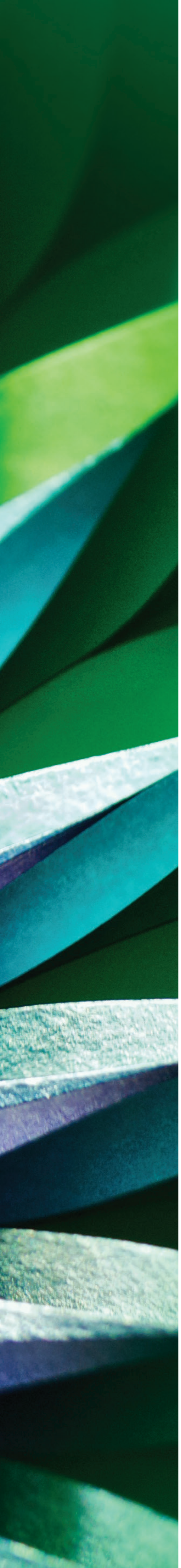

BACKGROUND NOTE

Carbon Pricing

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CARBON PRICING

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Background

The Asia and Pacific region is driving global economic growth. However, this growth has been enabled to a large extent by utilizing fossil fuels as a key input to production. As a result, the region has also become the largest source of greenhouse-gas (GHG) emissions, adversely affecting the climate, which is a global public good. Asia and the Pacific generated about 51% of global carbon dioxide (CO_2) emissions in 2018. The developing member countries of the Asian Development Bank (ADB) accounted for about 43% of global emissions the same year.[1]

Global efforts to avert climate change by avoiding greenhouse-gas emissions have been gaining momentum since the Paris Agreement was adopted in 2015. Nonetheless, the current level of ambition reflected in the nationally determined contributions (NDCs) of the 189 countries that have ratified the Paris Agreement is insufficient to meet the goal of limiting the rise in surface global temperature to well below 2°C by 2100 and pursuing more ambitious efforts to limit it to 1.5°C above pre-industrial temperatures: there is a huge emissions gap. The United Nations Environment Programme (UNEP) estimates that countries need to raise ambition threefold to achieve the 2°C goal, or fivefold to achieve the 1.5°C goal.[2]

The coronavirus disease (COVID-19) pandemic has caused a worldwide economic downturn, resulting in a decrease in GHG emissions globally for the first time in many years.[3] While this temporary drop in GHG emissions is positive, the threat of climate change will persist as countries embark on the path to economic recovery from the pandemic. According to the International Energy Agency, economic recovery without clean energy policies has already resulted in global energy-related CO_2 emissions to be 2% higher in December 2020 than in December 2019 (pre–

[1] Global Carbon Atlas. 2019. *CO_2 Emissions*. http://www.globalcarbonatlas.org/en/CO2-emissions (accessed 9 December 2019).
[2] UNEP 2019.
[3] This is consistent with empirical evidence. For example, Doda (2014) suggests emissions are pro-cyclical, or positively correlated with gross domestic product over the business cycle.

COVID-19 pandemic).[4] Although new estimates suggest that global warming by 2100 could be as low as 2.1°C as a result of the recent wave of establishing national net-zero targets, more ambitious commitments, backed by long-term strategies, are necessary to close the emissions gap. It is critical that countries make informed choices in designing their COVID-19 recovery packages, to avoid adopting interventions that favor high-carbon economic activities. Current research and lessons from the global financial crisis of 2008 suggest that supporting carbon-intensive economic activity can increase the vulnerability of economies to future risks and create lock-in to high-carbon pathways that is very expensive to reverse.[5]

Carbon pricing is one of the most cost-effective ways to promote decarbonization, helping countries achieve both economic and environmental objectives. Carbon pricing can also generate much-needed public revenue that can be used to stimulate investment in low-carbon technologies and processes, thereby promoting sustainable growth.[6]

Carbon Pricing

Economists recognize that climate change is a market failure. It imposes costs as well as risks for future generations.[7] This market failure exists because the negative impacts of emitting GHGs are not accounted for when generating economic activity, i.e., they are not reflected in the prices of goods and services. Hence, there is no accountability for the negative impacts of adding GHGs to the atmosphere. GHG emissions are "external" to the market. Further, allowing the free use of the climate as an input to economic activity perpetuates the linkage between fossil fuel consumption and economic growth. Putting a price on GHG emissions effectively "internalizes" the cost of climate change, thereby correcting this market failure and enabling decarbonization of economic growth.

Carbon pricing is an integral element of the broader international climate policy architecture and

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[4] International Energy Agency. 2021. *Press Release. After steep drop in early 2020, global carbon dioxide emissions have rebounded strongly.* https://www.iea.org/news/after-steep-drop-in-early-2020-global-carbon-dioxide-emissions-have-rebounded-strongly.

[5] S.F. Burke and A. Bowen. 2020. *Policy brief. Pricing carbon during the economic recovery from the COVID-19 pandemic*. London.

[6] K. Asakawa, K. Kimoto, S. Takeda, and T. H. Arimura. 2020. *Double Dividend of the Carbon Tax in Japan: Can We Increase Public Support for Carbon Pricing? In Carbon Pricing in Japan*. Singapore: Springer (pp. 235-255).

[7] N. Stern. 2008. The Economics of Climate Change. *The American Economic Review, 98*(2), pp 1–37. http://www.jstor.org/stable/29729990 (accessed 29 October 2020).

can be adopted domestically in tandem with other policies, such as removing fossil fuel subsidies and creating regulatory conditions that promote private sector investment in renewable energy. Carbon pricing policies send a price signal to the market, effectively leveling the playing field between fossil- and renewable-based energy solutions. These price signals can be achieved through carbon taxes, emissions-trading systems (ETS – cap and trade), and international offset mechanisms. Thus, carbon pricing can work either through holding emitters accountable for the impacts of their activities (e.g., through a tax), rewarding those that reduce the emissions of their activities (e.g., through carbon crediting), or by guiding decision making (e.g., through internal shadow pricing).

Carbon pricing provides a clear signal but allows GHG emitters to choose between either reducing their GHG emissions or paying to continue to emit. Thus, carbon pricing creates economic incentives for mitigating climate change in a flexible manner at least-cost for the economy as a whole. However, for carbon pricing to be effective, it is imperative that the market signal adequately internalizes the externalities associated with GHG emissions. When this occurs, carbon pricing can provide much-needed and persistent motivation for companies to adjust their investment decisions and produce, and for consumers to adjust their behavior and purchase lower-carbon goods and services.

Clear and predictable carbon pricing policies in domestic and international markets can also help countries achieve climate targets articulated under their respective NDCs cost effectively. Carbon pricing can mobilize both domestic revenues (through carbon taxes or ETS) and international carbon finance for investments in low-carbon technologies (international offset mechanisms). Robust carbon pricing instruments can be effective tools for achieving an energy transition by accelerating the diffusion of advanced low-carbon technologies, enhancing the deployment of renewable energy technologies, promoting e-mobility, and incentivizing decarbonization. Carbon finance mobilized through any of the bilateral, regional, or international carbon markets can alleviate financial barriers and facilitate, for example, cross-border trade of electricity that increases the share of renewables in the overall electricity supply mix and fosters regional integration.

Carbon Taxes and Cap-and-Trade

The two main types of carbon pricing policy instruments available to governments are ETS and carbon taxes.

- A carbon tax sets a fixed carbon price that creates a cost for emitting, providing an economic incentive to innovate and transition to clean energy and energy-efficient operations. Carbon taxes can effectively modify production and consumption patterns in favor of low-carbon goods and services, while providing a relatively predictable and much-needed public revenue that can be used to further pursue sustainable development.[8] However, the market response to the price signal in the form of emission reductions cannot be determined when adopting the policy.

- A cap-and-trade program typically sets a fixed quantity of emissions allowed from the sector(s) that it regulates (a cap), which has the advantage of predictability in helping countries meet the emission-reduction targets expressed in their NDCs. The market response in the form of a price signal can be influenced by governments through methods used for allocating emissions allowance and the fees charged for non-compliance, but with sufficiently low allowances and a sufficiently high non-compliance fee, the price of emitting is determined primarily by market supply and demand.[9]

In principle, both carbon taxes and cap-and-trade systems can lead to significant emission reductions. However, there are context-related pros and cons of both instruments. National circumstances and the specific design of the instrument is commonly more consequential in determining outcomes than which instrument is applied.[10] Both can also lead to the generation of public revenues. Decisions regarding how to utilize such revenues depend on national policy preferences. While noting that recycling revenues to support citizens can help build greater support

[8] S.F. Burke and A. Bowen. 2020. *Policy brief. Pricing carbon during the economic recovery from the COVID-19 pandemic.* Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy. London.

[9] ADB. 2015. *Emissions Trading Schemes and Their Linking: Challenges and Opportunities in Asia and the Pacific*. Manila.

[10] Robert Stavins. 2019. Carbon Taxes vs Cap and Trade: Theory and Practice. *Discussion Paper* ES 2019-9. Cambridge, Massachusetts: Harvard Project on Climate Agreements (November).

for carbon pricing, it is important that the revenues are used to support activity that is green (footnote 10).

As noted above, from an economic perspective, carbon taxes and cap-and-trade systems operate in a similar manner, but with different outcomes in focus. Carbon taxes set a fixed price, and the market response to that price determines the level of GHG emissions within an economy. Cap-and-trade systems sets a maximum level of GHG emissions within a jurisdiction (the regulated sector of the economy), and the price of staying within that limit is determined by market forces. In the first case, the price is known in advance, but the outcome in terms of emission reductions is not. In the second case, the emission reduction (determined the cap) is known in advance, but the price imposed for achieving it is not. Carbon taxes are normally applied at the national level but can target specific goods or sectors. Cap-and-trade programs can be implemented at regional (such as the European Union ETS), national (such as the Republic of Korea (ROK) ETS), and subnational (such as state-based ETS in the United States) levels. Some also allow the use of emissions credits generated through baseline-and-crediting programs and purchased from entities outside the boundary of the cap-and-trade program.[11]

The use of carbon pricing instruments is gaining momentum with seven carbon pricing initiatives currently being implemented or emerging in the Asia and Pacific region. Kazakhstan, an early mover in the region, launched its ETS in 2013. The ROK launched a national Emissions Trading Scheme (K-ETS) in 2015 (Box 1). In February 2021, the People's Republic of China began the operational phase of its national ETS, building on its experience of successfully piloting carbon markets in eight regions.[12] The ETS regulates more than 2,200 companies from the power sector (including combined heat and power, as well as captive power plants of other sectors), which emit more than 26,000 tCO_2 per year and is estimated to cover approximately 40% of national carbon emissions (footnote 12). Viet Nam is considering an ETS for the steel sector and market-based instruments for the waste sector. Indonesia has also drafted regulations for a pilot ETS. And the

[11] Cap-and-trade systems and baseline-and-crediting mechanisms function differently and are established distinctly from each other, but can also interact. For example, under Phase II of the ROK's ETS (K-ETS), regulated facilities are allowed to use carbon credits generated outside of the country under the Carbon Dioxide Mechanism (CDM) for up to 5% of their compliance obligation, provided that the CDM projects are developed by companies based in the ROK (ADB 2018c).

[12] ICAP. 2021. *China National ETS*. https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=55

Philippines' House of Representatives Committee on Climate Change conditionally approved a cap-and-trade bill in February 2020.[13]

Box 1: Korea Emissions Trading System

The Republic of Korea (ROK) launched East Asia's first nationwide mandatory Emissions Trading Scheme (Korea ETS [K-ETS]) in 2015. Currently, the K-ETS is the second largest after the European Union's Emission Trading System, and covers about more than 68,500 of the country's largest emitters, accounting for almost 73.50% of the ROK's greenhouse gas emissions. The country aims to use the K-ETS to play an essential role in meeting its updated 2030 Nationally Determined Contribution target of a 24.4% reduction from 2017 emissions. In 2020, the average secondary market price for allowances was at around US$27.62 per tCO_2e. 2020 was an important year for climate action in the ROK not just because of the announcement for a Green New Deal and a net-zero target for 2050, but also because of the adoption of key regulations for the third trading phase set to commence from the new trading year in 2021. The share of auctioning increases from 3% to 10% in 2021 for 41 out of 69 eligible industries to participate in auctions, whereas the remaining 28 subsectors receive 100% free allocation.

Sources:
Asian Development Bank. 2018. *The Korea Emissions Trading Scheme: Challenges and Emerging Opportunities*. https://www.adb.org/publications/korea-emissions-trading-scheme
International Carbon Action Partnership. 2020. *Korea Emissions Trading Scheme (KETS)*. https://icapcarbonaction.com/en/ets-map?etsid=47.

There is also an appetite and interest for the introduction of carbon taxes in the region. In 2012, Japan implemented a carbon tax on oil, gas, and coal imports, with the revenues of the tax going towards measures to curb CO_2 emissions.[14] In 2018, Singapore also adopted a carbon pricing legislation to support the adoption of a carbon tax (Box 2). In Singapore, the main argument for the selection of a simple carbon tax over other options was because a carbon tax can achieve the same outcomes as an ETS, while signaling price certainty and balancing administration burden on companies and implementation costs.

[13] https://icapcarbonaction.com/en/ets-map.
[14] Carbon Brief. 2018. *The Carbon Brief Profile: Japan*. https://www.carbonbrief.org/carbon-brief-profile-japan.

Box 2: Singapore's Carbon Tax

Singapore's Carbon Pricing Act No. 23 was adopted in 2018 and served as a basis for implementing an economy-wide carbon tax. The simple design of the carbon tax, which regulates about 50 of the largest emitters that contribute to about 80% of Singapore's greenhouse gas emissions, helps limit the administrative burden of the policy instrument. It started with a carbon tax rate of S$5/t$CO_2$ or about US$3.72/t$CO_2$e in 2019 that will be in place through 2023, when the tax rate will be reviewed. The government intends to increase the tax rate to S$10–S$15 or US$7.43–US$11.15 per ton CO_2 by 2030. Gradually phasing in the system allows businesses to adjust their operations. The government also provides rebates or refunds to help households adjust to the impacts of a carbon tax and avoid negatively impacting the most vulnerable consumers. Therefore, poorer households that consume less electricity see a larger relative share of their utility bills refunded. Finally, in terms of revenue utilization from the carbon tax, revenue from the carbon tax is recycled back to the economy, by providing support to companies to implement energy-efficiency measures.

Source: Singapore National Environment Agency. *Carbon Tax*. https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/climate-change/carbon-tax (accessed 2 February 2021).

Baseline-and-Crediting Mechanisms

Baseline-and-crediting mechanisms are instruments that can be used to create flexibility for an international cap-and-trade system. In an international climate policy regime (such as the Kyoto Protocol or, currently, the Paris Agreement and its NDCs) where there are national quantitative targets that cap emissions, emission-reduction standards can generate fungible emissions credits that can be traded to monetize emission reductions achieved and assist buyers in achieving compliance with their cap. Under baseline-and-crediting mechanisms, entities can invest in mitigation actions and demonstrate that doing so results in fewer emissions than what would most likely have occurred without the investment. Entities that register and confirm such emission reductions are issued carbon credits, or offsets. Whereas carbon taxes and domestic ETS create revenue flows within domestic markets, baseline-and-crediting mechanisms create international

revenue flows. Baseline-and-crediting mechanisms can also be used within a jurisdiction to create flexibility for regulated entities under a carbon tax or cap-and-trade scheme.

The largest and most far-reaching baseline-and-credit mechanism is the Clean Development Mechanism (CDM), which is governed by the United Nations Framework Convention on Climate Change (UNFCCC). The mechanism was designed to provide offsets usable for complying with industrialized country emission targets under the Kyoto Protocol.[15]

The Joint Crediting Mechanism (JCM), initiated by the Government of Japan in 2010, is an example of a baseline-and-crediting mechanism that involves cooperation between Japan and host countries based on bilateral agreements. JCM was developed outside the UNFCCC but, subject to rules under Article 6.2 of the Paris Agreement (refer to next paragraph), will enable bilateral trade between Japan and participating countries and, thus, potentially will be used to achieve NDC targets. It creates financial flows that facilitate the diffusion of low-carbon technologies that contribute to GHG mitigation and sustainable development in the countries where they are applied. Since 2013, the JCM has indirectly generated financial support for 178 projects in 17 countries around the world. Of these, 64 have been registered as JCM projects and 35 have already resulted in issuance of JCM credits. The Asia and Pacific region has the largest presence in the JCM: the Government of Japan has entered into bilateral agreements with 11 of ADB's developing member countries and supported the development of 160 projects, 59 of which have been registered.

Article 6 of the Paris Agreement establishes a new framework for international carbon market mechanisms outlined under a decentralized approach (Article 6.2) and a centralized approach (Article 6.4) to international cooperation on carbon markets.[16] Article 6 of the Paris Agreement provides for baseline-and-crediting approaches at project, program, sector, and policy levels; and provides an accounting framework for direct or indirect linking of domestic ETS. Direct linking both requires and creates opportunities for increasing policy harmonization and integration in Asia and the Pacific. Article 6 can also support green recovery from the COVID-19 pandemic and green economic growth in developing countries by reducing the cost of achieving their NDC targets and

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[15] UNFCCC. 2012. *Benefits of the Clean Development Mechanism*. Rio de Janeiro. http://cdm.unfccc.int/about/dev_ben/index.html.

[16] ADB. 2018. *Decoding Article 6 of the Paris Agreement*. Manila.

by creating access to international finance. [17] Nonetheless, continued failure to reach agreement over guidance and rules for implementing Article 6 has created uncertainty over when international carbon markets under the Paris Agreement can come into play, and what implications this will have for key national decisions about engaging in international cooperation through carbon markets.[18]

Conclusions

Despite the devastating economic impact of COVID-19, governments are accelerating transitions to low-carbon economies through pledges to become carbon-neutral. Achieving such commitments necessitates an increased role for carbon pricing in domestic and international climate policy architecture. Carbon pricing can ensure that green recovery policy interventions are aligned with medium- and long-term climate- and energy-transformation strategies. This holds for domestic carbon pricing systems and international carbon markets under the Paris Agreement. It provides an opportunity to formulate green recovery and economic growth packages that combine both. Article 6 of the Paris Agreement also provides increased opportunities to achieve NDC targets cost-effectively while supporting green growth.

Developing countries in the Asia and Pacific region that have initiated or already implemented carbon pricing schemes should keep up the momentum. They should continue the planning and remain committed to implementation, since this will help them to achieve a green recovery from the COVID-19 pandemic and stimulate green economic growth. Strategies that catalyze climate finance from both public and private sectors and channel that finance to low-carbon projects that create sustainable jobs should be the centerpiece of post–COVID-19 economic recovery packages.[19]

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[17] International Emissions Trading Association, University of Maryland, and Carbon Pricing Leadership Coalition. 2019. *The Economic Potential of Article 6 of the Paris Agreement and Implementation Challenges*. Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO.

[18] Attempts to reach a decision on the Rulebook for Article 6 failed at both the 24th Conference of the Parties (COP24) in Katowice (2018) and at COP25 in Madrid (2019).

[19] ADB. 2020. *Green Finance Strategies for Post–COVID-19 Economic Recovery in Southeast Asia*. Manila.