilisation of vast amounts of resources and coordinated implementation strategies, especially for the most vulnerable communities.

4. BUSINESS LEADERSHIP: Champion the vital role of non-state actors in spurring momentum and change

Non-state actors (NSAs), which include regional and city governments, as well as businesses, can play a crucial role in supporting climate mitigation. First, by lowering their emissions they can directly help countries achieve or even exceed their NDC targets. Second, if national governments incorporate NSA action in their decision-making, they can increase their climate ambition. In Southeast Asia, businesses with ambitious mitigation targets are predominantly (and often exclusively) large, multinational corporations.

Southeast Asian small- and medium enterprises, which generate a larger share of GDP than their western counterparts, are often prevented from making similar mitigation or emission reduction commitments, because of less access to finance, lower consumer awareness, complex manufacturing processes or regulatory barriers. Nevertheless, businesses can exert upward pressure on governments to improve their competitiveness in global markets that will be impacted by climate mitigation efforts.

5. AVOID FOSSIL-FUEL LOCK-IN: Understand the economic perils of fossil fuel lock-in

Globally, Southeast Asia is one of the only regions still planning a significant expansion of coal infrastructure to meet growing energy demand. While significantly lower than a few years ago, the coal pipeline in Vietnam, the Philippines and Indonesia remains vast, with a total of 44 GW of coal power expected to come online in the next ten years.

This will create serious risks to macroeconomic stability for economies where state-owned enterprises dominate the power sector.

In recognition of these risks, some countries have passed policies to limit future approval of coal-fired power generation. For example, in October 2020, the Philippines became the first country in Southeast Asian to announce a moratorium on greenfield coal. Indonesia passed its own moratorium in 2021 and government officials are now in discussions on the early phase-out of coal power plants. Thailand is also planning to reduce coal power generation to around 10% of its power mix over the next 20 years and is considering a complete phase-out of coal power.

6. ELECTRIFY ECONOMY: Accelerate the rate of electrification to decarbonise energy demand through sector coupling

While the energy transition is currently taking place mostly in the power sector, there is still a large proportion of GHG emissions released from the transport, industrial and buildings sectors that requires urgent mitigation. One key strategy to reduce greenhouse gas emissions in these sectors is to use clean electricity either directly (for electric vehicles, heating and cooling, low-temperature heat) or indirectly (hydrogen or synthetic fuels produced from renewable electricity through electrolysis). This electrification strategy – sometimes referred to as "sector coupling" – has an important role to play in achieving economy-wide decarbonisation, assuming that net-zero electricity generation can be achieved.

Sector coupling will require the construction of new renewable power plants and a more integrated approach to operating the energy system. If implemented intelligently, sector coupling can provide new sources of flexibility (e.g., batteries, pumped hydropower) that facilitate renewables integration through dynamic demand-flexibility. In this way, sector coupling can reduce the curtailment of renewables and minimise total system costs. It can also make the transport, building and industrial sectors an active, consumer-centric component in improving the management of the energy system. Finally, a modern and interconnected power grid with rules for open access to clean energy generators can help to ensure broad access to affordable and clean power.

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Introduction

While the urgent need for countries to make net-zero commitments is a key feature of international climate negotiations – including those taking place at COP26 – in emerging and developing countries in Southeast Asia, this discussion inherently involves broader issues related to sustainable economic development. Specifically, any emissions reduction strategy in such countries needs to be part of a larger just transition strategy focused on sustainable, inclusive and resilient economic development. Overlooking this fundamental reality can be counter-productive: If the public cannot identify with the developmental goals arising from their government's climate strategies, the political consensus required to make increasingly difficult decisions will be hard to achieve or if realized, it will be hard to sustain. Viewed in this way, the net-zero objective is one among many means to an end that ensures broader sustainable development goals. A failure to understand this sensitivity could critically impair mobilisation of the political will and popular support required to translate Paris Agreement goals into tangible policy and action. Realising national development objectives crucially depends on building long-term resilience in anticipation of the impacts of global warming while also ensuring climate-sensitive coherence in the government's long-term development plans. Thus, incorporating climate change into long-term development strategies to achieve national priorities while reducing emissions represents a promising approach for building the social and political support needed to raise climate ambition and guide the full implementation of Paris-aligned actions in the short and medium term.

At the same time, all countries need to maximise their efforts to reduce greenhouse gas (GHG) emissions, as the achievement of development goals crucially depends on our ability to limit global temperature increase to 1.5°C (compared to pre-industrial levels) by the end of the century. Balancing the interlinked objectives of development, resilience and mitigation is a politically sensitive and difficult challenge that is particularly fraught in the net-zero discourse. Developing countries have contributed less to global warming, and it is in large part due to failures by developed countries to take ambitious action and to mobilise sufficient resources, which has compounded the challenges developing countries are facing now.

Against this backdrop, this paper focuses on a narrower set of objectives of how key aspects of net-zero emissions planning for the decarbonisation of the energy sector relate to the development needs of Indonesia, the Philippines, Thailand and Vietnam which are the countries of focus in the CASE programme. Country-specific case study examples and insights were collected from a series of interviews from in-country stakeholders and experts. In this paper, we shine a spotlight specifically on power sector transformation, given its technological readiness and political prioritisation within the countries, and on its key role in achieving economy-wide net-zero emissions. The paper discusses six 'bridging concepts' relevant to Southeast Asia and its net-zero efforts, while detailing their potential to accelerate the transition towards resilient national economies.

Climate targets and net-zero planning gaining momentum globally, but is not yet sufficient to meet Paris goals and avoid severe climate impacts

While countries have agreed to submit new and increasingly ambitious Nationally Determined Contributions (NDCs) under the Paris Agreement, only 75% of countries have submitted updated targets as of October 2021, with notable major emitters still absent or having submitted non-ambitious targets. A total of 134 countries covering 78% of global GHG emissions have also either adopted or are considering net-zero targets (Net Zero Tracker, 2021). Together, aggregated NDC and net-zero plans globally, if fully implemented, are still not in line with the Paris temperature limit and would lead to an emissions gap of 25 to 28 GtCO2e in 2030 (between emissions expected if all NDCs are achieved and emissions required for 1.5°C compatible pathway) and an estimated increase in global warming of 2.4°C by the end of the century (Climate Action Tracker, 2021a; UNEP, 2021). All countries in Southeast Asia have submitted NDCs, and over half of Southeast Asian countries are currently discussing net-zero targets.

While discussions about these targets are ongoing, these discussions are at different stages throughout the region. Every country is following different approaches in formulating its long-term climate targets, carefully weighing their interaction with mid-term economic development goals. Of the four countries in the CASE project, Indonesia has pledged to reach a peak in emissions peak emissions by 2030 and is currently discussing 2060 as an economy-wide net-zero emissions target (Government of Indonesia, 2021). At COP26, Thailand has announced its aim to reach carbon neutrality by 2050 and net-zero GHG emissions by or before 2065, while Vietnam will target net-zero emissions by 2050 conditional on finance and technological support from the international community (MFA of Thailand, 2021; VietNam News, 2021). The Philippines have not yet announced mitigation targets but is currently discussing long-term energy strategies.

Equity considerations related to net-zero

Immediate, rapid and large-scale reductions in GHG emissions are needed globally over the next decade to put the world on a path to net-zero emissions by mid-century and to thus limit warming to 1.5°C, which would reduce the likelihood and magnitude of severe climate impacts (IPCC, 2018, 2021).

The Paris Agreement recognizes that ‘parties should protect the climate system […] on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities’. This principle requires developed nations to take the lead in mitigation action and to support developing countries in fighting climate change and adapting to its impacts.

From a climate and equity perspective, the question is not whether all countries should aim for net-zero emissions to avert the worst impacts of climate change, but, rather, which countries should get there faster, and which nations should receive support to move in the right direction. As shown in Table 1, developed countries bear far larger responsibility both to drive concerted climate action as well as provide the resources necessary to achieve the transition of less advanced economies. These statistics suggest differentiated historical responsibility when comparing larger economies to Southeast Asian countries, but also suggests different financial capabilities of accelerating to a net-zero transition when comparing countries within Southeast Asia (e.g., Singapore).

Table 1: **Selected climate and equity indicators for selected countries**

Country	Share of cummulative emissions 1750-2019 [%]	Emissions per capita (2019) [tCO2e/cap]	Emissions intensity of GDP (2019) [kgCO2e/USD2010]	GDP per capita (2019) [thsd. USD2010/cap]	Trend in emissions - 2015 vs 2019 [%]	Emissions per capita - 2015 vs 2019 [%]	Emissions intensity of GDP - 2015 vs 2019 [%]
Vietnam	0.4%	4.7	2.2	2.1	↑ by 36.3%	↑ by 30.9%	↑ by 4.8%
Indonesia	1.2%	3.4	0.8	4.5	↑ by 11.1%	↑ by 6.1%	↓ by 8.9%
Philippines	0.4%	2.3	0.7	3.3	↑ by 19.4%	↑ by 12.8%	↓ by 7.7%
Thailand	0.6%	6.1	0.9	6.5	↑ by 0.9%	↓ by 0.4%	↓ by 12,1%
Singapore	0.1%	10.0	0.2	59.4	↓ by 20.7%	↓ by 23.1%	↓ by 30%
China	13.7%	9.6	1.2	8.2	↑ by 5.3%	↑ by 3.4%	↓ by 18.5%
EU-27	16.0%	8.1	0.2	37.1	↓ by 5.5%	↓ by 6.1%	↓ by 13.1%
United States	21.4%	20.2	0.4	55.9	↓ by 1.9%	↓ by 4.1%	↓ by 10.4%
Australia	1.2%	21.6	0.4	57.2	↑ by 2.1%	↓ by 4.1%	↓ by 7.7%
World	100%	6.3	0.6	11.1	↑ by 3.4%	↓ by 1.1%	↓ by 7.4%

Sources: Authors' compilation from (Climate Action Tracker, 2021b; Gütschow et al., 2021; Ritchie, 2021; World Bank, 2021)[1]

Developing countries are responsible for only a small fraction of historical GHG emissions, and yet they are also the most vulnerable to climate change, which is expected to aggravate social inequality and poverty while creating economic pressures that endanger achievement of the Sustainable Development Goals (SDGs).

In a 3.2°C warming scenario, Southeast Asian markets would see a 37% decline in GDP by 2048, compared with 18% globally (Gray & Haller, 2021). Southeast Asian governments face significant trade-offs, as they must prioritise resilience and adaptation strategies while also responding to global calls for decarbonisation, despite comparatively limited financial resources.

[1] Emissions cover all greenhouse gases (GHG) and all emitting sectors excluding land use,land use change, and forestry (LULUCF) due to data availability.

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ENABLER 1

UNDERSTAND SYNERGIES: Employ no-regret opportunities to drive climate and development policy

1. UNDERSTAND SYNERGIES: Employ no-regret opportunities to drive climate and development policy

In 2015, all member states of the United Nations, including the CASE countries of Thailand, Vietnam, Indonesia and the Philippines, acceded to the Paris Agreement along with the 2030 Agenda for Sustainable Development. Both agreements, although negotiated under different multilateral processes, are closely interlinked.

Despite the continued existence of difficult decisions and trade-offs, it is important to mainstream climate considerations into broader development goals while clarifying win-win synergies between climate policy and sustainable development. This approach can spotlight opportunities for ambitious action in both domains.

Development as an enabler of climate action and climate action as an enabler of development

As developing nations are among the most vulnerable to climate-change impacts, long-term development policies must prioritise resilience to the challenges of a rapidly warming world. Vulnerability to extreme weather events and slow-onset change in combination with structural weaknesses in the economy and society that have been exacerbated by the pandemic have reemphasized the value of resilient and flexible infrastructure and economy. Likewise, climate action in the context of developing countries can be understood as measures taken to ensure climate-sensitive coherence in a government's long-term sustainable development and adaptation agendas, while also contributing to global efforts to limit temperature warming.

In the energy sector, global trends are making development priorities and decarbonisation outcomes increasingly synergistic and compatible with recent technology and structural shifts. Cost reductions in emerging clean technologies are leading the transformation towards sustainable alternatives such as renewable energy, decentralised power systems and battery storage.

Global financial flows and investments are moving away from inefficient and inflexible baseload electricity generation technologies and carbon-intensive processes in international trade.

Multilateral development banks and other investors have started incorporating the impacts and risks of climate change into their investment decisions (IMF, 2019); carbon border adjustment mechanisms are being discussed in some regions (European Commission, 2021); and the large coal financiers South Korea, Japan, and China have all announced their intention to end offshore support for coal (Blondeel & Van de Graaf, 2018; Liu et al., 2021; MFAPRC, 2021).

In the power sector, moving towards an energy transition means taking advantage of such developments while maximising the benefits of a resilient and sustainable sector. When a primary driver of political action is economic development, and governments are concerned with realising sustainable development more rapidly, low-carbon solutions in the power sector are highly compelling, because they are not only cost-effective, but can also provide wider benefits beyond emissions reductions. Against this backdrop, climate protection strategies should be optimally aligned to resilience and development priorities, as this policy coherence is important for tapping political will and achieving all goals equitably. Moreover, where goals cannot be met equally, trade-offs need to be clearly understood and managed – and potentially addressed through international finance mechanisms.

Linking climate and development priorities is key to unlocking public and political support in Southeast Asia

The interconnection between climate action and sustainable development has been extensively discussed in the scientific community and there are a wide range of empirical findings for Southeast Asian countries. However, such research is often overlooked in the public and political debate. Indeed, the long-term development strategies of policymakers often fail to take scientific evidence on climate change into account. This is partially attributable to the methods of communication used by researchers: evidence is not always translated into broadly accessible communication materials. To ensure wider dissemination of scientific findings in the media while encouraging broader public discourse, it is important for researchers to package and tailor their messaging for specific audiences.

Another problem is that topics with relevance for climate action and sustainable development – including air pollution, the health impacts of global warming, power grid stability and food security – are often not directly linked to climate policy but are rather treated as standalone issues in public discourse. In Southeast Asia the topic of air pollution, particularly in large cities, is high on the public agenda and prominent in public discussions. In Indonesia, for example, a court recently ordered the president and other government officials to take measures to tackle Jakarta's air pollution after residents filed and won a lawsuit starting in 2019 (Nirmala, 2021). While vehicle emissions and coal-fired power plants are usually identified as the main culprits of pollution, their relation to climate mitigation measures is not always evident in media reports. Painting a clearer picture of how climate action and sustainable development can be productively interlinked can help to mobilise popular support for mitigation actions.

At the political level, it is important to build awareness of the benefits of sustainable development is important, as its tangible value is not always well understood. The non-climate-related impacts of sustainable development are often viewed as a parameter for socioeconomic monitoring, rather than an important component of policy development (A2A, 2021). The multifaceted nature of sustainable development and its relevance to multiple ministries can help foster cooperation between agencies of government, which is often lacking in climate policy-making. Indeed, building coherence between the development plans adopted across various agencies could – if prioritised – help to achieve decarbonisation outcomes faster as a positive secondary effect.

The Philippine Energy Plan, for example, emphasises that the transformation and transition in the energy sector is a process that should integrate climate change mitigation and adaptation strategies while supporting the achievement of the Sustainable Development Goals (Philippines Department of Energy, 2021). In contrast, in Thailand, responsibility for the monitoring and achievement of different SDG indicators is divided between ministries; each is responsible for achieving their "own" targets, leading to limited cooperation. Clearly mapping out the mutual synergies between SDG 13 on climate action and other SDGs could foster greater collaboration while engaging more of the government in climate-related issues. Governments, particularly finance ministries, often focus on minimising the costs of climate policies rather than on maximising their benefits or potential synergies with other objectives. In this connection, the climate change narrative often revolves around the cost of ambitious climate action, while overlooking the even higher cost of inaction.

Research on Vietnam, for example, finds that the coal-fired power plants still scheduled to come online under the draft Power Development Plan for 2021–2030 could cause around 1,500 premature deaths and cost up to $270 million (6.2 trillion VND) in healthcare and welfare cost every year (Myllyvirta & Suarez, 2021). In Indonesia, transport sector emissions are estimated to cause around 7,000 premature deaths annually, with associated costs of $4.2 billion (Anenberg et al., 2019). To better enable ambitious climate action, it is helpful to emphasize the mutual benefits between sustainable development and climate policy.

More research at the most granular level promises to enhance the delivery of climate mitigation within the framework of Southeast Asian agendas for adaptation and sustainable development. In particular, there is a need to enhance our understanding of trade-offs and shed light on the best allocation of foreign and domestic resources. Ultimately, if policy-makers were to systematically consider the benefits of sustainable development in their policy-formulation processes, this would strengthen the integration of climate action in long-term development plans while augmenting the implementation of NDCs – including their ambitious reformulation to support resilience-oriented sustainable development.

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ENABLER 2

ENHANCE MITIGATION: Leverage socioeconomic development, adaptation, and resilience objectives to achieve mitigation

2. ENHANCE MITIGATION: Leverage socioeconomic development, adaptation, and resilience objectives to achieve mitigation

Inaction or insufficient action in addressing climate change has been hampering development and will continue to do so in the future. In Southeast Asia, the political priorities for most governments are economic growth, boosting productivity and reducing inequality. Yet these priorities, along with the wider SDGs, cannot be achieved without globally coordinated action to address climate-change mitigation.

The suite of policies implemented for effective climate mitigation differs between countries, and may be motivated by a myriad of factors, including the pursuit of resilient economies and long-term development strategies. In Southeast Asia, the pursuit of socioeconomic development and other climate objectives, such as adaptation and resilience, has proven to be a promising enabler of mitigation efforts.

Although not motivated by decarbonisation objectives, Southeast Asia has made progress in climate action

Recent developments in the energy sectors of Vietnam, Thailand, the Philippines and Indonesia provide grounds for optimism. The energy transition in the region is well underway – and is likely to gain significant additional momentum in the next few years. A moratorium on greenfield coal was declared in the Philippines in 2020 (Department of Energy Philippines, 2020a); Indonesia followed suit in 2021 (Perusahaan Listrik Negara, 2021). Such pronouncements were unimaginable a couple of years ago.

Vietnam has made rapid advancements in developing renewable energy in recent years, installing in a short period of time the largest solar power capacity in Southeast Asia (PV Tech, 2021). The Philippines is the first country in the region to set a moratorium on new coal-fired power plants, and is now seeking to achieve a 35% renewables share by 2030 (Department of Energy Philippines, 2020b). Thailand intends to sell only zero-emission vehicles by 2035 and to become a regional leader for EV production (RE100 Thailand Club, 2021; Thailand Greenhouse Gas Management Organization, 2021). The prime minister of Thailand has called for action against high levels of air pollution – including shifting commuters to public transport, providing alternatives to waste incineration in rural areas, and monitoring emissions at industrial plants (Bangkok Post, 2020; Bloomberg, 2021).

Meanwhile, in Indonesia, financing schemes for the early phase-out of coal power plants are under discussion (The Jakarta Post, 2021a).

It is interesting to note that these developments have not been driven primarily by mitigation concerns, but rather by underlying socioeconomic priorities, including the desire to promote economic growth, attract foreign investment, improve public health, create jobs, increase the reliability of the power system, and strengthen the technology and service sectors. While the decarbonisation of the economy is not a primary objective of CASE governments – as reflected in the overall low ambition of their mitigation targets – current development trends show that substantial emission reductions in these countries can be achieved through the pursuit of coherent, resilience-oriented and inclusive development objectives. In this way, socioeconomic considerations in Southeast Asia are driving major shifts in energy policies and systems that will make an important contribution to global mitigation pathways.

While synergies between development priorities should be maximised where none exist, decarbonisation efforts are still needed and should be financed by developed countries.

Critical reflection on what 'just transition' means is essential

While measures to tackle climate change in the power sector can lead to a wide range of benefits, any form of structural transformation is likely to produce divergent gains and losses for different parts of the economy and between different communities and social groups (A2A, 2021). In line with this insight, the 'just transition' concept is gaining traction in the discussions surrounding clean-energy transitions, particularly in countries with a high dependence on coal.

While use of the term 'just transition' is far more frequent amongst researchers in Southeast Asia than in policy discussions, elements of the concept do inform popular debate. For example, negative labour market impacts – such as jobs losses in the coal sector in Indonesia or Vietnam – are often cited to argue for a slower transition. Proper analysis of impacts to jobs and the wider economy can help to counter that narrative, support those who stand to lose out from the transition and cultivate the skills and capacities required for systematic change. Accordingly, analytical work should not report only on net-job gains or losses, but also critically evaluate where jobs are lost and what is needed to leave no one behind. In Indonesia, for example, the Directorate General for New Renewable Energy and Energy Conservation addressed this notion in public discussions, highlighting how the deployment of renewable energy can create "better and more competitive energy" in terms of environmental impact and the workforce.

While much has been written about the hallmarks of a just transition, the term is often invoked haphazardly (SEI, 2019). Most policymakers simply assume that a just transition involves supporting those dependent on coal, oil and gas to transition to other jobs.

However, creating a truly just transition requires careful evaluation of how risks and benefits are currently distributed among stakeholders in the energy system, not only in terms of jobs but also concerning other disparities, such as energy access by gender or socio-economic status. Furthermore, it is necessary to map out the distributional changes that can be expected as fossil fuels become less relevant in the energy mix. By developing an applied definition of 'just' that takes such considerations into account, transition policies are more likely to overcome public and political resistance, achieve implementation and deliver on overall development priorities (SEI, 2019).

Lastly, it is important to consider the potential trade-offs across all sectors and segments of society, beyond the current focus on the energy sector. In Vietnam, for example, the rapid development of solar power in recent years has required the acquisition of large areas of land, including agricultural land and forests. Such development always implies trade-offs, given potential biodiversity loss, increased risks to food security and/or foregone economic opportunities, e.g., for small-scale farmers. Another example is the automotive sector in Thailand, one of the country's largest manufacturing industries, which mainly produces vehicles with internal combustion engines. A just transition for the sector will require industrial transformation, transition arrangements for all workers, and planning for fair access to sustainable mobility. More research is needed to properly understand the full breadth of potential trade-offs and to determine the resource requirements – both domestic and international – to address impacts on people and the environment.

If a government wishes to embark on a decarbonisation pathway, what are some guidelines for action?

Set clear and ambitious climate targets that are weighed against development objectives: Setting mid- and long-term climate targets provides critical high-level signalling and guidance that, in combination with other nationally prioritised strategies, can enable attainment of sustainable development objectives while accelerating decarbonisation. Ambitious targets that understand the direction the world is taking and that are anchored in development goals are an important step for fostering sustainable growth and climate-change resilience.

Underpin long-term targets with short-term action: While discussions around net-zero targets can facilitate dialogue and decision-making, especially when contextualized with strategies for SDGs, near-term action is essential to honour long-term goals – and could be improved in the region. For example, Indonesia is currently deliberating its net-zero pathway at different levels yet current energy plans and recent developments continue to suggest coal will remain the dominant fuel over the long term. Similarly, Vietnam's latest draft Power Development Plan (PDP8) shows an increased share for coal in the future, despite growing investment in renewables. Thailand, for its part, has announced net-zero targets on the heels of prominent public debate, but the country's latest energy planning still shows a significant role for fossil fuels.

Target-setting is just one element of effective policy action. Another important practice is 'back-casting' – that is, identifying the short-term policy steps needed to realise long-term objectives by working backwards from a desired future state. This can help to prevent unnecessary costs, improve awareness for the necessary components of a just transition, and maximise positive spillovers between different policies.

Understand the challenges along the way and recognise the support needed to address them: It is important to reconcile the global need for all countries to agree on net-zero pathways with the economic challenges for developing and transitioning economies in Southeast Asia. During the journey to global net-zero emissions, it will be necessary to implement high cost measures in hard-to-abate sectors with no obvious or direct benefits for socioeconomic development. It is critical to identify these challenges with sufficient granularity and outline implementation plans that are made conditional on access to the technology transfer and international climate finance promised to developing countries when they signed the Paris climate agreement. To be sure, the failure of developed countries to provide the climate financing agreed to in Paris has created credibility issues and this could become a serious obstacle to the achievement of transformation and development goals.

CASE
for Southeast Asia

ENABLER 3

UNLOCK CAPITAL: Re-direct and scale up international finance for mitigation and adaptation

3. UNLOCK CAPITAL: Re-direct and scale up international finance for mitigation and adaptation

Climate change represents a major threat to the socioeconomic development goals of Southeast Asian countries. Broad segments of the region's population are likely to experience acute climate change impacts, in part because they lack the financial resources required for adaptation. While international climate finance could help Southeast Asia to transition to a low-carbon economy aligned with development objectives, the volume of such funding mobilised to date has been inadequate.

Donors are largely failing to provide predictable, steady levels of resources at the scale required, while the volume of finance being transferred is too focused on the priorities set by donors and remains difficult to access.

At the same time, recipient countries often lack coherent long-term policy commitments that include the fiscal and structural reforms necessary to attract investment.

International climate finance as an important enabler of sustainable development

International climate finance – which can take the form of equity and debt investments, loan guarantees and grants – is an important enabler of low-carbon investment and adaptation projects in developing countries. The urgency of the climate crisis has highlighted the important role that wealthier countries have to play in providing the investment funding required to meet all climate targets in developing countries in a socially sustainable manner.

With a view to energy system transformation, the IEA has estimated that Southeast Asia will need over $3.2 trillion in cumulative investment between 2019 and 2040 ($140 billion per year) to fulfil the key energy-related components of the UN Sustainable Development Goals (SDGs) – namely, to deliver on the Paris Agreement, achieve universal access to modern energy services by 2030 and dramatically reduce energy-related air pollution. Accordingly, the IEA has called for a major reallocation of capital investment to low-carbon energy systems and efficiency measures (IEA, 2019).

However, both the Paris Agreement and SDGs recognise that climate action cannot be taken in a vacuum, given the interrelationships between earth systems and human economic activity. Accordingly, they call for robust climate action that is informed by the principles of environmental and social justice. Given a holistic approach that considers the interconnections between socioeconomic development and climate action, a sustainable transition in Southeast Asia could require at least $2 trillion in investment between 2021 to 2030, or $220 billion per year (Bain et al., 2021). Meeting these investment requirements will require mobilisation of vast amounts of resources and coordinated implementation strategies, especially for the most vulnerable communities. One hurdle to achieving this level of investment is the strong differences across Southeast Asian countries in investment conditions, including perceived risk, which translates into varying costs of capital rates. For example, the indicative costs of capital for Independent Power Producer (IPP) investments in Thailand are 3%–5%, but are significantly higher (7%–10%) in the Philippines, Vietnam and Indonesia (IEA, 2019).

Complex financier requirements and inconsistencies with national regulations prevent access to international finance

Various factors and complexities impair access to international finance, including national restrictions in recipient countries and the strict and inflexible requirements set by international funds. While national rules sometimes prevent access to certain types of finance, a lack of detailed regulations can also engender uncertainties among foreign investors, preventing projects from moving forward. For example, Philippine law prohibits international support for sovereign loan guarantees, and Vietnam recently mandated an annual guarantee limit on domestic and foreign loans, placing strict controls on the growth of foreign commercial loans (Decision 856/QD TTg, 2021).

Strict and inflexible international fund requirements can also be misaligned with national contexts and priorities, further limiting access to finance. Multilateral climate funds are considered the most challenging sources of finance due to their complexity and heterogeneity, with each funding source typically having its own investment criteria and application requirements (RMI, 2019).

In Thailand, the slow adoption and implementation of environmental, social and governance (ESG) practices has limited access by domestic investor access to Green Climate Fund finance. Finally, donor preference for loans over grants has proven to be a limiting factor given rising levels of public debt on the heels of natural disasters and the COVID pandemic. This is particularly true in Vietnam, where combined grant and loan packages were declined by the government.

With nearly 100 different sources of climate funding available, navigating the different rules and financing terms for each is a cost-intensive challenge, especially for countries that are still building the technical and institutional capacities to do so (NDC Partnership, 2021). In addition to negotiating the different rules and terms, there is a need to establish working relationships with finance providers. As different ministries can be responsible for accessing international funds, depending on their type and purpose, the learning and experience gained from a successful financing project is often excessively fragmented.

In the absence of integrated long-term national strategies, finance favours donor priorities

While international climate finance is growing, a significant gap remains in attracting sufficient international flows to Southeast Asia at scale. In many cases in which climate finance has been successfully deployed, it has often been driven by the priorities of donor institutions rather than those of recipient countries. One of the commonly cited barriers to non-grant instruments is the requirement that the planned investment have ‘bankability’, which can prove to be an insurmountable hurdle given uncertain future returns or benefits. Climate adaptation measures are particularly endangered by this requirement, as they often lack a clear assessment metric, such as avoided emissions.

Often, the anticipated benefits of adaptation measures are so far in the future they are not included in the financial risk assessment. Accordingly, mitigation actions are disproportionately favoured over adaptation measures. At the COP26 in Glasgow, countries will seek to develop clear guidance on tracking and measuring actions and evaluating the financial support needed for adaptation as part of the Global Goal on Adaptation. To be sure, climate adaptation is becoming more embedded in policy and planning in Southeast Asia. However, in comparison to climate mitigation, the level of international engagement and quality of financial instruments available are markedly different.

The absence of clear long-term strategies and consistent national policies creates uncertainties for climate investment, as domestic investors are unable to identify investment priorities and/or quantify associated opportunities. Inconsistent policy signals and uncertainty regarding long-term goals have been holding back leading investors in Southeast Asia (Fuentes and Chapman, 2021). A clear long-term plan that makes a firm commitment to climate change actions would help to furnish the reliable conditions that investors need to make large-scale, long-term investment.

For example, the Philippine Energy Plan 2020-2040 estimates the need for a $119 billion injection to accelerate the clean energy transition to meet the country's NDC targets, and calls on private and public sources of international finance to provide much of that capital (Philippines Department of Energy, 2020). Nevertheless, the policy and investment frameworks still need adjustment to encourage additional investment in sustainable energy.

Actions to re-direct and scale international finance

Long-term strategies, clear government goals and stable policies can reduce uncertainty and enable countries to specify their international financing needs, thus creating scalable and resilient investment opportunities. New guidance tools – such as criteria for sustainability investment that translate climate and environmental objectives into clear criteria for climate-aligned projects – could help to create a common language between financiers and recipients. Some projects, such as in clean transport in Thailand, are currently not considered climate related, and may have missed opportunities to receive international support. Widely accepted sustainable finance criteria could help to close existing knowledge gaps while enhancing the ability of projects to show a climate mitigation or adaptation benefit, thus increasing their eligibility to obtain international climate finance.

Criteria for climate-change projects could also help financial institutions to identify and classify projects contributing to climate change goals (BNM, 2021). This would enhance awareness of opportunities for non-energy, climate-related projects to access international climate funds. In March 2021, the ASEAN Ministers of Finance endorsed the establishment of an ASEAN Taxonomy Board to create a multi-tiered taxonomy that reflects the needs, aspirations and goals of ASEAN states (ASEAN, 2021).

Countries need to create supportive policies and financial ecosystems that attract a diversity of financing sources. Meanwhile, multilateral banks and institutional providers of international finance should consider more flexible investment criteria to account for the national contexts of Southeast Asia.

CASE
for Southeast Asia

ENABLER 4

BUSINESS LEADERSHIP: Champion the vital role of non-state actors in spurring momentum and change

4. BUSINESS LEADERSHIP: Champion the vital role of non-state actors in spurring momentum and change

Non-state actors (NSAs), which include regional and city governments, as well as businesses, can play a crucial role in supporting climate mitigation. First, by lowering their emissions they can directly help countries achieve or even exceed their NDC targets.

Second, if national governments incorporate NSA action in their decision-making, they can increase their climate ambition. This can generate an ambition loop, where national and non-state targets become mutually reinforcing (Kuramochi et al., 2020; NewClimate Institute et al., 2021).

An increasing number of businesses are setting net-zero emission targets globally

A growing number of corporate actors have pledged net-zero emission reduction targets or have joined networks of ambitious actors. For example, the Race to Zero campaign by the UNFCCC has mobilised over 3,000 businesses together with cities, regions, investors and academic institutions to work towards net-zero CO2 emissions by 2050 (UNFCCC, 2021). In 2020, the number of global businesses making net-zero pledges tripled to over 1,500. These companies cover a wide range of sectors. Generating combined revenues of over $11.4 trillion, they have 19.3 million employees and an emissions footprint of over 3.5 GtCO2e/year (Data-Driven EnviroLab & NewClimate Institute, 2020).

If all current NSA commitments were fully implemented, their emission reduction potential would amount to between 2.0 and 2.5 GtCO2e/year in 2030, approximately double the combined annual emissions of Thailand, Indonesia, Philippines and Vietnam in 2019 (NewClimate Institute et al., 2021; Ritchie & Roser, 2021). Alongside individual action, there has been a growing number of multi-stakeholder arrangements known as international cooperative initiatives (ICIs). Their aim is to bring together a range of actors, including NSAs, national governments and other international organisations to implement more ambitious policies and pledges than those currently in place (Lui et al., 2021). At least 297 such ICIs focused on climate mitigation have been identified, including approximately 13,000 businesses, investors, cities, regions and NGOs. Even more ICIs focus on other non-mitigation related climate objectives.

Net-zero planning for businesses in Southeast Asia is less robust due to differing landscapes, priorities, and barriers

In Southeast Asia, businesses with ambitious mitigation targets are predominantly (and often exclusively) large, multinational corporations. They include Unilever, which has a global 100% renewable energy target that applies in Indonesia; companies on the Dow Jones Sustainability (DJSI) World Index in Thailand such as the oil and gas and chemicals company PTT; the Thai-based, regional coal mining company Banpu; Toyota Philippines; and the business data company BIN Corporation in Vietnam.

Some companies in fossil-heavy sectors are also managing climate risk. These include the Indika and Bukit Asam coal mining companies in Indonesia, which have pledged sustainability goals and diversification of their portfolios; and Independent Power Producers (IPPs) such as AC Energy Philippines, which has committed to a full exit from coal by 2030. In Vietnam, more local companies in the private sector are shifting towards greener business models, although most are big players.

For example, the Saigon Co.op supermarkets have been deploying widespread on-site rooftop PV, while VinFast, a large automotive manufacturer, recently began selling electric cars and motorbikes. Compared with Western economies, a larger share of GDP in Southeast Asian countries is generated by micro, small and medium enterprises with different means and priorities. NSAs in Southeast Asia often have fewer avenues to access financing and smaller overall capital needs for implementing future-proofing strategies. Even when circumstances allow, investments may be steered towards other non-mitigation-oriented priorities such as climate resilience, not least given the consistent threat of external climate shocks in Southeast Asia and their negative impact on business and economic productivity. Hence, discussions on corporate climate action in the region tend to focus on responses to risk, opportunity and competitiveness.

Another reason for a thinner mitigation landscape among NSAs in Southeast Asia is that, compared to developed economies, there is less consumer awareness and concern about climate issues helping to drive corporate action. This is exemplified by the service industry, which makes up the greatest number of companies with net-zero pledges (NewClimate Institute et al., 2021). Here, businesses have a dual incentive to set mitigation targets.

The engaged consumer base offers an economic opportunity, while the technological options and decarbonisation costs are straightforward. By contrast, manufacturing sectors, which dominate the business landscape in Southeast Asia, are more challenging to decarbonise, as they have greater abatement costs, require considerable technical know-how and have complex accounting across their upstream and downstream processes. Companies can be hesitant to set targets because the pathways and technologies are either unclear, too expensive or do not add up to the necessary savings.Companies may also be motivated to implement climate-friendly action but be constrained by the regulatory and business environment. One typical example is that a country's energy mix does not have enough renewable capacity to deliver the amount of clean energy that companies demand. Toyota Philippines is such a case. It relocated parts of its operations to the Philippines to take advantage of the Green Energy Option Program (GEOP). The programme has been delayed, however, and it is uncertain when Toyota will be able to tap into renewable energy sources. Indonesia, another an archipelagic nation, faces similar renewable supply issues because capacity is often unavailable on islands where businesses need it. Some companies, such as the Saigon Co.op supermarkets in Vietnam, have circumvented the issue by installing solar rooftop PV for on-site RE generation.

Businesses in Southeast Asia can leverage their power to achieve economic and mitigation objectives

Governments should recognise that climate mitigation can create opportunities in all areas of the economy, and a transition towards clean energy could help future-proof business competitiveness and, by extension, the domestic economy. Businesses, by contrast, should call on governments to create an enabling environment for achieving their business goals and remaining competitive, rather than pushing for national net-zero targets or meeting Paris goals specifically. Corporate net-zero targets are not an end in themselves, but they can influence larger development goals in the region.

The private sector is an integral part of the economy for most countries in Southeast Asia and thus possesses strong leverage over policymaking, should the region's businesses wish to prioritise mitigation options. For example, Gojek, Indonesia's giant multi-service platform, which is valued at $10 billion and provides Uber-like ride hailing (among other services), has made a zero-emission and 100% electric vehicle pledge by 2030. With its market size, the company's initiative has put immense pressure on the government to scale up charging stations and transition to a fossil-free electric grid.

Unilever's 100% renewable target in Indonesia puts similar pressure on the government and utilities to provide cleaner power. Toyota has even called on the Philippines Department of Energy to accelerate the clean energy transition (Apanada & Kaldjian, 2021). Toyota's request to the Department of Energy can also help SMEs in the Philippines become more competitive in the global market. Specifically, higher shares of renewables could reduce the high energy costs in the region and improve supply resilience, incentivising other multinational companies to transfer operations, thus furnishing investment to help the economy grow. The policy and governance landscapes in each country thus play a vital role.

Vietnam has a tax exemption regime in place for some climate mitigation activities, a feed-in-tariff scheme and a preferential land-use fee, which have attracted significant private investment in renewables projects over the past few years. In contrast, Vietnamese state-owned enterprises face constraints when seeking to invest in new fields such as mitigation-oriented activities as they will require approval from relevant authorities. This has hindered PetroVietnam and other companies from investing in renewable energy. In Indonesia, by contrast, the government protects state-owned enterprises by treating them preferentially and providing capital infusions to keep them afloat.

The key motivation is to remain competitive

Ultimately, the main motivations for companies to set net-zero targets are financial considerations and questions of competitiveness, be it in Southeast Asia or elsewhere. In the EU, for example, corporate climate mitigation planning is often driven by prospective economic benefits or the desire to ensure future resilience, given high-level policy signals (e.g., EU-ETS, carbon border adjustment mechanisms). In Southeast Asia, successful incentives for businesses have come in the form of tax incentives and reduction schemes (Vietnam), lower potential costs of electricity (Philippines), and a movement away from business models that will likely become unprofitable in the future (mining and energy companies in Indonesia and Thailand).

Market pressure can help increase ambition since certain standards and targets may be needed to access markets in the EU and elsewhere abroad. For example, Thai companies on the DJSI index face international pressure because science-based targets and strategies are required to receive high company scores.

Indonesia's palm oil association, GAPKI, is considering making pledges to lower its carbon footprint, in an effort to stay relevant in markets where the environmental impact of palm oil is coming under increasing scrutiny.

CASE
for Southeast Asia

ENABLER 5

AVOID FOSSIL-FUEL LOCK-IN: Understand the economic perils of fossil fuel lock-in

5. AVOID FOSSIL-FUEL LOCK-IN: Understand the economic perils of fossil fuel lock-in

Globally, Southeast Asia is one of the only regions still planning a significant expansion of coal infrastructure to meet growing energy demand.

This commitment to coal is attributable to the conventional wisdom that only fossil fuels can provide reliable and affordable baseload electricity to power development. But the paradigm is in the process of shifting.

Driven by global financial trends and the need for a more flexible power-system, Southeast Asian governments are reconsidering their coal pipeline

The prospects for coal power development have been diminishing over the past few years, globally and in Southeast Asia. Indonesia, Vietnam and the Philippines are looking to cancel numerous coal power plants equivalent to 60 GW capacity. Thailand is also planning to reduce coal power generation to around 10% of its power mix over the next 20 years and is considering a complete phase-out of coal power. One reason for the coal cancellations is depressed demand due to the COVID-19 pandemic, which has made existing coal capacity more than sufficient. Yet several other trends are driving the change.

Financiers are stepping out: Many international financiers have retreated from funding coal power plants projects due to climate urgency, reputational and fiduciary responsibilities[2], and economic considerations. As of October 2021, more than 1,200 divestment commitments have been made by financial institutions globally, and these institutions control more than $14.6 trillion in assets. China, Japan and South Korea, which are the last major sources of coal funding for Asia, have pledged to end overseas coal financing (Watts, n.d.). This leaves large development projects in Southeast Asia up in the air, raising the question of how, for example, Vietnam will finance the additional 30 GW of coal planned in its most recent power development plan (PDP8).

Economic non-viability: The cost of coal has been low in the region due to subsidies and the availability of domestic resources. Nonetheless, electricity generation from renewables is on track to reach cost parity with coal-fired generation.

Moreover, new coal power plants are likely to need high-quality pollution control, abatement technology, and carbon capture and storage, which bring high levels of additional capital and operating costs.

Future power systems will need to be flexibly operated: Even if it is easier than previously assumed to ramp coal power generation up and down, the process increases wear and tear and reduces the ability of the power plant to cover its high capital costs. Investments in retrofitting coal power plants to improve their operational flexibility need to be compared with other options (Agora Energiewende et al., 2021; Shrimali & Jindal, 2021).

If the infrastructure already exists, gas peaking plants (”peakers”) can provide reserve power during the transition to clean energy. In other situations, battery storage – which is becoming ever-cheaper – can be the favored option.

[2] Fiduciary responsibility refers to corporate directors’ legal obligation to serve the best interests of the shareholders amid new government regulations on sustainability, current climate challenges, changes in spot market operations, and green investment initiatives for banks and financial institutions.

Expanding coal capacity risks producing stranded assets and jeopardising energy security

While significantly lower than a few years ago, the coal pipeline in Vietnam, the Philippines and Indonesia remains vast, with a total of 44 GW of coal power expected to come online in the next ten years. This will create serious risks to macroeconomic stability for economies where state-owned enterprises dominate the power sector. For example, Indonesia, where much of the fleet of coal power plants was built before the 2000s, is now under pressure to lower its emissions. The country plans to introduce co-firing in 19 GW of ageing coal power plants, relying on up to eight million tons of biomass per year.

However, this raises questions regarding biomass sourcing, sustainability and cost, all of which will ultimately determine the economic viability of co-firing. Adding new coal power plants also carries risks that policymakers have so far overlooked. As seen during the pandemic, governments have a take-or-pay obligation fixed on the capacity tariff regardless of lower demand. These long-term contracts might not be economically efficient for off-takers since it can mean settling for less clean and affordable power sources, especially when the cost of solar PV is projected to be much lower than running a coal power plant. For example, in Thailand, relaxing minimum take-or-pay obligations could reduce operating costs by $103 million (3.5 billion Baht) in 2025.

Similarly in Indonesia, additional compensation for covering fixed-cost structures for the Independent Power Producers (IPP) would amount to $6.5 billion (IEEFA, 2020). This scale of subsidy would affect the financing outlook for PLN[3] and EGAT[4], but it would also seriously jeopardise state budget resources needed to fund COVID economic recovery plans and development goals. Currently, the economics of coal power are exposed to three main risks that call into question its fundamental viability:

New and recently completed coal power plants in Southeast Asia may face quantity risks since they will be used much less than planned. The revenue structure for coal plants will be challenged since the prices of renewables and batteries are rapidly falling. Renewables could capture a significant market share, reducing coal plant revenues and creating a higher risk of stranded assets. In view of these risks, Southeast Asian countries are in talks with the Asian Development Bank (ADB) about a new initiative, the Energy Transition Mechanism, under which the owners of coal-fired power plants could be compensated for retiring them ten to twenty years earlier than their service lifetimes (The Jakarta Post, 2021b). It is important that the design takes into account price discovery mechanisms; otherwise, the mechanisms could risk prolonging the life of coal power plants and crowding out clean-energy investment.

Fossil-fuel prices are likely to rise and become more volatile in the future. Surging demand in China, which still very much depends on coal, has shaken coal prices. Running coal power plants will be more expensive to operate as fuel prices become higher, whether due to decreasing coal supplies or the soon-to be introduced carbon tax. Higher price volatility will also impact investment risks. With fossil fuel becoming more expensive and volatile, power systems that are highly dependent on fossil fuels may be faced with either limiting domestic electricity consumption or buying expensive fuel – both options that represent a risk to energy security.

Fossil fuel exporters are at risk of shrinking revenues as countries around the world move away from coal power generation. When an economy depends on revenues from fossil-fuel exports, declining export rates severely affect the national budget and economic growth.

[3] PLN (Perusahaan Listrik Negara) is an Indonesian state-owned power utility.
[4] EGAT (Electricity Generation Authority Thailand) is a Thai state-owned power utility.

In Indonesia, this risk was hedged through regulation such as the Domestic Market Obligation, which set a coal floor price and ensured a minimum volume for domestic consumption. However, with Indonesia's plan to reach net-zero emissions in 2060, it is inevitable that the coal transition will have an impact on the economy and employment.

This gap must be covered by increases in other economic activities such as manufacturing, tourism or renewables, as in the case of East Kalimantan (IESR, 2019). The proceeds from the current coal-based economy should be funneled into the development of new economic drivers and the foundations for a just transition.

Is natural gas a bridging technology or is it here to stay?

Many countries regard fossil gas as the right energy source to close the supply gap, since it can provide back-up power and balance the grid. Southeast Asian governments, financiers and the gas industry have looked to the experiences in the US and Europe as examples where coal-to-gas switching has succeeded in lowering energy intensities while maintaining economic growth. But the US and Europe have relied on extensive and interconnected gas networks built before the uptake of renewables and the advent of a strong climate agenda. Given the urgency of climate constraints, the falling cost of renewables and energy storage, and the centrality of flexible generation in the electricity sector, developing a similar network in Southeast Asia could expose regional economies to a number of risks.

Gas as a commodity bears an even higher risk of price volatility and import dependency. Gas price fluctuations are particularly sensitive to geopolitics and global interdependencies. This can increase electricity prices in both free and state-controlled market systems. Regardless of the market design, the fuel costs must eventually be borne by consumers or state budgets. Relying on natural gas risks increasing import dependency. Due to the gap between projected demand and indigenous production, Southeast Asia is projected to become a net importer of gas by 2024 (ASEAN Centre for Energy, 2021a). By contrast, building more local renewable capacity would minimise price volatility exposure and increase energy security.

Developing gas infrastructure would need massive funding and risk stranding assets. In order to improve gas security, ASEAN members states are pursuing a Trans-ASEAN gas pipeline and network of LNG terminals (ASEAN Centre for Energy, 2021b). Thailand has the third largest pipeline of LNG terminals proposed or under construction in the world (Plante & Nace, 2021); the Philippines and Vietnam are currently eyeing LNG terminals to support gas demand (GlobalData Energy, 2021). But aside from the high capital costs, LNG terminal construction has been plagued by cost overruns and construction delays. As renewables expand, gas infrastructure, like coal, will see less use, leading to falling prices. As the world decarbonises, some of today's investments in gas infrastructure are likely to become stranded assets.

Infrastructures can lock economies into carbon-intensive pathways. Existing energy facilities have a competitive advantage over new facilities because of the sunk capital they represent. Even if renewables become cheaper, existing gas facilities will continue to operate as long as power prices remain above their marginal operating cost. Hence, the creation of a gas infrastructure could crowd out renewable energy from future investments portfolios. In the IEA's recent Net-Zero Pathway report, fossil gas capacity remains in operation until around 2030, after which it is then rapidly supplanted either directly by green electrons, i.e. electrification, or indirectly by green hydrogen (IEA, 2021b).

It is certain that green gas produced by renewables will play an important role in the future energy system, so that any new gas infrastructure, be it in the form of floating ships or pipelines, should be hydrogen compatible (IEA, 2021b).

While Europe is currently studying the role of fossil and green gases, Southeast Asian countries have just begun to grapple with the strategy. Further research is needed on competitiveness and the role of gas relative to other technologies and approaches to provide grid flexibility, such as battery storage.

Coal moratorium: a call for flexible, reliable and sustainable power

In October of 2020, the Philippines became the first country in Southeast Asian to announce a moratorium on greenfield coal (Department of Energy Philippines, 2020b). This decision was based on an urgent need to improve flexibility, reliability and sustainability of the system. By doing so, the Philippines Department of Energy acknowledged that new coal can further destabilise the power system given the country's excessive volume of inflexible technologies, which consist mainly of coal power plants. In previous years, unplanned and irregular shutdowns of critical coal plants in Luzon have undermined supply reliability.

The use of back-up power from gas or diesel plants has increased generation costs fourfold, from $0.043-$0.19/KWh (PHP 2.18 to PHP 9.64/KWh), resulting in higher bills for consumers (Dalusung & Manansala, 2021). The coal moratorium signals the country's rapidly evolving strategy, which is trending toward efforts to develop a more flexible and resilient power supply system.

Coal risks are mostly well understood and reflected in national and international policies. Switching from coal to gas brings additional complexities and new economic risks, especially due to potential lock-in. Combined cycle gas turbine systems will only add more rigid baseload generation capacity in countries where inflexible baseload generation is already excessive and destabilizing for the grid. Peaking and phasing-out coal power will not only reduce emissions but also act as a shield against multiple economic risks such as fuel price volatility and stranded assets. Powering economic growth through renewables and energy efficiency measures can modernise the power sector, contributing to grid development and dramatically improving services delivery with flexible generation. These measures can increase energy security in general and energy access for areas that require predictable, stable power for health services, schools, and local enterprises and industries. Moreover, they can serve as a hedge against volatile fossil fuel prices while providing economic opportunities including new green jobs.

CASE
for Southeast Asia

ENABLER 6

ELECTRIFY ECONOMY:
Accelerate the rate of electrification to decarbonise energy demand through sector coupling

6. ELECTRIFY ECONOMY: Accelerate the rate of electrification to decarbonise energy demand through sector coupling

Due to the sharply declining costs of renewable energy technologies, many countries have accelerated their emission reductions in the power sector. In 2021, renewables represent around 70% of total investment in new generation capacity worldwide, and they are now a major driver of reduced greenhouse gas emissions (IEA, 2021a).

While the energy transition is currently taking place mostly in the power sector and there is still a large proportion of GHG emissions released in transport, industry and buildings that requires urgent mitigation.

Integrating end-use sectors: a key strategy for achieving economy-wide decarbonisation, improving energy efficiency and facilitating integration of variable renewables

One key strategy to reduce greenhouse gas emissions in the transport, industry and building sectors is to use clean electricity either directly (for electric vehicles, heating and cooling, low-temperature heat) or indirectly (hydrogen or synthetic fuels produced from renewable electricity through electrolysis) (BloombergNEF, 2020; IEA, 2020; IRENA, 2021). This electrification strategy – sometimes referred to as "sector coupling" – has an important role to play in the economy-wide decarbonisation, assuming that net-zero electricity generation can be achieved. Sector coupling will require the construction of new renewable power plants and a more integrated approach to operating the energy system.

As electricity becomes the primary global energy source and power systems become the backbone for the decarbonisation of the economy, energy efficiency will increase in two ways. First, electric devices are in general more efficient compared with fossil-based alternatives. Using direct electricity would mean smaller losses from energy conversion.

Second, while electricity demand will increase due to the electrification of end-use sectors, energy efficiency measures can help utilities maintain and relieve grid pressure at peak times. By putting energy efficiency and sector coupling at the forefront, electrification can reduce economic dependency on fossil fuels and lower air pollution – fostering a healthier planet, healthier ecosystems and healthier people. At the same time, electrification will create new business opportunities and new jobs to boost the economy.

If implemented intelligently, sector coupling can provide new sources of flexibility (e.g., batteries, pumped hydro) that facilitate renewables integration through dynamic demand-flexibility. In this way, sector coupling can reduce the curtailment of renewables and minimise total system costs. It also makes the transport, building and industry sectors an active, consumer-centric part in the better management of the energy system. Finally, modern and interconnected transmission and distribution grids will expand shared resource coverage.

While still in its infancy, sector coupling in Southeast Asia represents a leap-frogging opportunity

Southeast Asian economies are just starting their energy transition. Accordingly, sector coupling is still in a nascent stage of development and requires further support before it formally appears on the policy agenda (Phoumin, 2021). The role of sector coupling in Southeast Asia is also different from that in Europe. For example, the main challenge in the Southeast Asian buildings sector is to provide not heating but cooling, which is already electrified.

The low seasonal variation of weather systems in some Southeast Asian countries also reduces the role of synthetic fuels, which in the future can be substituted directly with battery storage. Finally, the heavy industry sectors (steel, cement, chemicals) are much less developed in the region than in industrialised countries. Hence, the challenge here lies less in transformation than in leapfrogging fossil-fuel-based technologies and investing directly in net-zero industrial processes.

Sustainable transport can bring greater economic and health benefits to people and local economies and provide sustained decarbonisation

Rapid economic growth in Southeast Asia is accelerating urbanisation and traffic congestion, and some capital cities in Southeast Asia have the world's busiest and most polluted roads. Electrifying vehicles has been one way to tackle pollution issues, reduce oil imports, and boost the local manufacturing industry in Southeast Asia. For instance, Thailand's National Energy Plan (NEP) Framework, announced in August 2021, has set a target for 30% of vehicle production in 2030 to be electric and fueled by low-carbon electricity (Bloomberg, 2021). The Vietnamese company VinGroup launched an electric bus service in 2021, and as the country's only automobile manufacturer developing charging stations, to have 40,000 charging ports across all 63 provinces by the end of the year (Nhat, 2021). Meanwhile, 90% of households in Indonesia, The Philippines, and Vietnam do not own a car, requiring citizen-centric mobility solutions (Wijeratne and Lau, 2015).

Southeast Asian cities are currently building and improving mass transport systems (bus and rail). If they electrify these systems, they will be able to serve large volumes of passengers and create more sustainable transport while reducing pollutant emissions. Sustainable solutions must also be implemented more broadly, covering the entire spectrum of transport modes. The rise of online platforms for ride hailing and sharing in Southeast Asia is one example of a wide-ranging approach to sustainable transport. It encourages the use of public transport by better integrating multi-mode transportation. Another aspect is micro-mobility. According to a recent survey, nine out of ten Filipinos want active micro-mobility in the form of walkable cities, cycling lanes and priority for public transport (Philippines Department of Transportation, 2021).

Electrifying industry: e-fuels and industrial competitivenes

Direct use of electricity is economically preferable due to its efficiency. However, there are several cases – heavy industry, maritime shipping and aviation – where straightforward alternatives do not exist and fuels with high-energy density or specific chemical properties are required.

Here, renewable electricity-based fuels ('e-fuels' or 'green molecules') will be an option. For cost and efficiency reasons, the use of green molecules needs to be restricted to uncontroversial applications where no viable alternatives exist.

As industry grows in Southeast Asia, it is important that low-carbon technologies be introduced early in order to comply with climate policy measures such as a Carbon Border Adjustment Mechanism (CBAM), which is currently being planned in Europe. Power-to-heat technologies can provide solutions for low-temperature heat requirements, where synthetic fuels can contribute to meeting high-temperature heat demand. There are also business opportunities associated with producing hydrogen for export to countries such as Japan and South Korea, whose planned hydrogen strategies rely on hydrogen imports.

Indonesia, Thailand, Vietnam and the Philippines have several pilot projects to produce hydrogen from geothermal, wind turbines, and solar installations. A Hydrogen Thailand Group Club was formed in 2020 and joined by key public- and private-sector stakeholders and research institutes to advance hydrogen as an alternative fuel for a low-carbon circular economy. PetroVietnam (PVN) has already developed a strategy and roadmap for the gradual replacement of grey hydrogen with green hydrogen.[5]

Long-term planning and coordination between energy departments and other government ministries are essential to unlocking sector coupling benefits and achieving decarbonisation goals

Sector coupling is a vital part of the clean-energy transition and will be essential in order to decarbonize energy use. But sustainable development in a broad sense requires a societal shift in how we design our everyday lives. Mandating electrification without well-designed policies could rapidly increase electricity demand. As a result, more fossil fuel-fired power plants may have to be built in order to ensure sufficient power supply in the medium and long term. Long-term planning and coordination between energy departments and other relevant government ministries (transport, industry, buildings) will be essential to unlocking sector coupling benefits and achieving decarbonisation goals. Existing traditional power systems and monopoly markets in Southeast Asian countries will need to be reformed to support the use of renewable electricity across all end-use sectors.

Thailand is the site of one of the first such efforts in the region. Thai government ministries are working with to finalise a National Energy Plan (NEP) that integrates decarbonisation, digitalisation, decentralisation, deregulation and electrification policies. It is crucial that the rest of Southeast Asia follow suit.

Forward-thinking policies require cross-sectoral strategies that integrate energy generation, grid operation and flexible demand in a single resilient and low-carbon energy system. Electricity needs to become the primary energy source, while power system planning must become more agile to keep up with technological advancements and system-level changes.

[5] Grey hydrogen is currently the most common form of hydrogen globally and is generated from methane through a process called "steam reforming". Green hydrogen is carbon-neutral and is produced by using clean energy from renewable energy sources to split water into hydrogen and oxygen through a process called electrolysis.

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