Chapter 6

Conclusions and Policy Recommendations

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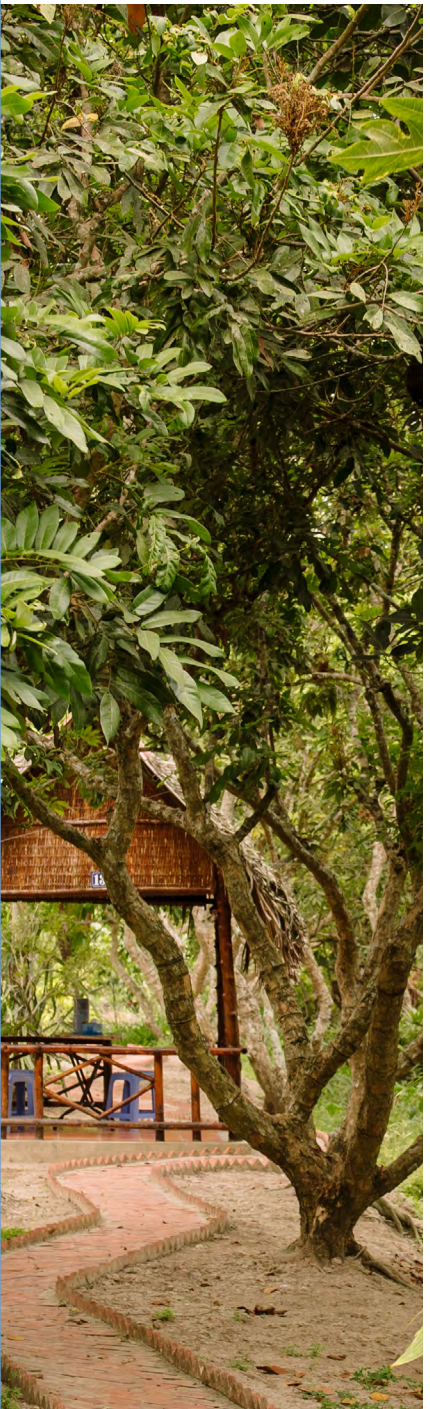


This final chapter will first summarise the salient findings of the preceding five chapters, with a focus on critical concerns which the developing countries and emerging economies of the Association of Southeast Asian Nations (ASEAN) in the region are confronted with in making the transition to a low-carbon green growth paradigm in the post-pandemic era. The chapter then proposes concrete actions to help countries to address these issues, with the aim of achieving broad-based consistency in the short-term actions responding to the coronavirus disease (COVID-19) pandemic and long-term structural actions towards net zero and resilient economies.

Managing development transformation and responding to crises of various sorts is a common and constant feature of economic endeavours across Asia. The emerging economies of ASEAN, China, and India, as well as the advanced economies of Japan, the Republic of Korea, Australia, and New Zealand, have enjoyed remarkable growth since 1980 despite two financial crises – the 1997 Asian economic crisis and the 2008 financial crisis. Before the onset of the third crisis – the COVID-19 pandemic – Asia's gross domestic product (GDP) per capita income was projected to continue to grow. The major development focuses of Asian countries will be on overcoming the structural challenges of inequality and the middle-income trap, and the increasingly pressing need to halt the adverse impacts of climate change and environmental degradation. As part of the post-2008 global financial crisis response, countries in the region were expected to take initiatives to adopt a new paradigm of low-carbon green development. The adoption of the new paradigm was discussed in the ADB–ADBI (2013) publication, and the experience of almost a decade is reviewed in this book.

The COVID-19 pandemic first hit Asia in late 2019. This is the third major crisis that Asia has encountered in 3 decades and it continues to cause widespread impacts across the region. Countries have been dealing with health-related emergency responses, combined with measures for sustaining livelihoods and supporting economic recovery. Many countries have experienced multiple waves of COVID-19 infections, with new variants posing additional risks, and are vulnerable to prolonged economic impacts. Continued lockdown and travel restrictions have kept carbon emissions from soaring during the pandemic. Speedier rollout of vaccines and continued fiscal support for industries and households are also facilitating the economic rebound, and thus energy and resource use in key economies. The pandemic has caused temporary changes to the trajectories of energy and resource use and carbon emissions, as well as the investment patterns of low-carbon infrastructure development. Nevertheless, methane emissions from oil and gas fields and agriculture, as well as the land use sector, have continued to increase – even during the crisis (Worden et al., 2017). From a climate change mitigation perspective, all countries – both emerging markets and developing countries – have retained their 2030 Paris Agreement nationally determined contribution (NDC) targets, and several advanced economies have joined the global call for 2050 net zero emission targets. However, several countries in the region have not increased their ambitions from the time of signing of the Paris Accord in 2015.

The region-wide efforts to deal with the pandemic impacts are unprecedented. It is all the more noteworthy that countries are dealing with the dual challenges of managing the short-term health security emergency and the looming long-term human and environmental security concerns. The pandemic is not a setback for the region's efforts in the

transformation journey, as perceived by some. Rather, it is a once-in-a-generation opportunity to catalyse and recalibrate the accelerated pace of low-carbon green development to build a sustainable, inclusive, and resilient Asia. This has been reflected in the commitment of one-fifth of the world's 2,000 largest public companies to meet net zero targets (Black et al., 2021).

1. Regional Megatrends and Motivations for Low-Carbon Green Growth

Sustainability and low-carbon development have received unprecedented policy attention over the last 2 decades because of the co-benefit policy goals of air quality improvement, energy security, and economic competitiveness. This coincided with the countries in Asia making progress towards regionally integrated production and services networks, and becoming an active part of global supply chains. A major policy agenda has been to converge the interests of growth, climate change, trade, and social inclusion. Governments, the private sector, and communities have set low-carbon targets and undertaken initiatives to reduce carbon intensity and to enhance environmental performance and shift patterns of growth to become more inclusive.

Policy actions to mitigate climate change and steer green growth gained momentum in 1997 when the Kyoto Protocol was signed. Efforts peaked in the 2015 Paris Agreement but are continuing through refinements to the implementing strategies, such as the updated NDC targets and the ambitious goal of achieving net zero emissions by 2050. Asian countries have been an active part of the global pursuit of a low-carbon economy and are addressing social development challenges together. With the clear quantification of emission reduction targets, countries are developing and adopting implementable actions, with policy measures, before and after specific target dates. NDC implementation plans, as reported by countries across the region, comprise more than 300 policy announcements that vary widely in stringency, scope, and mix. Regulations on renewable energy supply and energy efficiency are in place in most of ASEAN and East Asia. However, where regulatory frameworks exist, they often achieve emission reductions as co-benefits of economic, environmental, and social policies that emphasise inclusive and sustainable development (e.g. policies that encourage renewable energy uptake in off-grid areas, energy savings by low-income households, and investment in air quality improvement).

For an increasing number of countries in the region, decoupling emissions from economic growth is becoming part of the economic transformation. For example, the ASEAN Plan of Action for Energy Cooperation aims to achieve a renewable energy target of 25% in 2025. The net zero emission targets of China, announced in 2020, aim to reduce energy consumption by 2050 and attain the emission peak before then. China has committed to reach net zero emission targets by 2060. India's National Action Plan on Climate Change includes a solar mission that aims to create an enabling policy framework for the deployment of solar power to off-grid consumers. Other ASEAN Member States (AMS) such as Indonesia, Malaysia, and Thailand target contributions to national energy supply from low-carbon resources, measures and incentives for energy efficiency, the preservation of natural resources, and promoting growth across all sectors of their economies. Japan formulated its net zero emission targets to be achieved in 2050 through guided investments in innovations in niche technologies such

as green hydrogen as well as carbon capture, utilisation, and storage (CCUS) – and their diffusion across the world. The Republic of Korea has set green growth as its national development strategy, providing an enabling environment for new creative green industries. Regional cooperation and integration, which are often focused on economic and trade policies, have helped in the arbitration of national level efforts and have complemented commitments made at the global level. Chapter 2 revisited these megatrends. The trends and strategies employed before the pandemic outbreak were based on the idea of decoupling economic growth and carbon emissions through integrated technology and financial policies. Nevertheless, global assessments reveal that the NDCs committed to at the 2015 United Nations Climate Change Conference (COP 21) by almost all countries are not sufficient to keep the world below a temperature increase of well below 2°C, and more ambitious targets are required (Raman, 2016).

2. Characterising Policy Innovations for Low-Carbon Green Growth Before the Pandemic

Both developing and advanced economies in the region have responded to calls for low-carbon green growth with several types of policy instruments of varying significance. Table 6.1 classifies the policy instruments being practised in several countries, which are replicable and are already being scaled up across the region.

Table 6.1 Classification of Low-Carbon Green Growth Policy Instruments Practised in ASEAN and East Asia

Technology-based		Fiscal-based carbon pricing
Fiscal	Regulatory	
Investment subsidies Preferential tax treatment Government investment in venture capital Public investment vehicles Demonstration grants Public research and development Tax credits/holidays Feed-in tariffs/premiums Public procurement Subsidies for energy efficiency purchases	Technology performance standards Renewable fuel/energy efficiency standards Building regulations Automobile regulations Information standards	Emission trading mechanisms Carbon tax Hybrid trading-tax schemes Renewable energy certificate trading

ASEAN = Association of Southeast Asian Nations.

Source: ERIA study team.

Those policies can be categorised as regulations, market-based instruments, and voluntary schemes. Chapter 3 took a closer look at policy initiatives at the national, sectoral, and subnational levels before the pandemic. Policy initiatives taken before the pandemic clearly indicated that the main ingredients for a successful transition towards a low-carbon economy are available and could be upscaled. The salient features can be summarised as follows:

- Emerging and advanced economies acknowledge the need to approach low-carbon green growth from a broader development perspective, as is shown through the emphasis on a wider and varying set of pledges, policies, and programmes. Climate mitigation targets,

resource efficiency standards, and regulations on fossil fuel use are being continuously updated, while new market-based instruments such as emission trading systems are being developed.

- National governments pay attention to the integration of low-carbon energy targets in a broader context, acknowledging the strong links between climate policies and other environmental and inclusive development issues. Aligning climate policies with the three pillars of broader economic transformation – co-benefits, economic resilience, and social inclusion – while maintaining the overall objective of emission reductions, is a promising way for sectoral level decarbonisation as well as achieving a net zero economy.
- Policymakers acknowledge the broader challenge of implementing a low-carbon circular economy, aiming for actions that affect not only the economic competitiveness and technological realms but also the everyday decisions of individuals. Behavioural changes and lifestyle choices are therefore a major issue, and awareness and communication strategies to mobilise actors at the national and local levels are envisaged.
- Given the difficult changes needed to achieve NDC targets, current policy initiatives have recognised the need to grasp the 'low-hanging fruits' – opportunities with low up-front costs – such as resource efficiency. The implementation of NDCs and net zero targets is easier if policies have multiple benefits, but as mentioned later in the chapter, both implementation and ambition gaps remain.
- Implementation deficits remain a challenge to be addressed in several countries. A strong financing strategy, banking sector, and public–private partnerships will be imperative to ensure the continuity of emission abatement strategies and to reinforce the realisation of NDC targets by 2030, either through regulations or market-based initiatives. Various private funding channels and financial instruments are also being tested in an incremental way.

3. Impacts of the COVID-19 Pandemic and Enablers of a Green Recovery

The COVID-19 pandemic is confronting conventional development strategies, with new investment risks being posed to different stakeholders in varying magnitude across the economic sectors (ERIA, 2020). The impact of the pandemic is felt through both supply and demand for energy and resource use, altering countries' emission profiles in the short term. After a fall in demand of about 1%–3% in 2020, regional electricity demand is bouncing back in 2021 – well ahead of what can be provided by low-carbon energy resources such as renewables. The rebound effects of energy demand are leading to increased output from coal-fired plants, which still dominate the primary energy supply in several countries. Oil and natural gas demand are also expected to bounce back more quickly, driven mainly by an increase in industrial demand and

use. The full impacts of the pandemic on employment, household income, and structural change are still not comprehensively assessed, but are expected to bottom out in 2021, with some countries starting their recovery earlier than others, while several others are still struggling to contain the spread of the virus. The effects of the pandemic are more visible in the transport sector, where oil demand in 2021 is set to remain well below 2019 levels because of lower consumption of automobile and aviation fuels.

Chapter 4 analysed the economic recovery patterns and composition of stimulus packages in ASEAN and East Asia, which is happening in a phased manner but in an uneven pattern. The focus of governments during the emergency and recovery phases was on saving lives and livelihoods due to the huge impact of the pandemic on jobs, incomes, and economic growth. Hence, only a small portion of the stimulus packages is designed to be responsive to tackling climate change or meeting the aspirations of a net zero economy. As of mid-2021, governments in the region have committed about US$5 trillion in COVID-19 related relief funding, mostly providing emergency support and economic recovery. Both the content and scale of the economic recovery stimulus packages matter for low-carbon green growth. Less than 1% of the value of the packages is targeted towards low-carbon energy and climate-resilient infrastructure development. The government stimulus in a few pioneering economies is providing support for investment in integrating renewables into grids; improving energy efficiency through digital technology penetration; and accelerating the research, development, and deployment of niche technology areas such as green hydrogen and CCUS.

It is understandable that a small proportion of emergency response financing was allocated to finance green investment and climate change operations. There is always a social safety imperative to address urgent healthcare needs – saving lives and protecting livelihood income. At the same time, synergies between the short- and long-term response actions must not be overlooked. For example, a stressed public health system is a short-term concern that will require a long-term perspective when undertaking urgent stop-gap measures. Managing medical waste during the pandemic response period will require long-term solutions. At the macroeconomic level, the consistency of public spending capacity in the short and long term must be carefully observed. Overspending on short-term actions will not only limit the fiscal space for long-term public investment solutions, but also add to the public financing management burden later.

Some of these short-/long-term trade-off and synergy issues are reflected in the ASEAN Comprehensive Recovery Framework (ACRF) of 2020, which aims to boost aggregate demand and employment through five broad strategies. The main purpose is to lift the productivity and competitiveness of AMS and bring about the transformational changes needed for inclusive, sustainable, and resilient growth. Further, stimulus packages and the implementation of the ACRF can exploit transformative opportunities brought forth for human security, digital technologies, the innovation potential of industries, and global supply chain resilience. The pandemic recovery must be driven by appropriate policy interventions that

fully capitalise market potential, but has to be part of coordinated actions by governments, industries, cities, and financial institutions.

Chapter 4 discussed the above aspects and analysed how governments, industries, cities, and financial systems are playing a leadership role in driving the recovery. Aligning their actions with low-carbon economy transition goals can contribute to more resilient and inclusive growth. The key findings are as follows:

- Early implementation of targeted spending on the economic recovery and investment in the low-carbon transition boosts stakeholder confidence, counteracts the trade-off pressure, and creates needed co-benefits and spillover effects. While governments, industries, cities, and financial systems have accumulated experience, deep knowledge, and the means to emerge from this crisis stronger and in a sustainable way, there is a significant risk that the economic recovery could go the other way too. Going back to the carbon-intensive and polluting 'old normal' would be the most dangerous path. Postponing the necessary interventions, new innovations, and essential investments could increase the cost of tackling climate change and would lead to a significant deterioration of the social discipline we all need to manage future risk.

- Alignment with the long-term objective of low-carbon green growth during the economic recovery phase has become critical for governments to avoid an unintended high-carbon lock-in. Empowering city and local governments to plan and implement low-carbon, climate-resilient, and circular economy action plans is an essential part of the green transformation, revitalising the local economy and building social cohesion.

- ASEAN and East Asia's experience across different sectors of the economy has revealed that digital technological change could become a catalyst for accelerating the low-carbon economy transition with smart supply and demand management approaches. Several governments provide special support for continued information and communication technology models and training on implementing best practices of small and medium-sized enterprises (SMEs). However, formulating guidelines and technical standards to conquer the cost barrier of digital technology that has low-carbon benefits remain a challenge. Some Asian governments and industries have cooperated successfully in generating a mutually reinforcing cycle of market reorientation and cost reduction along the global supply chain during the pandemic. This has contributed to the large-scale development of digitalisation, which has efficiency improvement as well as the danger of becoming a new source of carbon emissions.

- Advancing sustainable financing can and should seek to leverage the trajectory of low-carbon green growth in the post-COVID-19 sustainable growth phase. However, one of the effects of the pandemic has been the increase in levels of public debt, limiting the ability to mobilise funds for

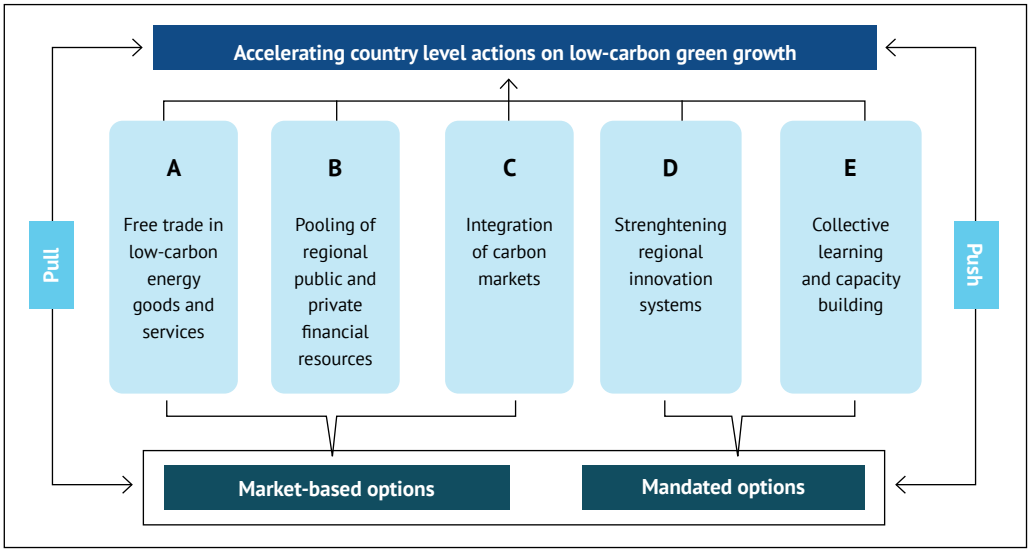
recovery, including for low-carbon energy. The financial strains in 2020 were particularly visible amongst resource exporters, although these have been eased somewhat by the rally in commodity prices in 2021. To mount a serious effort to mobilise low-carbon investments and get on a path towards net zero emissions, governments need to engage institutions such as green investment banks and climate bond markets to increase financing of climate change investments now while costs are still cheaper than later. In this context, it is worth mentioning the efforts of the Glasgow Financial Alliance for Net Zero, which brings together more than 160 firms with assets in excess of US$70 trillion from the leading net zero initiatives across the financial system to accelerate the transition to net zero emissions by 2050 at the latest (UNFCCC, 2021).

- Rapid technological, economic, and societal changes during the pandemic are generating uncertainty around a number of variables that could affect the nature of demand for low-carbon infrastructure, technology products, and services. The current institutional settings and coordination process amongst the key stakeholders are simply not adequate to fit into the low-carbon transformation needed. Overcoming the institutional inertia means addressing the issue of silo mentality in policymaking, as well as a series of status quo political economy factors such as employment in the fossil fuel industry; the competitiveness of other industries that use fossil fuels, such as the cement and steel industries; and the removal of pervasive subsidies and capacity gaps with public procurement systems.

4. Harnessing Regional Cooperation Opportunities

There is significant potential to reduce greenhouse gas (GHG) emissions in a cost-effective and people-centred way through regional cooperation. Chapter 5 examined the importance of inter- and intra-regional cooperation. International cooperation could happen at three levels – local/city, sectoral, and regional – to harness the co-benefits of climate change mitigation, thus reducing the cost of implementing actions, with an increased degree of integrated structurisation. At the regional level, windows of opportunity for cost-effective implementation of national actions arise through interlinkages and interaction between economies to scale up the liberalisation of trade in low-carbon goods and services, integration of carbon markets, development of clearly articulated financing strategies, and improved governance for promoting innovation and institutional capacity building, as illustrated in Figure 6.1.

Figure 6.1 Regional Cooperation Architecture for Accelerating Low-Carbon Green Growth



Source: ERIA Study Team.

A regional cooperation agenda aligned with the above actions and other critical areas – such as decarbonising fossil fuel industries, controlling forest and land use change, and empowering city governments – could be important conduits for upscaling finance and investment in the post-pandemic era. While the richest ASEAN and East Asian economies will be able to mobilise domestic and international private finance, other small developing countries will probably need to attract resources for innovation and capacity building from official development assistance. In many developing countries, the institutional capacity is underdeveloped to unleash the potential of carbon markets and the introduction of carbon pricing mechanisms.

Nevertheless, feasible policies could be implemented, such as taxing the most polluting fuels and saving money by phasing out fossil fuel subsidies that could be used to provide development help for fossil fuel owners.

A wide range of technologies at various stages of development could contribute to low-carbon green growth. The liberalisation of trade and reduced tariff rates would overcome cost barriers and accelerate innovation and technology transfer. Table 6.2 presents a framework of policies to do this. New opportunities, all of which have the potential to generate job growth and provide competitive advantage, include (i) the production and export of offshore solar, wind, and storage technology; (ii) trade in electric vehicle technology and establishing a hydrogen supply chain; and (iii) decarbonising the fossil fuel industry with niche technologies such as CCUS. The recently established Asia CCUS Network, hosted by the Economic Research Institute for ASEAN and East Asia (ERIA), aims to establish efficiency standards and hold capacity building workshops for CCUS.

Cross-border energy trade is placed to grow as regional mechanisms such as the ASEAN Power Grid are gaining

Table 6.2 Regional Cooperation for Low-Carbon Technology Transfer

Type of economy based on carbon-intensiveness	Trade in low-carbon goods and services	Foreign direct investment	Information sharing and licensing	Intellectual property rights	Green industrial policies
Domestic policies					
Low carbon-intensive: Lao PDR, Cambodia, Myanmar	Liberal access	Non-discriminatory investment promotion	Improve information flows about public domain and mature technologies	Basic protection and minimum standards only	Basic education; improve infrastructure; reduce entry barriers
Low to medium carbon-intensive: Indonesia, Thailand, Viet Nam	Liberal access	Non-discriminatory investment promotion	Improve information flows; limited incentives for licensing	Wider scope of IPR protection; employ flexibilities	R&D support policies; improve infrastructure; reduce entry barriers
High carbon-intensive: Brunei, Singapore, China, and India	Liberal access	Upstream supplier support programmes	Improve information flows; limited incentives for licensing	Apply full TRIPS	R&D support policies; improve infrastructure; reduce entry barriers
Advanced country (Japan, Republic of Korea, Australia, New Zealand) policies towards developing and emerging Asia					
Low carbon-intensive: Bangladesh, Lao PDR, Cambodia, Myanmar	Subsidise public good-type imports; free trade	Incentives for outward flows exceeding those for FDI	Subsidise transfer of public domain and mature technologies	Forbearance in disputes; differential pricing for exports of IPR products; competition policy assistance	Support for general low-carbon technology policies; public and public–private research facilities
Low to medium carbon-intensive: Indonesia, Thailand, Viet Nam	Free trade; no controls	Incentives equal to those granted for own disadvantaged regions	Assistance in establishing joint venture partnerships; matching grants	Differential pricing of public good-type IPR protected goods; competition policy assistance	Support for general low-carbon technology policies; fiscal incentives for R&D performed in developed countries
High carbon-intensive: Brunei, Singapore, China, and India	Free trade; no controls	Incentives equal to those granted for own disadvantaged regions	Assistance in establishment of joint venture partnerships; matching grants	Differential pricing of public good-type IPR protected goods; competition policy assistance	Support for general low-carbon technology policies; fiscal incentives for R&D

FDI = foreign direct investment, IPR = intellectual property rights, R&D = research and development, TRIPS = Trade-Related Aspects of Intellectual Property Rights.

Source: ERIA Study Team.

more interconnections and renewable energy is being integrated into the grids. Regional energy trade with hydrogen – including hydrogen-based fuels such as ammonia – is also well placed to grow. However, experience with establishing efficient regional energy markets suggests that it requires infrastructure standardisation and a change in regulatory measures, which take time to be developed and unified. Intra-regional trade in hydrogen today is limited, with only a small number of cross-border pipelines. Almost all the hydrogen and hydrogen-based fuels traded today are produced from fossil fuels.

Another outstanding and significant interregional cooperation issue relevant to both advanced and developing economies is the prospect of the extensive transfer of low-carbon technology with appropriate policy enablers such as intellectual property rights. Patent protection limits the ability of domestic industries in ASEAN to redesign and adapt externally developed technologies to

local conditions, hence their diffusion is lower. To overcome this, industries and research institutes in developing economies could be involved in regional collaborative partnerships from the research and development (R&D) stage, such as hydrogen fuel. Achieving extensive technology transfer and foreign direct investment (FDI) will require multisectoral policy arrangements, as shown in Table 6.2. In such a regional cooperation arrangement, willingness on the part of developed countries to forgo some commercial advantage for their own industries becomes inevitable.

The cost of key low-carbon technologies such as solar, wind, hybrid vehicles, building insulation, and energy storage is getting progressively cheaper. The pace at which this happens is linked to cumulative deployment – the more a technology is deployed, the greater the reduction in cost. Policies on innovation, intellectual property rights, trade, and FDI play a crucial role in this process, particularly in determining how quickly some new, innovative clean technologies in high-carbon sectors such as shipping, aviation, and heavy industry are being scaled up.

The integration of regional markets is a prerequisite for reducing the cost of climate change mitigation, but challenges exist. For example, new aggressive emission targets for NDCs at the 2021 United Nations Climate Change Conference (COP 26) and net zero emission targets in some countries could create incentives for polluting and high-carbon industries to move to developing countries with less ambitious emission caps and limited regulatory oversight – ultimately shifting where emissions are released, but not their absolute total. While regional cooperation represents a new opportunity for increased FDI and technology flows into emerging economies, the carbon border tax adjustments being considered by some advanced economies could have consequences on developing Asian countries accessing these export markets that were previously open. The introduction of carbon labelling and associated regulations could shift this to developing Asia's comparative advantage – bringing more transparency to carbon footprints that are often presented in the aggregate, such as when multinational companies report the footprint of their final products from a region as if it were one uniform good or service.

Regional cooperation also creates new cost-effective implementation of NDC targets through mutual learning. The major economies of developing ASEAN, China, and India share two important characteristics: high rates of economic growth and the need in the post-pandemic phase to address their sustainable developmental gaps. Achieving further decoupling of GHG emissions from economic growth, particularly methane emissions from oil and gas fields as well as the forestry sector, will create many socio-economic policy challenges. The exchange of knowledge about how to overcome these challenges will be mutually beneficial, particularly about least-cost technology innovation and adoption, reform processes, and the minimisation of mitigation costs. The coordination of national policies amongst developing countries, emerging economies, and advanced economies could reduce the prospect of an interregional shift in high-carbon industries and intra-regional carbon leakage. If and when national carbon prices arise, regional links could reduce mitigation costs by exploiting areas of comparative advantage in reducing carbon emissions from avoided deforestation, including forest fires, or

improving the efficiency of coal-fired power plants and capturing carbon emissions from oil and gas fields.

5. New Pathways for Closing the Aspirational and Implementation Gaps

Governments have to deal with the pressing priorities of post-pandemic recovery, inequality, and climate change. The pandemic brings several uncertainties that prevent the green recovery from being on a solid footing. A principal concern is that there are serious strains on corporate and household investments, including energy efficiency investments, in countries that have been hard hit. In 2020, lower fuel prices, supply chain disruptions, and lack of funding lowered spending on more efficient buildings, low-carbon equipment, and vehicle technologies. Although the energy intensity improved across the region prior to the pandemic, the rate of improvement slowed noticeably during the pandemic, by 0.8%–2.0% in 2020 (Susantono et al., 2021).

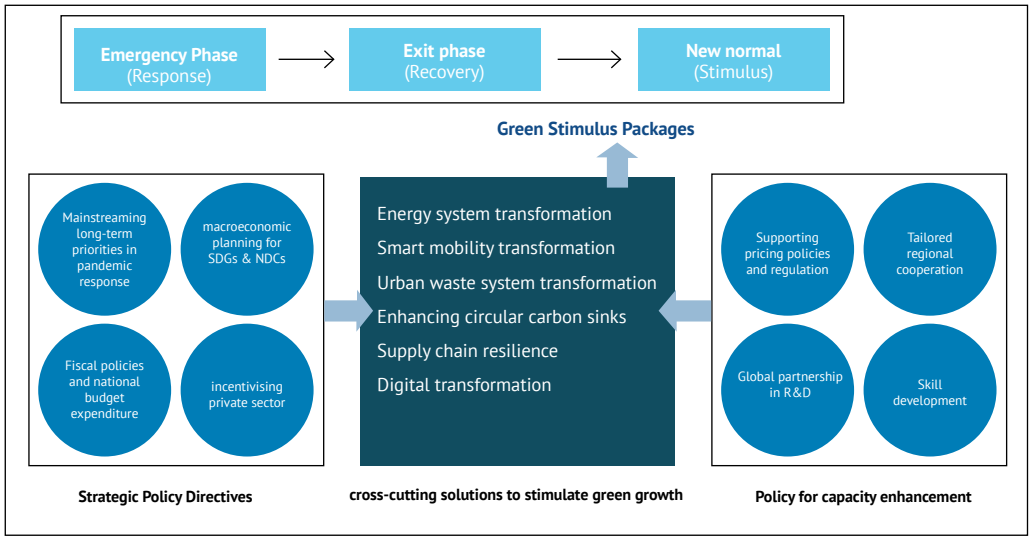
On the social development front, COVID-19 has hit the poor the hardest and worsened inequality. The number of people living in poverty in developing countries in the region is estimated to have increased for the first time in 20 years, and as many as 40 million more people could fall below the poverty line if the pandemic is not contained during 2021. It is alarming to note the loss of 81 million jobs in Asia, which is considered as a dynamic and vibrant region (ILO, 2020).

Concerning climate change, the recently released Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2021) clearly established the GHG-caused climate changes. The report warns that the planet is irrevocably heading towards warming by 1.5°C over pre-industrial times in the next 2 decades, and that global GHG emissions need to fall by about 45% from 2010 levels by 2030, reaching net zero around 2050. For this to happen, the world requires urgent, rapid, and far-reaching transitions in energy, industry, buildings, transport, land, and cities.

Governments will have to make tough policy choices while closing two gaps – implementation and transformation. Closing implementation gaps involves delivering real progress against established NDC targets, and rapidly improving and strengthening the implementation capacity to deliver on more ambitious targets. This is what is needed in view of the pressing short- and long-term concerns of climate change, inequality, and recovery. Closing implementation gaps is tightly connected to closing the transformation gaps, which is required to redesign the economic systems at a more fundamental level by delivering innovative low-carbon products and services, changing financial markets, and altering governance models.

As the pandemic is contained, AMS will need to focus on the ACRF to stem the economic impacts. As they do, it will be vitally important to help them build the foundation for a more resilient, sustainable, and prosperous future. The quality, content, and strength of the stimulus investments will determine sustainable development outcomes for decades to come. As shown in Figure 6.2, action across six revolutionary areas could deliver the transformation needed: (i) energy system transformation, (ii) smart mobility transformation, (iii) transformation of urban waste systems, (iv) enhancing circular carbon sinks, (iv) supply chain resilience, and (vi) digital transformation.

Figure 6.2 Outlook for Integrating Long-Term Low-Carbon Green Growth Objectives in the Pandemic Recovery and Stimulus Packages



NDC = nationally determined contribution, R&D = research and development, SDG = Sustainable Development Goal.

Source: ERIA Study Team.

Investments in these six areas in the recovery and new normal phases of the pandemic crisis will maximise co-benefits in at least three major ways: (i) boosting demand; (ii) creating quality jobs across the earnings spectrum; and (iii) maximising emission abatement, which requires continued education and specialised skills training.

However, addressing the implementation gaps requires new policy directives on public budgeting, enhancing financial systems, and realigning climate objectives with a whole economy approach. Developing countries and emerging markets have a unique opportunity, but require policies that enhance the capacity and capability of institutions including local governments. While there is encouraging momentum to drive systemic change in the financial system towards environmental, social, and governance (ESG) investments and corporate reporting on ESG metrics, governments and the private sector must continue to work together to create better climate-related risk mitigants and investment enablers.

Investments will need to be fast in scaling up, labour-intensive in the short run, and have high economic and environmental benefits in the long run. A key challenge will be the cost of the preparatory works for these new initiatives during the economic recovery phase. The low-carbon infrastructure initiatives may be more complex interventions from the perspective of inter-ministerial coordination and cooperation. Securing these immediate investments requires quality human resources – engineers, legal or contracting experts, and other international advisory services – whose cost may exceed the available budget resources. To overcome this, grant-based resources from bilateral or international financial institutions or global green funds could be helpful.

Aligning short-term stimulus measures with long-term sustainability goals will involve trade-offs. In countries with inadequate or less ambitious climate mitigation targets and financing policies, new short-term investments are likely to reinforce unsustainable trajectories. Almost all ASEAN and East Asia countries entered the pandemic emergency phase producing significant carbon emissions, and air and water pollution. Many countries also lack sectoral targets to absorb the targeted technology interventions. As a result, the recovery packages announced during the exit phase risk reinforcing the status quo, which is significantly tilted towards negative environmental outcomes, thus amplifying climate risks in the medium term. However, challenges common to both developed and developing countries include the required behavioural changes by households and the affordability of new low-carbon technologies. For developing countries, stimulus packages should have balanced implementation of climate change adaptation and emission reduction measures, while improving economic growth and poverty reduction.

To date, low-carbon green growth research and policy actions have been mainly taken in high- and middle-income countries. However, low-carbon green growth could be an opportunity for low-income countries to leapfrog by becoming part of innovation networks at the regional level. Nevertheless, local low-carbon green growth research needs to be better tailored to the economic structures of the countries involved.

Future growth in lower-income countries is often heavily agriculture-based initially and can be made strongly pro-poor and low-carbon. Forestry has been a major source of income for some low-income countries, and, given the great importance of forests as a carbon sink, the potential value of avoided deforestation and reforestation could be a significant source of finance for those countries through mechanisms such as the carbon offset mechanism and the Reducing Emissions from Deforestation and forest Degradation (REDD+) programme, although considerable progress still needs to be made in developing these international mechanisms. For example, there is an urgent need for Indonesia, Malaysia, and Myanmar to stop losing a large area of forest cover.

In middle-income economies, policies for pro-poor green growth can be devised. Government revenues from low-carbon industries could be distributed to pro-poor sectors, such as agriculture, health, and education; and to support skills development in sectors that are crucial for the poor, such as agriculture and forestry. This would also provide opportunities to involve isolated communities in decision-making and share profits on a local level, such as through rural electrification with renewable energy.

6. Recommendations

Developing ASEAN and East Asia must be at the centre of the global agenda on low-carbon and green growth in the post-pandemic era. At the continental level, Asia has much at stake in the global fight against climate change – the region is the most populous, has had high economic growth and a rising share of global emissions, and is the most vulnerable to looming climate risks.

This book makes two important observations. First, developing countries and emerging economies – ASEAN, China, and India – as well as advanced countries are already moving towards a low-carbon transition, but not fast enough and still a long way from the Paris Agreement goals. Second, it is cheaper to mitigate emissions now than paying for climate damage and tipping points. Furthermore, the post-pandemic recovery presents a golden opportunity to step up such aggressive efforts.

This book calls for a more broad-based approach with focused efforts to meet climate mitigation targets, as expressed in the NDCs by 2030 and the net zero economy by 2050; and to aim at achieving the peaks as soon as possible. In terms of the transition from the pandemic response to the post-pandemic recovery, it is too early to judge the efficacy of many of the recovery packages as the pandemic is not over. However, it is imperative to align the incentives and mandates of all public institutions with low-carbon green growth objectives. A focused and critical assessment of initial policy actions offers lessons to speed up stimulus packages to ensure an effective response. What has emerged from the cross-country review is that isolated or sector-focused policies will not be sufficient for the switch to low-carbon, inclusive, and resilient growth.

Moving towards longer-term sustainable development goals requires structural changes and innovative approaches. This book highlights the level of effort made before and during the pandemic. Much more effort is urgently called for from the developing and emerging economies of Asia. The countries considered in this book are most dependent on carbon-intensive sectors for their economic growth, and will become the principal sources of future emissions if hard regulatory and tax reforms not implemented now. The next-generation recovery packages could be designed to upscale low-carbon investments to avoid locking in emission-intensive infrastructure, as Asia's energy demand is surging again. While the transition to a net zero economy offers fertile ground for innovation, governments must establish regulatory certainty and incentives for the market-based approaches needed (e.g. carbon pricing) to make the required, often long-term and risky, investments by the private sector. The analysis of the Sixth Assessment Report of the IPCC Working Group 1 (IPCC, 2021) showed that even if net zero emission targets are reached, global warming will continue to increase for the next 50 years because GHG emissions are cumulative. The implication for the developing countries of Asia is that as a major bloc of the global economy, they need to make more substantial efforts to cut emissions.

The book's analysis points out that for developing Asia in general and ASEAN in particular, resource-efficient, low-carbon green growth is not only imperative – it is also feasible and attractive. This is elaborated in the following 10 key messages.

1. Developing and emerging economies in the region are already acting on the transition towards a low-carbon economy in a progressive way.

Close examination of carbon emission profiles and policy actions help illustrate how, despite having very low per capita GHG emissions, many

developing and emerging economies of ASEAN and East Asia are making efforts towards substantial reductions in carbon emissions, resource use, and energy consumption against a business-as-usual trajectory.

From a climate change mitigation perspective, countries are keenly aware of the opportunities associated with low-carbon green growth and the risks of being locked into high-carbon infrastructure. Decoupling economic growth from carbon emissions is increasingly a policy goal being prioritised for national benefit rather than as a result of international pressure or concern.

Importantly, from the perspective of many low- and middle-income countries, the assessment shows that low-carbon green development can support a range of other co-benefit policy goals, including local environmental protection, poverty alleviation, energy security, economic competitiveness, the development of new industries, employment creation, investment in knowledge and innovation, and health benefits from lower air pollution. This combination of reasons helps explain the strong interest from many developing countries in low-carbon growth trajectories.

2.Stronger transformative policy actions are required for achieving low global warming levels.

The current NDC targets, incremental actions, and trajectory of each country are designed in the national context when considered against the respective country's baseline – but they are not ambitious enough. None would lead to the realisation of a low-carbon development pathway consistent with emissions of 1.5°C climate stabilisations targets and a net zero future by 2050. The overall picture is that GHG emissions are still growing – reflecting rapid increases in GDP and per capita income growth, and the associated demand for energy, transport, and natural resources consumption.

Furthermore, the lack of substantial decoupling of emissions in the energy and transport sectors, combined with a lack of effective sectoral technology road maps, means that some countries will be in high emission growth in the short term and that the region will use up the global emissions 'budget' at an alarming rate. For countries in the region to adopt even more ambitious abatement targets, it will require new approaches such as embracing the concept of the circular carbon economy; supporting the development of new technologies such as hydrogen, CCUS, and electric vehicles; and reducing the cost of existing clean energy and energy efficiency technologies.

All countries will need to explore more radical approaches to economic development, including more holistic waste management, conservation of forests, stricter codes for new buildings, more aggressive targets for the tourism sector, large-scale low-carbon resilient interventions along supply chains, and the pricing of the environmental externalities of fossil fuel production and consumption.

3.Low-carbon green growth planning can be further mainstreamed into national development plans.

The country assessments of policies and practices have demonstrated that it is possible to integrate low-carbon development objectives into sectoral plans, and across sectors – rather than treating low-carbon green growth

as an add-on to be solved through stand-alone climate policies and energy investment projects. Precisely because climate change and the COVID-19 pandemic are economy-wide challenges, an integrated approach as part of the economic recovery could help to build bridges between different parts of government, and the long-term perspective required could provide a useful challenge to the status quo.

Making low-carbon green growth a nationwide issue to be tackled by national development plans, rather than the preserve of any particular line ministry, was a key lesson before the pandemic, and one that could have lasting consequences in terms of government coordination on climate change, energy, economic, and fiscal policy at the national level. Central to this was the strong priority given to intergovernmental and stakeholder engagement in setting new targets for NDCs, greening the stimulus packages, and supporting their immediate implementation. This is important in building consensus around hard decisions on carbon pricing and the introduction of other market-based instruments.

4.The potential to accelerate the low-carbon transition as part of the COVID-19 pandemic recovery is high.

The region's leading economies have been implementing economic stimulus packages that inject several billion dollars directly into sectors that have a large and lasting impact on carbon emissions – agriculture, industry, energy, transport, and waste. There is potential for large-scale reductions in GHG emissions in these sectors, a significant percentage of which could come at a negative cost, meaning they will actually contribute to the economic recovery and job creation. This includes measures such as increasing cogeneration, improving vehicle efficiency, and reducing electricity system losses. However, even win-win investments frequently face hurdles that require a concerted policy response. Nevertheless, there is a lack of decisive actions to use the stimulus to take specific sectoral action in many countries.

Public health systems in many areas of the region are weak and vulnerable, and cannot stand the stress test of health emergencies. A major overhaul of health systems – both infrastructure investments and management systems strengthening – needs to be programmed. This is an important opportunity to adopt low- and/or net zero carbon approaches to plan, design, and implement the health system improvement by engaging stakeholders of different disciplines.

There is clearly a leadership role to be played by central governments and the private sector through strong technological and innovation policies that can help attract the required investments in low-carbon solutions during the pandemic. Transitioning to a zero-carbon future at the regional level is a process that needs new targets to be set, strong institutional mechanisms, and political commitment. The ACRF offers a promising blueprint for targeted spending on low-carbon resilient infrastructure. Implementing the options identified as part of the ACRF would send a strong a signal to investors on ambitious action towards net zero and for the city governments to build the capacity, including innovation, needed to harness the potential of digital technologies.

5. Financing new infrastructure investments must be transformative and well prioritised towards a net zero future.

With a few exceptions, the overall response of countries during the pandemic economic recovery demonstrates little prioritisation of low-carbon infrastructure planning and a low level of willingness to act now. Outcomes so far range from minor policy shifts to transformative technology interventions that support new investments. However, where low-carbon resilient planning has been successfully mainstreamed into development policymaking or economic recovery packages, more longer-term outcomes can be expected. Although there are many low or negative cost opportunities to reduce or avoid GHG emissions, there is still probably a net cost to adopting a low-carbon pathway, at least in the short to medium term, even if this is relatively small in comparison to the economic growth that can be expected over the same period with the introduction of new low-carbon technologies. The scale of funding required necessitates the use of a wide range of financing mechanisms, including incentives where appropriate, to direct investment into low-carbon technology development, early-stage start-ups, and R&D supporting innovation; and to stimulate private sector investment. International climate finance will also be important, but prioritisation will be required because of its limitations in the face of such high demand. Increased funding for low-carbon circular economy projects also require transformative policy changes such as carbon pricing and emission trading systems, as they are likely to generate new revenue.

6.Mainstreaming low-carbon green growth into national development programmes and city planning needs new forecasting tools and capacity building.

Not all countries and cities in the region have good quality data and modelling capacity to visualise different policy pathways towards a net zero future, along with the net costs and benefits. To be effective in this context, scenario-modelling tools available at the global level need to be open access so that the assumptions can be customised to local conditions. In many low-income countries, appropriate planning tools do not exist, leading policymakers to make a number of suboptimal decisions. It seems likely that, in a world where substantial action on low-carbon technology transfer and investments is partially funded through international financial mechanisms linked to the United Nations Framework Convention on Climate Change (UNFCCC) process, transparency in terms of data acquisition will also be crucial for the monitoring, reporting, and verification of actions undertaken at the country level. Academia, officials, and the corporate sector involved in low-carbon/zero emission planning activities can help to continue this effort by improving and consolidating the tools that are available; enhancing the capacity of countries to collect, verify, and incorporate useful data; and ensuring that best practice is shared. Finally, there is increasing interest in integrating resilience considerations into future work, potentially leading to low-carbon, circular resilient economic growth. Many energy, transport, and agricultural systems are sensitive to external shocks such as financial crisis, pandemic, and climate impacts. As many of the low-carbon infrastructure

investments and decarbonisation of fossil fuel industries are long-term in nature, research and capacity building is needed for progressive target setting and sharing the early experiences and best practices. There are potential synergies in considering alternate development pathways that deliver low-carbon, circular economy, and resilience benefits.

7. Economy-wide low-carbon innovation and digital technologies hold the key for developing Asia to decouple future economic growth from its resource use in the post-pandemic era.

Incremental improvement is not enough for the developing countries of ASEAN and East Asia. Existing and breakthrough technologies must be innovatively applied to realise the full potential of low-carbon green growth. Asia needs to invest more in innovation now if it is to be a low-carbon leader in the future. The COVID-19 pandemic has shortened the time needed for the Fourth Industrial Revolution, which has fundamentally altered the ways in which production is done, people work, and consumers are linked. The application of digital technologies is promising for reducing carbon intensity and altering future energy demand in the post-COVID-19 era. Education and training are as essential as R&D. Low-carbon innovations and the integration of digital technologies must support and reinforce the inclusive growth imperative. The analysis presented in this book points out that this can be achieved through regional cooperation. Moving towards interdependent low-carbon green growth policies will bring higher costs to some sectors, isolated regions, and weaker groups. Policy reforms – technological or fiscal – should ensure compensation for the vulnerable. Fiscal transfers, sector-specific approaches, and job generation should be part of the next-generation stimulus packages.

8. Regional cooperation will make it easier and less costly to implement the national action agenda and pursue net zero targets.

ASEAN and East Asia leaders have already reached a high level of consensus on regional economic integration and the importance of tackling climate change. This can be done either through market-based mechanisms to encourage low-carbon trade and investment flows between countries, or through non-market mechanisms such as joint region-wide initiatives. Regional cooperation architecture arrangements such as the ACRF, ASEAN Economic Community Blueprint, and Regional Comprehensive Economic Partnership promise vast domestic markets that provide excellent conditions for the formation of new green hydrogen supply chains and new green industries. Effective cost reductions through economies of scale in some Asian countries would help others to overcome the cost barriers for large-scale deployment if free trade in low-carbon technology goods and services is realised. Enhancing cross-border energy through grid interconnectivity could lead to a very different cost-efficient outcome in terms of renewable energy integration and the mobilisation of private finance. Countries will benefit from policies such as energy efficiency standards, labels, and certification for low-carbon goods only if non-tariff barriers in their trade regimes are removed. Scale, combined with high investment levels and the ability to implement decisions quickly based on the best available knowledge, means that many

opportunities can be exploited ahead of competitors. Stronger incentives and price signals are needed to unlock the potential for emission reductions by industries and households. Given the advantage of its large market, ability to attract foreign investments, and abundant human capital, this region could quickly acquire, adapt, and master new technologies when regional level low-carbon innovation centres are established.

9.Leveraging and catalysing the private sector requires special policy attention.

The private sector will be a critical partner in delivering technology and finance at a scale required to meet the Paris Agreement targets or net zero emissions. Multinational companies can promote low-carbon behaviour across the supply chains that they manage; investors and private commercial banks are the main sources of investment for low-carbon infrastructure; and businesses and entrepreneurs provide the skills and knowledge leading to innovation in energy use and resource efficiency. Investors are increasingly aligned in greening their investments and reducing their ESG risks. For the private sector, the Paris Agreement has been referred to as a purchase order from 2030 for joint actions with governments. As the major private sector actors are bound by fiduciary duty to maximise the shareholder value of current assets, the existing regulatory pathways could slow the emergence and deployment of low-carbon energy technologies at the scale required. However, policymakers could work on at least three regulatory factors that could unleash the potential of the private sector towards a low-carbon transition. First, private financial institutions operate in a market environment where the prices for the commodity they replace (e.g. fossil fuels) are volatile and where the prices for the externalities they produce (e.g. emissions) are still very low. Markets for high-carbon based inputs will eventually be subject to downward pressure. Second, private investors in a low-carbon economy operate a capital-intensive business model because the foundational capital stocks are still being established. As a result, pioneering technology developers need to balance intensely competing demands for capital within firms. Third, low-carbon technology providers are often called on to provide cost-effective innovative solutions with long-lived assets that are subject to swings in commodity prices due to fiscal and public finance subsidies to high-carbon investments. Therefore, seizing the opportunities offered by the private sector will very much depend on efforts to design risk mitigants and investment enhancers. This will require policy interventions to consider the range of available channels to change the preferences, structure, and risk appetite of private investment.

In bringing forth private financing, central banks and regulators in the region will have a much more significant part to play than accorded at present. Central banks and regulators should be encouraging financial services firms to incorporate climate risk mitigation in their risk management practices and further fund the green finance market. This would be an additional push towards the low-carbon outcomes for which countries are aiming. Central banks and regulators should introduce climate risk mitigation measures as part of their business-as-usual regulation of the sector. Detailed

measures should include elements such as climate risk stress testing (macro and micro); climate risk based supervisory reviews, including assessing the quality of climate-based risk management; helping the development of sustainable finance linked bonds and instruments; and mandating that a proportion of the assets and reserves placed at the central bank include green finance instruments. In the medium term, they should also consider including capital add-ons for financial institutions that have exposure to fossil fuel related industries beyond a certain level or which have not incorporated green measures and risk management policies and practices to the degree stipulated by the central bank.

10. The journey towards low-carbon green growth during the pandemic recovery phase and post-pandemic new normal phase remains challenging; and continued efforts are needed to review and assess progress and give guidance on further actions.

The pandemic is far from over, but the impacts will have lasting effects on economic development and the fiscal space available for enhancing low-carbon investment. Many countries are now considering new NDC targets or putting together new collective targets for the region at COP 26. These – along with new emerging paradigms such as the circular economy, cool earth, and green new deal – could be best seen as part of a modular but continuous progressive process towards a net zero economy and investment plans that outline common but differentiated country responsibilities. With the rich diversity of country experiences comes the opportunity for continued sharing of and learning about policy insights and good practices. All this calls for an institutionalised mechanism at the regional level. Now is the time for the emerging markets and developing countries of Asia to move beyond independent energy transition policies to interdependent regional low-carbon green growth policies for the benefit of all. Although many national and subregional initiatives are in place and being contemplated, it is useful to summarise these, as shown in Table 6.3, and monitor for new policy innovations. Successful implementation requires effective knowledge-sharing programmes covering good policy practices, to multiply the number of competent decision makers in government, business, and civil society.

Table 6.3 Sector-Specific Policy Actions for Achieving Low-Carbon Green Growth in the Developing and Emerging Economies of ASEAN and East Asia

Near-term policies	Medium- to long-term targets
Energy	
Seek cost-effective, market-based solutions for the uptake of existing technologies - Invest in reducing the cost of existing low-carbon energy-efficient technologies such as solar, wind, and bioenergy - Continue to focus on lowering energy intensity and improving carbon productivity by changing the energy mix - Gradually remove energy sector (fuel) subsidies and introduce appropriate energy pricing through mechanisms such as feed-in tariffs and renewable portfolio standards - Progressively amend laws to scale up renewable energy in a competitive market dominated by fossil fuels	**Develop an efficient and competitive energy sector with innovative technologies** - Deploy new technologies such as carbon capture and storage and geothermal, using sector-wide approaches - Aim for an energy mix in which renewable energy meets nearly one-third of primary energy demand - Emerging Asia becomes a global showcase and leader in renewable energy, with more of the population having access to clean and green energy - Implement cap-and-trade systems for the utilities sectors
Energy efficiency	
Use a combination of regulations and market-based policy instruments to improve energy efficiency - Launch top-runner programmes for industrial technologies and electrical appliances - Expand carbon reduction labelling programmes for high-impact sectors - Develop a focused and well-packaged regulatory system for SMEs that integrates efficiency standards and targets by assisting with compliance mechanisms, including providing funds and matching grants with goals - Develop sectoral guidelines and training to achieve energy efficiency standards	**Deepen sector-wide reforms to achieve efficient use of energy derived from non-renewable energy resources** - Two-thirds of the manufacturers meet and use the top-runner standards - Strengthen the instruments of an integrated economic and environmental assessment programme by drawing on international practices adjusted to the context of emerging Asia - Provide training and capacity building to SMEs on new business opportunities - Evaluate, expand, and strengthen the bank guarantee system
Transport	
Develop new regulations, policies, and financing mechanisms to alter current fleet growth patterns - Introduce new performance-based targets and incentive systems (such as tax exemption for low-carbon vehicles) for the transport sector - Progressively improve the fuel efficiency and pollution standards for passenger cars and light-duty vehicles - Introduce retail sales of biofuels such as ethanol - Develop a consistent framework for integrating externalities, such as local air pollution, and use that to promote efficient and seamless multimodal transport systems	**Remove market distortions** - Provide subsidies to increase investments and reduce the production cost in manufacturing hybrid vehicles - The entire vehicle fleet must meet standards set at a regional level - Increase the number of retail service stations that sell hybrid fuels to 100% nationwide - Achieve socioeconomic objectives through connectivity, strategic development of transport corridors, and green transport options
Agriculture and forestry	
Identify and implement the immediate actions needed to restore carbon sinks - Introduce new market-based incentives for restoring degraded forests and providing rural employment - Double the inspection capacity, and tighten illegal encroachment and forest logging - Scale up pilot schemes for carbon sequestration and input (water and fertiliser) saving technologies - Extend awareness of market-based instruments to isolated communities/poor farmers	**Bring all major ecosystems under sound management to significantly reduce the cost of climate change mitigation** - Establish a fully functioning REDD+ systems - Halt deforestation and land degradation 100% - Ensure that sectoral mitigation opportunities are used to their full potential - Establish fully functioning carbon markets at the national and regional level
City-level measures	
Scale up coordinated policies for land use planning, urban finance, and city governance - Change regulations and standards in buildings that lead to inefficient use of energy and materials - Pilot-test market-based mechanisms, such as carbon pricing and cap-and-trade, to encourage efficient use of public resources - Encourage and provide advice on low-carbon lifestyle choices and mentoring programmes for neighbourhoods - Remove barriers to mass transit networks, improving the inter-modality of transport and urban freight solutions, etc.	**Create carbon-efficient, and more habitable, smart cities** - Achieve low-carbon status through improving overall resource use efficiency, benchmarked internationally - Create fully functioning carbon markets in all megacities and municipalities - Integrate technologies and business models for local wealth creation - Roll out performance indicators for all regional governments

Near-term policies	Medium- to long-term targets
Industry and trade	
Scale up and accelerate innovation - Integrate low-carbon targets and objectives into the state industrial policy - Link industrial promotion incentives and innovations to carbon performance - Reduce the tariff rate for low-carbon environmental goods and services, and strengthen intellectual property regimes - Provide information and training on existing and emerging technologies, management practices, and related business opportunities	**Create competitive markets focused on high value added, low-carbon products and services** - Industrial competitiveness reaches that of current advanced economies - Global economic growth is driven by innovations implemented in Asia - Asian economies employ world-class technologies and business practices in an open competitive market - Strengthen social capital for eco-restructuring of Asian industries
Fiscal	
Identify and implement immediate actions needed to introduce market-based instruments - Introduce carbon taxes or auction emission quotas in a broad-based, uniform cap-and-trade system - Introduce budgetary reforms with a gradual increase in energy taxes and the elimination of fuel subsidies - Introduce performance-based tax incentive systems for achieving sectoral emission targets - Explore innovative financing instruments and accelerate R&D support for future industries through the climate change agenda - Improve efficiency, transparency, and accountability in the financial sector, by including rating programmes and MRV systems linked to credit lines	**Develop revenue-neutral budgets for a carbon-neutral economy** - Reduce social security contributions and corporate income tax to compensate in part for raising more energy tax and quota auction receipts revenue - Introduce budgetary reforms to mobilise private capital - Integrate capital, technology, goods, and labour markets

MRV = monitoring, reporting, and verification; R&D = research and development; REDD+ = Reducing Emissions from Deforestation and forest Degradation; SMEs = small and medium-sized enterprises.

Source: ERIA Study Team.

This book analysed policy contributions and recommended shifts in public policy choices that will be required to avoid dangerous climate change. Based on current trends, national policies and new measures need to be much more ambitious to provoke a major economic transition. Taking collective action at the regional level would be in the political interest of all governments for these reasons:

1. A more direct region-wide push on energy efficiency, technology, investment, and deforestation is essential to add credibility to the NDC targets and national aspiration for a net zero economy without losing economic competitiveness.
2. Given the scale of investment required and the recent deterioration of public finances in many countries, only coordinated policies, price signals such as carbon pricing, and regional economic integration mechanisms could leverage private sector capital.
3. Since it will take time to agree on the details of a net zero economy road map, it is important to press ahead with concrete actions so that such a strong regional agreement can provide the international community with an insurance policy.

Near-Term Recommendations for Asian Countries to Pursue Collectively

Asia has much at stake in the fight against climate change, as it is the world's most populous region and a rapidly growing continent with a rising share of global GHG emissions, with certain subregional areas amongst the most vulnerable to looming climate risks. Nowhere are production, resource consumption, and emissions growing faster than in developing Asia. High-priority actions have already proven effective in several parts of Asia and could be scaled up at a regional level in the post-pandemic sustainable growth phase. Collectively, Asia must be at the centre of the global agenda on low-carbon green growth.

A decision to act together immediately on the following seven common key issues listed in Box 6.1 would transform Asia into a test bed and role model for the world.

Box 6.1 Regional-Level Actions for Accelerating Low-Carbon Green Growth in Asia

Bilateral and mega FTAs

- Examine trade policies for their compatibility with climate goals. Bring clarity to vague notations of environmental sustainability in non-binding clauses on completed mega FTAs such as the RCEP, and start negotiating new agreements to curb the proliferation of market-distorting unilateral fuel subsidies and carbon border tax adjustments.
- Make future bilateral trade agreements more climate friendly, by building on the best practices seen in global FTAs, particularly in removing the non-tariff barriers attached to low-carbon goods and services.

Regional energy trade and investments

- Accelerate regional partnership towards enhanced cross-border energy trade that includes greater grid connectivity programmes; developing a global supply chain for low-carbon hydrogen fuel and electric vehicles; setting new targets for the integration of renewables; feed-in tariffs and renewable energy portfolio standards; and capacity building for decarbonising fossil fuel industries, including establishing standards for CCUS technologies.
- Promote international partnership to work towards applicable national efficiency standards, developed and applied to a limited but critical range of energy-intensive industrial and consumer goods, and buildings. Governments may also develop carbon reduction labelling for electrical appliances and industrial manufacturing processes, building on work under way according to a mutually agreed timetable.

Regional carbon markets

- Promote the linkage of national and city-level emission trading schemes, which will require the setting up of a framework to prepare the ground for the linkage of carbon trade schemes,

including guiding principles for MRV systems.

- Foster learning between countries on different stages of considering and implementing carbon pricing schemes by creating a platform for dialogue and continued experience sharing.

Regional innovation fund

- Develop an ASEAN Plus innovation fund that could scale up public and private investment in R&D of next-generation low-carbon solutions – such as smart grids, smart cities, and smart agriculture – which integrate digital technologies for improved service delivery.
- Establish a network of national innovation hubs and incubation centres to help SMEs to accelerate the uptake of low-carbon technology. Provide financial support to start-ups to capture digital economy opportunities and help SMEs to meet the climate targets.

Empowering cities

- Redesign the institutional configuration, such as the ASEAN Smart Cities Network, to integrate energy, water, transport, and waste management strategies; and seize the immediate development benefits of low-emission resilient planning.
- Build low-carbon project finance capacity in cites to efficiently finance and deliver complex low-carbon circular economy projects.

Financial systems

- In a regionally coordinated way, diversify the government revenue stream in support of low-carbon green growth and align the budgetary incentives to discourage investment in carbon-intensive activities. Incentivise the disclosure of climate-related risks and increase the transparency in financial markets.
- Support the network of central banks and stock exchanges in developing a taxonomy for green finance, with appropriate green instruments that will include bonds, loans, and credit guarantees. Mandate them to better assess and manage climate-related risk that could threaten the financial stability of the system during the recovery and post-pandemic era.

ASEAN Secretariat

- Strengthen the ASEAN Secretariat with greater human and financial resources to monitor the implementation of ACRF strategies with greater real-time monitoring capacities.
- Shift the focus of long-term blueprints – such as the ASEAN Economic Community, ASEAN Socio Cultural Community, and ASEAN Agreement on Disaster Management and Emergency Response – that deal with climate change issues into a rolling short-term implementation programme

that can carefully factor in current emission trajectories, existing development gaps, and the impact of the pandemic, as well as the effectiveness of stimulus packages in supporting the green recovery.

ACRF = ASEAN Comprehensive Recovery Framework; ASEAN = Association of Southeast Asian Nations; CCUS = carbon capture, utilisation, and storage; FTA = free trade agreement; MRV = monitoring, reporting, and verification; R&D = research and development, RCEP = Regional Comprehensive Economic Partnership; SMEs = small and medium-sized enterprises.

Source: ERIA study team.

It is indisputable that the world has turned its full attention towards stopping the spread of COVID-19, which raises an important policy question about the nexus between COVID-19, economic recovery, and climate change. A common perception in a people-centred recovery is that COVID-19 could delay the climate agenda due to the increase in health expenditure and the decline in international oil prices. Therefore, the relevant question is what would happen to the fight against climate change once the immediate danger to public health is eliminated. The analyses in the book have critically highlighted the urgent need for accelerating the reduction in GHG emissions, which also has a direct bearing on human health.

The lessons that global citizens have learnt from the COVID-19 pandemic may lead them to demand and expect similar urgency and action from their respective governments to achieve a net zero future. Given the financial and infrastructural rigidities that exist in many emerging markets and developing countries, this change requires urgent strengthening of regional cooperation to move harmoniously towards net zero targets.