

# Chapter 1

## **Introduction**

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## Chapter 1: Introduction

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## 1. Navigating the COVID-19 Uncertainties and Unknowns

The developing and advanced economies of the world have been structurally transformed by the COVID-19 crisis. Eighteen months into the crisis, the cumulative economic and financial impacts were estimated to be much worse than that of the 2008 global financial meltdown (Engstroem et al., 2020). Several projections (Agarwala, 2020; UNEP, 2021) have also expressed certain levels of doubt over whether Asian countries, which are progressively integrated into the global economy, could continue to grow at the pace they have previously enjoyed for more than 2 decades, in the aftermath of COVID-19. The deceleration of the region's economic growth cannot simply be ignored given the complex nature of the pandemic itself and the containment measures, as well as its impacts on supply and demand potential, production structure, and the economics of sustainable development. There are wide differences between countries in terms of their developmental stages, health infrastructure, and economic integration. As the number of countries in the Association of Southeast Asian Nations (ASEAN) and East Asia that have reached the middle-income status is increasing, reaching the high-income status needs more creativity in industrial restructuring for successfully addressing the challenge of growing inequalities within countries.

The Intergovernmental Panel on Climate Change's Sixth Assessment Report (IPCC, 2021) has categorically

stated that the planet is irrevocably heading towards warming by 1.5°C in the next 2 decades. Keeping global warming below pre-industrial levels by the turn of the century was at the heart of the Paris Climate Agreement. Unchecked, and combined together with the pandemic, climate change will push 200 million people into poverty over the next 10 years, undoing the hard-won development gains of the last 3 decades (World Bank, 2021). Unless extremely deep emission cuts are undertaken by all countries immediately, climate goals are unlikely to be met by 2030. In line with this, the same IPCC report has recommended that countries strive towards net zero emissions by 2050. Achieving net zero emissions means that no additional greenhouse gases were emitted by that year. As of mid-2021, 52 countries and the European Union have pledged to meet net zero emissions targets. In total, they account for around 70% of today's global gross domestic product (GDP) and carbon dioxide (CO<sub>2</sub>) emissions. In the Asia-Pacific region, Japan and the Republic of Korea (hereafter, Korea) have joined the pledge for net zero emissions by 2050, whilst China aims to achieve net zero emissions by 2060. Singapore has also announced ambitious plans to achieve net zero emissions beyond 2050. Although many ASEAN Member States (AMS) have yet to set any specific targets for net zero emissions, several of them are working hard to redesign their policies towards meeting the Paris Climate Agreement targets, as expressed as nationally determined contributions (NDCs).

As countries around the world rush to repair their pandemic-battered economies, policymakers must decide what type of economic recovery they want to promote. Resetting policy measures during the pandemic recovery towards a low-carbon economy is critical

for three reasons. First, all countries need to resume the battle against climate change that was interrupted by the COVID-19 pandemic. Heatwaves, droughts, floods, and cyclones have become more intense and frequent in developing countries. Recent research (IPCC, 2017) has found that the impacts of climate change on agriculture, tourism, energy demand, and labour productivity will collectively result in a loss of about 8%–11% of the world's combined annual economic growth by the end of the century. Second, stimulus policies combined with appropriate skill development programmes can generate more jobs in low-carbon sectors, such as renewable energy and resource-efficient services development. For example, Garrett-Peltier (2017) and Engstroem et al. (2020) found that every US\$1 million spent on renewable energy created 7.5 full-time jobs and every US\$1 million spent on energy efficiency created 7.2 full-time jobs, which is significantly more than the 2.7 jobs generated from the same investment in fossil fuels in the 2008 financial stimulus packages. Third, policies that support internalising externalities, such as carbon pricing, can strengthen the long-term competitiveness of industries in developing countries that cater to the needs of consumers in advanced economies, who increasingly demand climate-smart, environment-friendly products (WEF, 2020; Cable, 2016). Setting the right policies would also ensure foreign direct investments from the growing number of multinational companies that have made public commitments to move towards a net zero future (ETC, 2020). However, the economic recovery measures announced by several economies have not been well harmonised to combat climate change and achieve co-benefits, such as job creation and social inclusion (Vivid Economics, 2021). Placing these countries on a low-carbon green growth pathway requires coordinated risk mitigation policies and investment enablers. Pandemic plans will also need to carefully factor in addressing existing inequalities

and vulnerabilities in countries, now further exacerbated by COVID-19 impacts.

Governments across ASEAN and East Asia have deployed a significant amount of emergency capital in response to the pandemic, with an initial focus on protecting lives and livelihoods. Further, the linkages between health impacts and climate change are becoming more evident. The pandemic has its own impacts, but it has also created new, once-in-a-generation opportunities for implementing hard reforms towards green growth that will require simultaneous technology, regulatory policy, and financing innovations, as well as sector-specific actions to tackle climate change and maintain the competitiveness of industries.

The European and Korean pandemic recovery packages provide a basic framework for low-carbon green growth with the core components being the promotion of low-emission and pollution abatement technologies and climate-resilient infrastructure in addition to leveraging public and private finance to invest in clean energy and infrastructure. The European Green New Deal type stimulus packages and their variants for economic recovery involve a comprehensive range of measures and initiatives to speed the transition of the economy and society towards a low-carbon and resilient future. These include a range of reforms to taxes and subsidies; tax credits and incentives for investment in renewables and low-carbon technologies; enhancing electricity network connections; incentivising the uptake of electric vehicles and the installation of charging stations; clean energy infrastructure and energy-efficient buildings; sustainable agriculture; upgrading the resilience of existing infrastructure to severe weather events; improving climate change-related disaster

preparedness; leveraging investment and lending for supporting the transition to a low-carbon economy; education, training and research and development focused on green growth; and the development of standards, codes, and regulations that support this transition.

Hence, a number of obstacles stand in the way of the effective implementation of a green recovery. Amongst the most important is the fact that existing policy frameworks and economic interests continue to be geared towards the conventional economic growth pattern, which is always coupled with increased carbon emissions. Inadvertently or not, this creates misalignment between existing regional policy frameworks, such as the ASEAN Economic Community (AEC), Regional Comprehensive Economic Partnership (RCEP), ASEAN Plan of Action for Energy Cooperation (APAEC), hindering the progress towards meeting global commitments such as the Paris Climate Agreement and the 2030 Agenda. The urgency for addressing climate change also requires ambition and the coordination of economic recovery policy responses, but in practice, there is no single standard to judge the adequacy of existing commitments and the design of recovery packages.

However, the ways in which economic recovery packages, new policy commitments, and technological change have produced real changes towards decarbonisation during the pandemic period is central to the future of sustainable economic growth. The level of commitment to fighting climate change and accelerating green growth has never been higher, but for the moment there remains a visible gap between growing carbon emissions and the needed investment and policy reforms. This book explores how and when this aspirational gap might be narrowed in the aftermath of the pandemic. The individual chapters, which are basically country-level

assessments of the pandemic responses, are based on three major questions: First, how rapid and widespread is the economic recovery, given the different rates of vaccination and the spread of the virus, and are the policies and investment coming through to make it a sustainable one? Second, how close do the current economic recovery packages get the region towards the target of limiting global warming, whilst accelerating economic growth? Third, what more needs to be done, and which parts of the economic system need focus in terms of changes in the energy mix, technologies, capital, and trade flows across the border?

## **2. Guiding Questions for the Regional-level Assessment of the Pandemic Impacts and Recovery**

There are different lenses through which to view the social impacts, economic recovery, and decarbonization in the post-pandemic era. A near-term perspective market for low-carbon goods and services could be tied with uneven recovery from the COVID-19 pandemic, which – in the absence of sufficiently rapid changes in the way that we use and consume energy and raw materials – is pushing up demand not only for renewables but for all sources of energy, and is leading to a rebound in prices and in CO<sub>2</sub> emissions. An alternate view comes from the increasingly ambitious pledges to curb carbon emissions that are being made by governments both national and local, companies, financial institutions, and others as the world prepares for a crucial 26<sup>th</sup> meeting of the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP26) in Glasgow. If and when implemented, the new pledges, such as the ASEAN Comprehensive Recovery Framework (ACRF) will have profound implications for the transition in the future, reinforcing

and accelerating the rise of a range of low-carbon technologies and financing channels. In addition, economically integrated AMS are keenly aware of the co-benefit opportunities associated with regional cooperation arrangements, such as the ASEAN Power Grid, without which they would risk being locked into high-carbon infrastructure investments.

In ASEAN, China, and India, decoupling economic growth from carbon emissions is a policy goal that is increasingly being prioritised for national benefit rather than as a result of international pressures or concerns. Perhaps more importantly from the perspective of many low- and middle-income countries in the region, the pandemic recovery can support a range of other policy goals, including local environmental protection, poverty alleviation, energy security, economic competitiveness, the development of new industries and jobs, and investment in knowledge and innovation. It is this combination that helps explain the strong interest from many developing countries in greening the industries and low-carbon growth trajectories. The following set of guiding questions was applied for the assessment of the country levels impacts and evolution of economic recovery packages. The government recompenses to the pandemic from March 2020 are categorised into three phases: Phase I – the emergency phase, Phase II – the recovery phase, and Phase III – the sustainable growth phase.

(i) National economies have been transformed by the COVID-19 Pandemic. What are the major impacts and how big and green are the recovery measures?

- Although the COVID-19 pandemic is a public health crisis, the lockdowns have resulted in severe economic impacts (due

to demand side and supply side shocks), social impacts (job losses and worsening inequality in income, gender, and other social development dimensions), and environmental impacts (temporary reductions in emissions and pollutions and increased medical waste). What are the compound impacts, multiplicity trends, and close linkages of the impacts during lockdown?

- Most of the emerging and developing economies in the region were on unsustainable and vulnerable paths in terms of public finance before the pandemic. Since then, governments across Asia have speedily released sizeable financing for relief and emergency assistance. How big are the economic measures provided in your country during Phase I (emergency)? What are the mechanisms and channels of the delivery and implementation of funds?
  - Following immediate action to manage the crisis, policymakers need to design and implement recovery strategies that can support climate actions. How green are the announced recovery and stimulus packages?
- (ii) Emerging markets and developing economies are preparing for a post-COVID 19 recovery. What could be the ambitious content of green stimulus packages that can help resuscitate economies, restore employment, and build a low-carbon economy?
- The right investments will need to be fast and labour-intensive in the short run and have multiplier effects and co-benefits in the long run. What are the desirable green investment

- and low-carbon policies for your country in Phase 2?
- The quality, content, and strength of medium-term development plans will determine the pattern of inclusive and sustainable growth for decades to come. Therefore, moving onto Phase 3, what will be the desired green investment and low-carbon policies that your country will consider for achieving the 2030 Paris targets and 2050 goal of a carbon-neutral economy?
  - There are a range of tools that can help policymakers get the green stimulus right and maximise the factors that are critical to the social well-being of communities. What sectoral-level guidance (public health, waste management, clean energy, and digital infrastructure) could be helpful for the cities/urban context, and where will most stimulus investment take place (in both Phase 2 and Phase 3) to maximise the well-being?
- (iii) Green stimulus packages also need supporting policies to maximise the benefits of inclusive and sustainable growth. What policy reforms and cooperation agreements are critical for a long-term low-carbon transformation in the post-COVID-19 pandemic setting?
- Phase 3 sustainable packages will be set in a difficult macro-fiscal context where economic expansion is necessary but fiscal space is severely constrained in many countries. Can carbon pricing and subsidy reforms provide a source of much-needed revenue, and can they be part of wider policy reforms to restore fiscal sustainability?
  - The developing countries of ASEAN will face an extremely challenging situation where all sources of private finance in support of the low-carbon transition are more constrained. What competition and open trade policies in low-carbon technologies and services will unlock international investments and support green growth?
  - A range of new low-carbon energy options, such as hydrogen, carbon capturing and utilisation, as well as digital technologies, are emerging but need regional cooperation for scale-up. How can ASEAN countries cooperate amongst themselves and with other advanced economies to drive innovation?
  - Some large-scale, low-carbon projects, such as the ASEAN Power Grid, Trans-ASEAN Gas Pipeline, and common energy efficiency standards, have been already underway before the pandemic. However, there are also many small-scale projects that have multiplier effects in terms of the local economy, jobs, climate, and Sustainable Development Goal payoffs and can be implemented under a green stimulus in a faster way. How can countries in the region jointly evaluate the potential of such initiatives and analyse the content of stimulus packages that would also enable them to



share and learn from best practices and avoid mistakes?

The answers to these questions can act as the foundations for long-term, low-carbon green growth only by implementing support packages that maximise the social benefits in the short term and mitigate environmental degradation in the long term. Such measures offer governments a win-win solution. Did the governments choose policy options that reinforce old economic structures, particularly those that will further lock in carbon-intensive development? Or did they see COVID-19 as a once-in-a-generation opportunity to build a better future that significantly improves low-carbon development outcomes? The country-level assessment of the 10 countries or jurisdictions (Australia, China, Europe, India, Indonesia, New Zealand, Malaysia, Thailand, Viet Nam, and the United States (US)) revealed that the actions taken so far are in between the two extremes.

### 3. Pandemic Lockdowns and the Economic, Social, and Environmental Impacts

Asia was the first region hit by the COVID-19 virus, which put a strain on its people's welfare, and policymaking for sustainable growth became exceptionally difficult. The impact of the initial lockdowns during the emergency period that started in March 2020 and the later lockdowns during the recovery period to contain the virus caused a decline in the level of output, household spending, corporate investment, and international trade. In particular, consumer expenditure dropped by

around one-third in many economies, which far outweighed anything experienced during the global financial crisis in 2008–2009. (OECD, 2020a).

Data on infections, tracing and inoculation are incomplete and do not provide a fully aggregated picture for measuring the net socioeconomic impacts, which vary across countries and their economic jurisdictions. Table 1.1 presents a telling indication of countries' initial responses to the pandemic and the response mechanisms along with other risks.

As the pandemic is far from over, health indicators are still flashing red in many of the studied countries. All 10 of the countries studied have experienced multiple waves of COVID-19 infections, with new variants posing several risks. Overall, most of the advanced economies in the region appear to be on track to getting the virus under control over the course of 2021.

The COVID-19 pandemic and the associated lockdowns took a heavy toll on Asia's labour markets. Unemployment surged, and labour force participation plunged. Job losses that occurred during the emergency and recovery phases were more concentrated in industries with lower wages and amongst women and youth (ILO, 2020). The pandemic's effects on tourism and the associated hospitality sectors, as well as manufacturing industries that require in-person contact, are larger in ASEAN. Accounting for more than 10% of the regional economy and a major employer of youth and women, the tourism sector interconnects several industries with multiple subsectors dependent on its performance. Since March 2020, regional tourism came to a virtual standstill, a major concern for many economies in terms of sustainable recovery.

**Table 1.1 Initial Fiscal Responses to the Pandemic and Existing Sustainability Risks**

Country	Total Stimulus#		Environmental Performance Index (EPI)	Climate Risk Index for 2020 (CRI)
	US\$ Billion	% of GDP		
Australia	191.40	14	74.9	28.00
Brunei Darussalam	-	3.2	54.8	118.00
Cambodia	1,174	1.2	33.6	75.83
China	594	4.1	37.3	42.83
European Union	2,130.20	30	-	-
India	270	10	27.6	18.17
Indonesia	44.1	4.41	37.8	68.17
Japan	2,100	40	75.1	5.5
Korea, Republic of	100	12.8	66.5	76.5
Lao PDR	0.26	2.8	34.8	35.5
Malaysia	59.6	17	47.9	84.3
Myanmar	1.28	2.1	25.1	58.83
New Zealand	58.5	19.5	71.3	53.17
Philippines	11.9	3.2	38.4	11.17
Singapore	66.8	18.3	58.1	125
Thailand	744	3.6	45.4	68.83
Viet Nam	10	3.6	33.4	23.83
United States	2,835.3	11	69.3	26.17*

GDP = gross domestic product.

Source: compiled by authors.

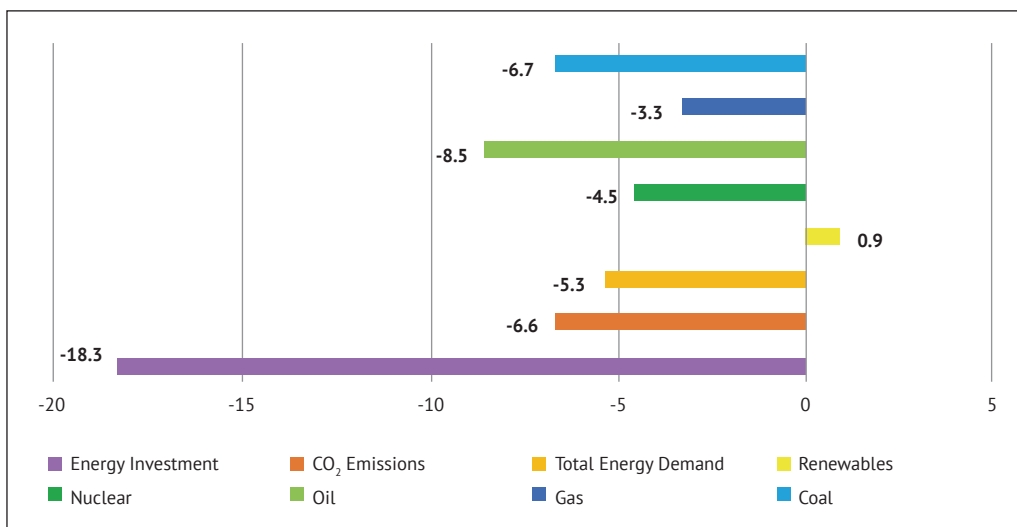
The pandemic further became a cause of unemployment in 2021, when it accelerated the migration of low-skilled workers. The resulting higher levels of income inequality have been significant when compared to the 2008 financial crisis (ADB, 2021). Unlike in the 1997 and 2008 crises, the prospects for global trade to lead countries back to recovery and an immediate bouncing back of employment are still uncertain in the developing countries of Asia. The pandemic is having disproportionate impacts on small and medium-sized enterprises (SMEs) and low-income households, exposing severe gaps in social protection and exacerbating already high inequality in several of the developing countries in Asia.

The success of lockdowns, social distancing, and work-from-home regulations to control the spread of COVID-19 reduced energy demand, especially oil consumption in the transport and production sectors, resulting in a reduction in the percentage of emissions emitted during March–November 2020. The IEA (2020) assessed that total energy demand globally dropped by around 5% in 2020, followed by energy-related CO<sub>2</sub> emissions by 7%. Figure 1.1 shows that the pandemic hit energy investment with a significant drop by 18%. Fossil fuel-based energy demand, notably oil and gas, plummeted significantly by around 8% and 7%, respectively. On the contrary, the contribution of renewables rose slightly.

Forcing people to do their activities from home, the pandemic caused a shift in how people work, travel, and trade, resulting in lower mobility via land and air transportation. One of the positive impacts of the COVID-19 situation was a drop in air pollution

in urban areas during the 2020 lockdowns. Studies (Bonardi, et al. 2021; Sannigrahi et al., 2021, Narain, 2020) show that air pollution, particularly PM 2.5 concentrations in major cities like Bangkok, Jakarta, and New Delhi, dropped by around 40% (IEA, 2020) during the initial lockdown. This is an

**Figure 1.1 Changes in the Energy Investments and Carbon Emissions in 2020 Relative to 2019**



Source: IEA, 2020.

important consideration for decision makers when conducting careful measurements to avoid air pollution returning to the previous levels during the recovery and sustainable growth phases as well as designing post-COVID19 economic recovery programmes.

In general, companies and bond markets invested in renewable energy power have outperformed listed fossil fuel companies and public equity market indices during the pandemic. Patenting activity for low carbon energy has, likewise, outstripped that for fossil fuels since 2000, with a new wave of digital technology-supported innovations coming in. Despite the pandemic, record breaking levels of

capital have flowed into technology start-ups during the recovery phase, with estimated investment of US\$4 billion, exceeding the early-stage equity raised in 2019 (IMF, 2021). Institutional investors are also actively seeking out more low-carbon-related technologies, such as hydrogen, and the geographical spread of companies is more balanced. Whilst the US still accounts for just over half the deal value, Europe was the only major region to increase investment in low-carbon technologies during the pandemic in 2020, and China’s share has risen from 3% in 2010 to over 30% in the past 3 years (Agarwala, 2020). Half of the digitally aided low-carbon and energy start-ups founded in 2020 were in the emerging economies

of India, Indonesia, Malaysia, and Singapore. China, Japan, Korea, the European Union, and the US, meanwhile, have made high-level commitments to low-carbon energy R&D and innovation, after framing it as a critical area of technological competition in the coming years.

However, the pace of growth in low-carbon energy or green patents has slowed during the pandemic period. Analysis of the historical data by the World Intellectual Property Organization shows a clear divergence in trends since 2015 between a continued rise in patents for low-carbon technologies and a decline in patenting for fossil fuels compared with a decade ago, a finding that reinforces the call for a new wave of innovation accompanied by concerted policy support.

#### **4. Pandemic exit strategies, economic recovery, and stimulus packages**

The COVID-19 pandemic is an unprecedented global health crisis that forced many governments to implement immediate action to contain the virus. In the initial stages of emergency, many governments shifted their priorities and budgetary resources to deal with the health and social security needs. Unprecedented measures to contain the virus, such as lockdowns, travel restrictions, and curbed mobility, resulted in temporary closures of many businesses, created financial market turmoil, and heightened uncertainty amongst investors. On the other hand, the ability of governments to mobilise fiscal support during the emergency and recovery phases through stimulus and recovery packages has determined

how households and companies have weathered the immediate risks and shaped the future of low-carbon investment in the post-COVID-19 era.

As of mid-2021, a cumulative amount of US\$17 trillion in stimulus support has been provided at the global level (IMF, 2021) for near-term emergency and economic relief. Of this, around US\$2.3 trillion has been directed to economic recovery, which is defined as spending that goes to new investments, including spending that could be directed at low-carbon infrastructure (OECD, 2020b) that is also mostly in advanced countries. The support for new low-carbon infrastructure, such as clean and new energy and energy efficiency, is set to be administered over the next few years – 70% of it by 2023 – and along the way it should also leverage additional spending from the private sector. The multiplier effects by country and sector suggest that this should amount to an additional US\$1 trillion in sustainable recovery spending over the period to 2023 (HSBC, 2020).

There are huge geographical imbalances within ASEAN and East Asia in terms of their economic recovery packages and stimulus spending (Table 1.2). Governments in the advanced economies of Europe, the US, and Korea have mobilised about US\$76 billion a year in public recovery spending for 2021–2023 for low-carbon energy.

The components of the EU Green New Deal by the European Commission include three concrete actions: a Just Transition Mechanism to leverage public and private money, including the European Investment Bank, to help those that are most affected by the move towards the green economy;

delivery of a Sustainable Europe Investment Plan, mobilising €1 trillion in investment for environmentally

responsible projects; and a proposed European Climate Law to make the net zero by 2050 commitment legally binding (Baker et al., 2020).

**Table 1.2 Covid -19 Impacts and Contents of Economic Recovery Packages (March 2020–August 2021)**

Country	Economic Recovery Measures
<b>Australia</b>	
<p><b>COVID-19 Impacts:</b> First wave was in March 2020 and second wave was in August 2020. It is lower during 2020 but reached to 1,400 people affected in August 2021 <b>GDP :</b> -7% in June 2020; -2.4% in 2021. <b>Unemployment:</b> 1.3 million jobs lost in April 2020 but recovered. <b>Fiscal stimulus in 2021:</b> US\$249.7 billion (18.4 % of GDP)</p>	<p><b>Emergency phase:</b> Finance assistance for retaining workers and amendment of credit regulations for avoiding bankruptcy. <b>Recovery phase:</b> No special package but included in 2021 budget, under items such as infrastructure investment. <b>Sustainable growth phase:</b> No special package but aligned with Technology Investment Roadmap Discussion Paper: hydrogen, energy storage, Carbon Capture and Storage (CCS), etc.</p>
<b>China</b>	
<p><b>COVID-19 Impacts:</b> The first wave was over in February 2020 and second wave was not observed. <b>GDP:</b> dropped in Jan-March but is already above the level of 2019 in July-September. Growth around 2.3% in 2020. <b>Fiscal stimulus in 2021:</b> US\$710.6 billion (4.8 % of GDP)</p>	<p><b>Emergency phase:</b> Social security reduction, refund of insurance payment <b>Recovery phase:</b> - Six guarantees, including employment, livelihood, food and energy, and industrial supply chain - Tax reduction, cash handouts, infra construction - Local economy supports by local government (fund transfer to local government) <b>Sustainable growth phase:</b> - 'Net zero emission by 2060' was announced in September 2021. Its detail was not released. Concrete measures would be a part of next five-years plan - Optimisation of energy structure, transportation, technology innovation, support measures: green finance, carbon market, etc.</p>
<b>European Union</b>	
<p><b>COVID-19 Impacts:</b> Peak of first wave was between March and April 2020 and second wave started in September 2020. Number of infections varies from country to country. Wave of infections repeated itself in 2021, but new infections decreased in many member countries, after Q2 2021. <b>GDP:</b> -6.6% (2020) (EURO currency region) <b>Fiscal stimulus in 2021:</b> US\$488.3 billion (3.8 % of GDP)</p>	<p><b>Emergency phase:</b> By member states <b>Recovery phase:</b> - Green Deal under Multiannual Financial Framework and Next Generation EU: 30% of expenditure is allocated to climate change - By member states: France focusses on manufacturer support and stimulus on buying products like cars. <b>Sustainable growth phase:</b> - Green Deal by EU: EU released 'Fit For 55' in July 2021, which includes comprehensive climate policy. - By member states: Germany includes future package in addition to stimulus and crisis management package and international responsibility.</p>

Country	Economic Recovery Measures
<b>India</b>	
<p><b>COVID-19 Impacts:</b> First wave ended in September 2020, but number of infections increased in 2021 and reached 40,000 people per a day in August 2021.</p> <p><b>GDP:</b> -8.0% (2020)</p> <p><b>Emissions:</b> first drop in 4 decades</p> <p><b>Fiscal stimulus in 2021:</b> US\$93.3 billion (3.5 % of GDP)</p>	<p><b>Emergency phase:</b></p> <ul style="list-style-type: none"> <li>- Food security system</li> <li>- Economic relief measures (cash and food)</li> <li>- RBI's Finance to banks</li> <li>- Economic package (US\$280 billion)</li> </ul> <p><b>Recovery phase:</b></p> <ul style="list-style-type: none"> <li>- Self-reliant India: (1) economy: (2) infrastructure: (3) system: (4) vibrant demography: and (5) demand</li> </ul> <p><b>Sustainable growth phase:</b></p> <p>No special package.</p> <ul style="list-style-type: none"> <li>- Potential: Power sector, transportation, industry</li> </ul>
<b>Indonesia</b>	
<p><b>COVID-19 Impacts:</b> Number of infections increased since April 2020 but was lower during 2020. It increased in 2021. New infection reached more than 50,000 in July 2021.</p> <p><b>GDP:</b> -2.1% (2020), modest drop.</p> <p><b>Fiscal stimulus in 2021:</b> US\$48 billion (4.5 % of GDP)</p>	<p><b>Emergency phase:</b></p> <ul style="list-style-type: none"> <li>- First stimulus (February): cash payments for social assistance, food etc.</li> <li>- Three principles; health/life, purchasing power and bankruptcy</li> </ul> <p><b>Recovery phase:</b></p> <ul style="list-style-type: none"> <li>- Measures are a mixture of emergency support and fast recovery</li> <li>- Second Stimulus (March 2020); exports and imports, and financial sector support</li> </ul> <p><b>Sustainable growth phase:</b></p> <ul style="list-style-type: none"> <li>- No special package. Third stimulus (March 2020) includes some green component, such as micro grid construction.</li> <li>- 'Net zero by 2060' was announced in August 2021.</li> </ul>
<b>Japan</b>	
<p><b>COVID-19 Impacts:</b> The first wave was April 2020, but new infections increased again in July 2020 and peaked in August 2020. It increased aging December 2020 and waves are repeating themselves, with a fifth wave in August 2021.</p> <p><b>GDP:</b> -9.9% April-June 2020 and started recovery. -4.8% (2020).</p> <p><b>Unemployment:</b> uneven impact in non-regular workers.</p> <p><b>Fiscal stimulus in 2021:</b> US\$830.7 billion (16.5 % of GDP)</p>	<p><b>Emergency phase:</b> Supplemental budget (April and June 2020): employment support, working capital support, rent support, and medical care support</p> <p><b>Recovery phase:</b></p> <ul style="list-style-type: none"> <li>- Basic Policy for 2021 budget preparation (July 2020): some climate measures, like hydrogen, quality infrastructure, included but not higher priority.</li> <li>- Ad hoc measures: Go-To Travel Campaign (suspended in December 2020 due to the increase of new infections)</li> </ul> <p><b>Sustainable growth phase:</b></p> <p>No special measures</p> <ul style="list-style-type: none"> <li>- Innovation, fiscal system reform and market mechanism, local economy and local finance, global/regional approach.</li> </ul>
<b>Korea, Republic of.</b>	
<p><b>COVID-19 Impacts:</b> The first wave was in March 2020. Number of new infections during 2020 is lower but increased and reached more than 20,000 people per day in August 2021. Waves are repeating themselves in 2021.</p> <p><b>GDP:</b> -1.0% (2020).</p> <p><b>Fiscal stimulus in 2021:</b> US\$73.5 billion (4.5 % of GDP)</p>	<p><b>Emergency phase:</b> Emergency relief grant: cash payments to all, medical leave subsidies, subsidies to vulnerable people and business, unemployment assistant fund.</p> <p><b>Recovery phase:</b> Part of Green New Deal: no specific short-term recovery package</p> <p><b>Sustainable growth phase:</b></p> <ul style="list-style-type: none"> <li>- Aiming for Smart country, green country, and Safe country. (1) Digital New Deal (e.g., 5G, digital learning, remote healthcare), (2) Green New Deal (e.g., green infrastructure, low-carbon energy), (3) Stronger safety net (e.g., digital skills training)</li> <li>- Net zero by 2050 was announced in October 2050.</li> </ul>

Country	Economic Recovery Measures
<b>Malaysia</b>	
<p><b>COVID-19 Impacts:</b> First peak was early April 2020. Number of infections are still increasing. New infections reached to over 40,000 people per day in August 2021.</p> <p><b>GDP:</b> Biggest drop was -7.7% in Q2 2020 but started recovery with a decline of 2.7% in Q3; -5.6% (2020)</p> <p><b>Fiscal stimulus in 2021:</b> US\$17.7 billion (5.2% of GDP)</p>	<p><b>Emergency phase:</b></p> <ul style="list-style-type: none"> <li>- First stimulus (February 2020): tax relief and loan deferment for people. Guarantee and loan moratorium for business.</li> <li>- SME Aid program (April)</li> </ul> <p><b>Recovery phase:</b></p> <ul style="list-style-type: none"> <li>- Second Stimulus (March 2020): greater support for people and business than during the first stimulus, with more focus on economic recovery</li> <li>- Short-term recovery plan: improving people's skill, tax relief, digitalisation support and financing for SMEs, and promoting a 'Buy Malaysian' campaign.</li> </ul> <p><b>Sustainable growth phase:</b> No major special packages aligned with sustainable growth strategy, such as Green Technology Master Plan, National Renewable Energy Policy, Shared Prosperity Vision 2030 - Poses challenges in attracting green investments - both domestic and foreign investments.</p>
<b>Thailand</b>	
<p><b>COVID-19 Impacts:</b> The first peak ended in March 2020. But increased again in April 2021 and its peak was August 2021.</p> <p><b>GDP:</b> -6.1% (2020).</p> <p><b>Fiscal stimulus in 2021:</b> US\$57.2 billion (11.4 % of GDP)</p>	<p><b>Emergency phase:</b> Phase 1 stimulus (March 2020): tax relief, cash payments, SMEs support.</p> <p><b>Recovery phase:</b></p> <ul style="list-style-type: none"> <li>- Phase 2 stimulus (March 2020) : filing of tax return in addition to the first phase packages</li> <li>- Phase 3 stimulus (April 2020): SMEs through banks, households, liquidity for financial sector</li> </ul> <p><b>Sustainable growth phase:</b> No special packages. - Agriculture (bio circular economy etc.), energy (electric vehicles, etc.), environment (green tourism, etc.), digital transformation.</p>
<b>Viet Nam</b>	
<p><b>COVID-19 Impacts:</b> First wave was in April 2020 and second wave was in August 2020, but the number of infections is very low compared to with other countries during 2020.</p> <p><b>GDP:</b> Q2 2020 is lower but still positive in 2020 (2.9%) Economic impact is mostly through trade.</p> <p><b>Fiscal stimulus in 2021:</b> US\$5.7 billion (1.7 % of GDP)</p>	<p><b>Emergency phase:</b></p> <ul style="list-style-type: none"> <li>- Labour support through cash payments, etc.</li> <li>- Support to business through bank credits, extension of tax payment and loan payment deferrals.</li> </ul> <p><b>Recovery phase:</b> No special program but various measures, including removal of barriers for production and business, are taken (access to finance, fiscal and credits policies, etc.).</p> <p><b>Sustainable growth phase:</b> No special packages but align with National Energy Development Strategy or policies.</p>

GDP = gross domestic product.

Source: Compiled by authors based on country papers (chapters of the book).

In the US, the green recovery plan is not as far-reaching as the 2008 Green New Deal, but many of the core elements for low-carbon green growth are there. It has committed to a US\$2 trillion infrastructure plan and the goal of net-zero emissions by 2050 (IMF, 2021). New infrastructure investment

committed during the pandemic period in Asia potentially puts the region on the cusp of a slightly people-centred green recovery. The leading position of China, Japan, and Korea in the development and deployment of low-carbon technologies is noticed. Some growing opportunities in renewable

energy development are captured in countries such as Indonesia, the Philippines, Thailand, and Viet Nam.

During 2020–2021, the Australian government has budgeted further investment in renewables and waste and resource recovery infrastructure, and the states and territories also followed suit in committing to an increased renewable energy uptake through reverse auctions and the designation of low-carbon energy transition zones. The Australian Climate Change Authority has emphasised a pandemic recovery plan with the components promoting decarbonising the energy sector and circular economy.

The 37th ASEAN Summit in November 2020 adopted the ASEAN Comprehensive Recovery Framework and Implementation Plan. It includes five key strategies: (1) enhancing health systems; (2) strengthening human security; (2) maximising the potential of the intra-ASEAN market and broader economic integration; (4) accelerating inclusive digital transformation; and (5) advancing towards a more sustainable and resilient future. Strategy 5 is consistent with the Paris Climate Agreement, which includes promoting sustainable development in all dimensions; facilitating the transition to sustainable energy; building green infrastructure and addressing basic resilient infrastructure gaps; promoting sustainable and responsible investment; promoting high-value industries, sustainability, and productivity in agriculture; managing disaster risks and strengthening disaster management; and promoting sustainable financing. The framework implies that that a return to ‘business as usual’ is no longer an option for ASEAN in the post-pandemic world,

and this paradigm shift will require ASEAN governments, businesses, and civil society to work collectively to enable systemic change needed by the region for a sustainable and resilient future.

Korea has announced the largest stimulus package (US\$333.7 billion) in the region, followed by India (US\$332.9 billion), Singapore (US\$85.7 billion), Indonesia (US\$74.7 billion), and the Philippines (US\$17.0 billion). As a percentage of Gross Domestic Product (GDP), Singapore has provided the largest share of recovery packages (24%), followed by Korea (20%), India (12%), Indonesia (6%), and the Philippines (4%). The Korean New Deal has the highest share of green stimulus measures as well, accounting for more than 50% of the targeted action plans. Meanwhile, India has allocated about 12% of its stimulus for environment-related activities, and Indonesia has directed 4% of its stimulus towards green outcomes (Vivid Economics, 2021).

The composition of the emergency support of US\$322.9 billion in India’s fiscal stimulus packages is focused on support for healthcare and welfare, tax relief for businesses, and targeted credit support for the agriculture sector. The package offers support to industries and the pandemic-affected population in the form of loans, capital investment, and incentives and subsidies. Specific sectoral support has been given to agricultural infrastructure development, electricity distribution, and digital technology companies.

Generally, the social development component of the stimulus outweighs the recovery directed towards low-carbon green measures in almost all countries in ASEAN. The agriculture sector has seen notable support in the Philippines, Indonesia, Thailand, and Malaysia, in particular. Several sectoral measures involve support for businesses, including tax incentives, loans, and credit guarantees.



Additionally, some support has been directed towards citizens and businesses in the form of subsidies for electricity generation and reduced fuel prices, as well as social protection transfers to low-income households. The new infrastructure projects announced as a part of the recovery are targeted to strengthen digital infrastructure and support several sectors, including tourism, water, sanitation, housing, and national health. In the energy and electricity sector, projects include the construction of natural gas networks for households and support for rooftop solar (ACE, 2020).

However, most of the stimulus and recovery packages do not include carbon footprint measurement or conditionalities when providing support to new infrastructure projects and bailing out companies that are involved in high-carbon industrial and commercial activities. Whilst China, India, Indonesia, and Thailand have introduced several positive measures, including funding for afforestation, incentives for electric vehicles (EVs), and support for bio-gas plants, continued support for environmentally harmful activities is expected to have a severe impact on the future of carbon emissions and inclusive growth. Given that large volumes of funding during the recovery packages are directed towards strategic state-owned enterprises (SOEs), governments should consider including conditionalities that require companies to decarbonise. For example, green conditionalities for the aviation sector could include efforts to curb emissions along its supply and consumer chains. Alongside bailouts with carbon strings attached, there is an opportunity for major carbon-emitting economies like China, India, and Indonesia to support a sustainable

recovery through green R&D subsidies and climate-smart infrastructure investments in the industrial and waste sectors.

In response to the initial effects of recovery programmes, spending on energy-efficiency improvements increased in 2021 by nearly 10% when compared to 2020 (Global Energy Institute, 2021). Stimulus spending is also spurring projects in new areas, such as low-carbon hydrogen and carbon capture utilisation and storage (CCUS). However, the amounts that are being dedicated to green recoveries are far from sufficient to jolt the regional investment regimes towards meeting the Paris Climate Agreement targets.

There is consensus on the need for the transition to a net zero economy by 2050 as rapidly as is practical. However, it is equally clear that transformational changes and structural changes in key economic sectors are not happening as observed in the economic recovery packages. Whilst there is no one-size-fits-all solution, several model-based analyses suggest that policies are effective in mitigating the adverse distributional consequences of the pandemic and accelerating low-carbon green growth.

## 5. Policy Responses and Regional Cooperation Strategies for Breaking the Vicious Cycle in the Post-COVID-19 Era

The policy adaptations that have happened during the COVID-19 pandemic emergency and recovery phases have tended to focus on minimising the destruction of income generation and international trade and maintaining production capacity

to help economies recover to their levels from before 2019. Low-carbon green growth needs the alignment of long-term policy goals into short- and medium-term investments in both public and private sector actions. The policy actions taken during the emergency and recovery phases have unfortunately put a temporary brake on hard reforms and brought more risk to future low-carbon investments.

Economic growth in advanced economies before the pandemic was characterised by low growth, surplus savings, and stronger monetary policy and expansionary fiscal action (LSE, 2020). On the other hand, the developing countries of ASEAN, China, and India face a much more complex and challenging fiscal situation (Victor, 2020). There has also been a rapid erosion of fiscal space and foreign exchange reserves in several developing economies since the outbreak of the pandemic.

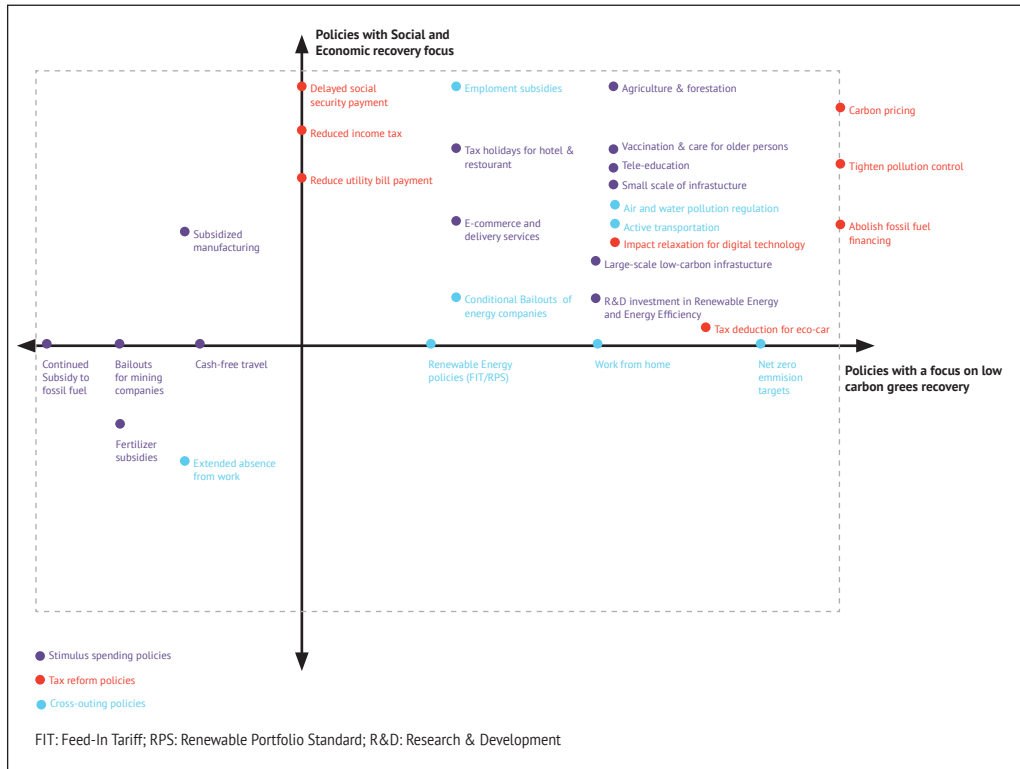
In Australia, the federal government and states have responded to the pandemic crisis with various policy reforms, such as planning and environmental legislation to address the immediate flexibility required for responses to the pandemic and to provide greater flexibility and centralisation of decision-making. The federal government and state governments have identified key developments and infrastructure to be fast-tracked for assessment and approval to support economic recovery from the pandemic. Policy actions, such as temporary reallocation from carbon-intensive sectors like airlines and transportation, provide an opportunity for job creation in more labour-productive and cleaner sectors. Figure 1.2 maps the varying types of policy instruments employed to reduce social

vulnerability and promote low-carbon green growth – which could be categorised as tax-based instruments and technology-targeted instruments, with several lying in between.

The policy reforms introduced in Japan, Korea, the US, and New Zealand during the same period have focused on identifying and processing priority low-carbon green growth projects for fast-tracking. The policy instruments and criteria for identifying priority projects include net community benefits that comprise social and affordable housing and environmental sustainability and renewable energy. Australia, China, Japan, Korea, and New Zealand present examples wherein with strong institutions and fundamentals, stepping up economic reforms to boost low-carbon green growth and investments is feasible during the pandemic but requires the adequate reallocation of resources across sectors, and support for the small businesses and workers affected by the economic transition. These countries have provided significant fiscal and monetary policy support to cushion the impact of the pandemic on their economies.

On the other hand, many developing economies of ASEAN and India are quickly running out of fiscal policy space in the recovery phase. Some of them have used unconventional monetary and fiscal policies. A wide range of financial sector measures have been taken to ease the pressure on banks and borrowers, including debt service moratoria, targeted lending schemes, and liquidity support. Although these measures have provided appropriate short-term relief, modifications are needed to minimise distortions and have a clear exit strategy for continuing these measures in support of low-carbon green growth investments so as not to aggravate existing climate vulnerabilities.

**Figure 1.2 A Taxonomy of Policy Instruments that Have Evolved During the Pandemic in Support of Inclusive and Low-carbon Growth**



Source: Compiled by authors based on country papers (chapters of the book).

Several unconventional monetary policies implemented in Indonesia, Malaysia, Thailand, and Viet Nam have been a surprise, as the circumstances do not resemble those prevalent in advanced economies when they used these tools. Malaysia and Thailand resorted to central bank lending operations to provide extra liquidity to firms, whilst Indonesia and the Philippines used large-scale asset purchases. The use of unconventional monetary policy reforms, whilst warranted, inevitably entails risks, which will increase the longer the tools are used, and steps should be taken to mitigate the risks, including by establishing frameworks delineating their use. The impact of the COVID-19 shock led to an unprecedented wave of corporate bankruptcies in the emergency phase, and in the absence of unconventional policy interventions,

they might have generated further financial turmoil, with firms unable to generate enough earnings, and sustained declines in profitability to cover their interest payments.

On the other hand, the COVID-19 crisis has also underscored the importance of implementing effective carbon pricing reforms as a source of new revenue streams and of implementing bailout programmes for green industries. To date, six countries or jurisdictions have carbon pricing initiatives implemented for which the design and implementation was not disturbed during the pandemic period

Carbon price reforms, new fiscal regulations, and well-designed bailout conditions can be a powerful way of tilting incentives towards low-carbon green growth (IIPP, 2019). Carbon

pricing and the phasing out of pervasive fossil fuel subsidies can be critical components in the future policies needed to restore growth and decarbonise the economic system (IEA, 2020). Fuel subsidy reforms are an important complement to carbon pricing, or a substitute if political economy factors prevent a carbon tax, and can be particularly timely and effective in times of financial crisis (Bowen, 2015). By ensuring fossil fuel prices reflect both supply and environmental costs, carbon tax measures also reduce the risk of locking in carbon-intensive capital (Rosenbloom et al., 2020). Carbon pricing can take the form of carbon taxes, which charge the carbon content of the fuel supply, or emissions trading systems (ETS), where firms need permits to cover their emissions. In ETS, the government controls the supply of allowances, and trading establishes the allowance price. Fuel excise taxes, which are economically like carbon taxes, should also be part of the support policy framework during the pandemic recovery.

The continued prevalence of regulated energy prices and subsidies that favour fossil fuels makes the transition to low-carbon energy more difficult. These market distortions dilute the case for more efficient investments. Although these subsidies fell to a record low of US\$180 billion in 2020, higher fuel prices and energy use, coupled with hesitant progress on carbon pricing reforms, are set to push this amount back up to US\$440 billion in 2021 (Anbumozhi, 2021). This rebound to well above

pre-pandemic levels is very worrying at a time when countries need to be redoubling efforts to cut wasteful consumption and accelerate low-carbon economy transitions. This rise in the subsidy burden adds to the fiscal pressures in developing economies, especially where subsidies are a specific incurred cost rather than foregone revenue.

It would be appropriate for some advanced economies to focus on fiscal neutrality in the stimulus example using the additional funds to reduce distortionary taxes. Countries with large funding needs can use the carbon tax revenues to support low-carbon infrastructure investments that are labour intensive. To meet the net zero targets by 2030, the World Bank (2020) and IEA (2021) estimated a carbon tax in the range of US\$90–US\$110/t CO<sub>2</sub>. Nevertheless, for the developing countries in ASEAN, it will be important to use part of the additional revenue from such a carbon tax to also alleviate the distributional consequences of hard tax reforms, which may particularly affect SMEs and low-income households.

Policies for bailing out corporations have been found to be helpful when significant numbers of jobs have been at stake during the pandemic. They can save jobs and accelerate the eco-restructuring of erstwhile brown industries. However, their implementation will need to consider the existing status of the financial and banking system. Strengthening the financial systems to support pandemic recovery and low-carbon green growth is necessary. To mitigate the risks of financial instability, governments, central banks, regulators, and the commercial banking industry need to transform financial risk management practices, improve the transformation and disclosure of climate risks, and enable stakeholders to make informed decisions. In this regard, economic ministries are required to work with the Network of Central Banks and Supervisors for Greening the Financial System (NGFS).

Policy responses for regional cooperation must make use of sectoral specialisations in order to build resilience in the region's supply chains. Restoring and creating such robust supply chains will involve streamlining trade, transport, and digital connectivity policies. One of the ways to achieve this is through efforts to expand cross-border energy trade by supporting initiatives, such as the ASEAN Power Grid (APG) and the Trans-ASEAN Gas Pipeline (TAGP). Melo and Solleder (2021) and Megan (2021) emphasised that in order to meet its low-carbon renewable energy targets, ASEAN will require billions of dollars in investments to advance the APG and TAGP. Participating countries will need to build more extensive cooperation frameworks and coordinated policies and ensure greater data transparency to build confidence amongst investors. This will require transparency in legislation and energy pricing agreements, along with strong credit ratings, to attract greater amounts of investment, particularly in countries like Viet Nam and Indonesia that have been held back by their opaque regulatory frameworks.

The falling cost of low-carbon circular energy technologies offers a huge opportunity (Bhattacharya, 2019; Huges and Roy, 2020) for all countries to chart a new path for lower emission industries towards growth and prosperity. Low-carbon energy companies around the world have performed well in financial markets during the pandemic, with listed renewable power companies outperforming fossil fuel companies and public equity market indices in recent years. Moreover, new employment opportunities will be tied to innovative production networks and energy supply chains that may be

located in other countries, particularly for solar, wind, batteries, smart grid components, and electrical vehicle components. Spending on these low-carbon technologies will grow faster in the post-pandemic era, requiring new manufacturing capacity to be expanded now.

However, for the moment, low-carbon technology transfer and investment remain far short of what would be required to meet the Paris Agreement targets. ASEAN countries, on average, place 5% taxation on low-carbon green goods, thus increasing the net cost of transformative low-carbon technologies. The tax structures of Cambodia, the Philippines, and the Lao PDR for imported low-carbon goods and services remain high above the regional average. ASEAN lessons on production networks in the automobile and electronic sectors as well as the easing of movement of essential supplies during the pandemic could be used to create similar cost-effective pathways for low carbon goods and services. As Scott Baker argues, economic uncertainty tends to reduce firm investment and innovation whilst limiting access to funding thus disproportionately impacting the low carbon energy sector which requires long-term commitment. The question remains how pandemic recovery policies can be recalibrated with the commitments made under the Paris Agreement and ongoing economic integration efforts.

Addressing the global net zero emission targets requires urgent policy actions at the national level. Countries are not starting their journey to net zero emissions from the same base and not with the same set of policy instruments. At present countries are implementing several combinations

of policy instruments in support of low-carbon green growth, including regulatory interventions, market-based instruments, and targeted support for low-carbon technology diffusion, innovation, and sustainable consumption. Advanced economies have a first-mover advantage and could reach net zero before developing economies and assist others in getting there by sharing their experiences. The context for individual companies' strategies on net zero likewise varies depending on their operations. It is much easier for industries reliant on electricity, such as digital technology companies, to take on ambitious emission reduction targets compared with those in the heavy industrial sectors. This creates a strong case for international collaboration to build up diverse capacities regionally and accelerate learning for the deployment of transformative low-carbon technologies whilst avoiding other potential risks, including energy security and negative spillovers, such as a loss of local jobs and lost manufacturing capacity. Although this international cooperation approach could result in a less open system of international trade, investments, and technology transfer, it would certainly manage the potential tensions between advanced and developing economies and will be crucial for ensuring an orderly and broad based inclusive transition, rather than a stalled journey.

## **6. The Way Forward: Action Areas for a Smart, Low-carbon, and Inclusive Recovery**

The COVID-19 pandemic shocks gave us a glimpse of what a better sustainable future could hold. The

chapters in the book first present the different ways advanced and developing countries are adjusting to the pandemic and developing their containment strategies, the socioeconomic impacts, and analysis of the potential for undertaking the low-carbon green growth agenda. Close examination of the economic recovery packages and policy actions that have evolved during the pandemic indicates the distributional effect of the pandemic across the sectors and huge gaps in meeting the aspirational goals of climate actions. Now we have a once-in-a-generation chance to set ourselves on a low-carbon, resilient, and inclusive development path. Today's policy actions will quickly become post-COVID-19 global net-zero transformation. All countries can gain from this transition if and when the recovery packages are aligned towards long-term sustainable development goals. The 2008 green stimulus experiences showed that for every dollar invested in low-carbon climate-resilient infrastructure, US\$4 in benefits could be generated (Chen et al., 2020).

To ensure a smart, low-carbon, and inclusive recovery, there are five thematic areas that need full review, consideration, and quick actions. First, transformative public and private investments are needed in the key system areas of energy, agriculture, food, water and land, cities, transport, and manufacturing. These systems are being prioritised because they contribute the most to carbon emissions in ASEAN and East Asia – together, they produce over 90% of regional GHG emissions – and face significant transformation challenges. These sectors are also critical for achieving the Paris Climate Agreement goals and global net zero ambitions. The available indicators show that progress at the national and regional levels has been patchy and incremental.

Transforming them at speed is key for all the studied countries, which are at different stages of development and require action from the public sector to catalyse the private sector, both to unlock major economic opportunities and create new jobs and reduce carbon emissions. Without any policy changes or a monitoring system, it is expected that carbon emissions will continue to rise until 2030 and beyond to meet increasing energy demand. On the planning front, most governments are still looking at conventional models of economic drivers that are driven by carbon-intensive investments, meaning that bad investment decisions made during the pandemic will lock us into expensive mistakes for decades. The short-term cost considerations should not justify postponing low-carbon green energy choices.

The second area that requires priority action is innovation in low-carbon and digital technologies, business models, and approaches to finance. Countries should ramp up public investment in research that can lead to low-carbon green growth solutions and increase cross-border collaboration to lower costs and market risks. Public procurement practices should be leveraged to drive innovation and accelerate venture capital investments. The period from the pandemic recovery to Net Zero 2050 offers an unprecedented level of market opportunity for the best innovators and investors in emerging markets, which could become home to most of the new zero-carbon assets.

Public budgeting is the third action area. Too much government spending runs counter to zero emissions goals. In all the studied economies, governments continue to spend

considerable budgetary resources in subsidising fossil fuels and incentivising inefficient production infrastructure. Government revenues and economic interests continue to be entangled in high-carbon assets. Governments must end their fiscal dependence on carbon-intensive growth, which would continue to deplete government revenues in the post-pandemic era. In the aftermath of the pandemic, a number of countries will have to contend with debt burdens that are possibly too large for them to manage. Given the likelihood of further exogenous shocks, debt relief or debt reduction for highly indebted and highly vulnerable economies may be required. Such relief could free up resources for crucial social spending on health, education, and social protection and help to catalyse an improvement in public debt management.

Public finance alone cannot help reach the Paris Climate targets by 2030 and accelerate low carbon green growth. The private sector, the fourth focus area, is essential to help shift the required financing from high-carbon to green infrastructure. The financial sector is beginning to factor climate change into its decisions, but an array of rules governing the financial system hinders the right allocation of resources. Governments should step up disclosure requirements, enhance governance, and improve the management of climate risks. Re-setting economic incentives for the finance sector to favour low-carbon investment options and long-termism is also essential. However, to be truly transformational, the national banking systems must get clearer mandates from their stakeholders in tackling climate change risks, re-think their incentive structures, and attract new sources of investments.

Lastly, getting low-carbon investments right is most urgent in cities, where most of the pandemic relief measures are being spent. Moreover, future energy, water, transport, waste management, and digital infrastructure investments will be spent in cities as urban populations grow. National governments must empower them to plan and build their capacity to finance net zero targets. There is a definitive need for building collaborative smart city networks that can bring together public-private actors for enhanced investments and act as effective platforms for sharing and fostering best practices.

Nevertheless, there will be some short-term trade-offs when aligning these action areas in the recovery packages and policy reforms during the pandemic recovery, including the transition costs, but these can be reduced through a people-centred approach. The cost of not addressing climate change is already immense and will only get more expensive. There can be no going back to the old normal if the above interconnected policy actions are taken up now. As Winston Churchill stated: 'One should never let a good crisis go to waste.'



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