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China's international role in navigating the climate–trade nexus

Lei Bian and Lucie Qian Xia

Policy insight

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About the authors

Lei (Alice) Bian is a Policy Fellow (Belt and Road Initiative) at the Grantham Research Institute on Climate Change and the Environment.

Lucie Qian Xia is a China Policy Fellow at the Grantham Research Institute on Climate Change and the Environment.

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Contents

List of abbreviations

ADB - Asian Development Bank

AfCFTA – African Continental Free Trade Area

AfDB - African Development Bank

AIIB – Asian Infrastructure Investment Bank

ASEAN – Association of Southeast Asian Nations

BRI – Belt and Road Initiative

CAI – EU-China Comprehensive Agreement on Investment

CBAM – Carbon Border Adjustment Mechanism

CBDR – Common but differentiated responsibilities

CCER – China Certified Emissions Reductions

CCUS – Carbon capture usage and storage

CDM – Clean Development Mechanism

CIDCA – China International Development Agency

CPs – Country Platforms

COFM – Coalition of Finance Ministers for Climate Action

COP15 – 15th meeting of the Conference of the Parties to the Convention on Biological Diversity

CTE – Committee on Trade and Environment

DFI – Development finance institution

EDMEs – Emerging markets and developing economies

EFC – Energy Foundation China

EGA – Environmental Goods Agreement

EITE – Emissions-intensive and Trade-exposed

ETM – Energy Transition Mechanism

ETS – Emissions Trading Scheme

EU CBAM – European Union Carbon Border Adjustment Mechanism

FAO – United Nations Food and Agriculture Organization

FFSR – Fossil Fuel Subsidy Reform

FOCAC – Forum on China-Africa Co-operation

GATT – General Agreement on Trade and Tariffs

GAUC – Global Alliance of Universities on Climate

GCF – Green Climate Fund

GFANZ – Glasgow Financial Alliance for Net Zero

HLCCP – High-Level Commission on Carbon Prices

ICAP – International Carbon Action Partnership

ICON – Institute of Carbon Neutrality

ICPF – International Carbon Price Floor

IDDI – Industrial Deep Decarbonisation Initiative

IMF – International Monetary Fund

IPCC – Intergovernmental Panel on Climate Change

ITMOs – Internationally transferred mitigation outcomes

JETP – Just Energy Transition Partnership

L&D – Loss and Damage

LDCs – Least developed countries

MCDF – Multilateral Cooperation Centre for Development Finance

MDB – Multilateral Development Bank

MEE – China's Ministry of Ecology and Environment

MIIT – China's Ministry of Industry and Information Technology

MOF – China's Ministry of Finance

MOFCOM – China's Ministry of Commerce

MRV – Monitoring, reporting and verification

NDB – New Development Bank

NDC – Nationally Determined Contribution

NDRC – China's National Development Reform Commission

NGFS – Network for Greening the Financial System

OECD – Organisation for Economic Co-operation and Development

PBOC – People's Bank of China

PPM – Production and process methods

RCEC – Regional Comprehensive Economic Corridor

RCEP – Regional Comprehensive Economic Partnership

SCM – Subsidies and Countervailing Measures

SDGs – Sustainable Development Goals

SDM – Sustainable Development Mechanism

SFWG – Sustainable Finance Working Group

SLB – Sustainability-linked bond

STA – State Taxation Administration

TESSD – Trade and Environmental Structured Discussions

TPS – Tradable Performance Standard

UNEP – United Nations Environment Programme

UNCTAD – United Nations Conference on Trade and Development

UNFCCC – United Nations Framework Convention on Climate Change

VCM – Voluntary carbon market

WTO – World Trade Organization

Summary

Forging China's climate–trade diplomacy amidst geopolitical uncertainty

The complex ways in which climate change measures and policies intersect with international trade are often overlooked in China's climate diplomacy. Conventional wisdom holds that trade and limiting global temperature rise to 1.5°C to meet the Paris targets are irreconcilable in terms of their conflicting aims. However, it is becoming increasingly clear that economic and environmental factors are interdependent, and that success in one requires sustained, complementary action in the other. Measures to address climate change can be compatible with policy ambitions for economic growth and human development. Trade agreements and rules that reflect climate and sustainability concerns have the potential to integrate environmental protection and economic growth. Fostering synergies between trade policy and climate commitments is particularly important for China as the world's largest developing country.

Progress has been made to further shared goals through the 'climate–trade nexus'. For example, the EU-China Comprehensive Agreement on Investment (CAI), agreed in December 2020 after seven years of negotiations, is the most ambitious agreement that China has ever concluded with a third party, and marks the first time that China has agreed to ambitious provisions on sustainable development in a trade agreement. The EU-China CAI reaffirmed commitment from both China and the EU that they will promote investment that contributes to the objective of sustainable development for present and future generations and agreed areas in which China and the EU would collaborate. Its ratification and implementation could have a positive impact on other countries and international actors as an example of a negotiation over a fair and free trade system that does not shy away from addressing the climate crisis and provides a strategic approach to climate and trade cooperation.

In this crucial decade for the global transition towards climate neutrality, a revitalisation of the multilateral trading system and international climate policy would benefit all countries. China has a leading role to play in enhancing trade and climate synergies through multilateral, plurilateral and bilateral trade agreements. At the multilateral level, China should further invigorate the discussions underway at the World Trade Organization's Structured Discussions on Trade and Environmental Sustainability (TESSD) and cooperation with WTO member states and external actors. At the plurilateral level, China should revive and facilitate negotiations that commenced in 2014 on the establishment of the Environmental Goods Agreement (EGA) – which emphasises that trade needs to be part of the solution to climate change. At the bilateral level of China's climate diplomacy, seizing the climate–trade opportunity could not only enhance climate cooperation but also be the engine that can drive forward progress in China–US relations, the world's most consequential international relationship.

China's intensification of climate action at home and abroad is testament to its status of a rising, responsible great power. China embodies a vital international role in which it contributes not only to the imagining but also to the creation of an alternative future in which trade and climate can be reconciled, integrated and enhanced in the service of humanity.

> **In this crucial decade for the global transition towards climate neutrality, a revitalisation of the multilateral trading system would benefit all countries, and China has a leading role to play.**

The role of climate-related trade policy in accelerating the energy transition

International trade and trade policy play a crucial role in supporting China to reach climate change mitigation and adaptation objectives, including in the Belt and Road countries. It can, for example, facilitate trade in renewable energy, improving China's low-carbon competitive advantage. Removing technical barriers to trade is key to promoting trade in environmental goods and services while also enhancing economic resilience against climate-related disasters. Incorporating climate change and environmental considerations into regional trade agreements such as the Regional Comprehensive Economic Partnerships (RCEP) and the African Continental Free Trade Area (AfCFTA) may facilitate China's trade in low-carbon technologies and scale up investments and supply chains with Southeast Asia and Africa.

Advancing carbon neutrality goals through international cooperation on carbon pricing

China is unlikely to achieve its 'dual carbon' goals (peaking carbon emissions before 2030 and becoming carbon neutral before 2060) unless collective climate action is ramped up. Carbon pricing mechanisms are a powerful market-based instrument that can support this. In 2021, China launched the world's largest national emissions trading scheme (ETS) to reduce carbon emissions in the power sector. However, carbon prices in China are well below what the High-Level Commission on Carbon Prices (HLCCP) says are needed to reach the Paris climate goals. By addressing domestic challenges (e.g. low carbon prices resulting from the fragmentation of national and regional ETSs), international cooperation on carbon pricing – primarily through carbon taxes will enable China to reap a wide range of socioeconomic benefits from the low-carbon energy transition.

Chinese policymakers can also be empowered to prioritise the development of a domestic carbon tax agenda within national development policies by placing an increased focus on the health co-benefits of climate policies (e.g. from reduced air pollution) and increasing understanding of the distributional impacts of a carbon tax across socioeconomic groups. With the introduction of a US$50 carbon price, IMF/OECD estimates that China would gain from nearly 3% of GDP by 2030 in health co-benefits, which far outweigh the economic costs of about 0.5% of GDP.

At the intersection of climate and trade policy are carbon border adjustment mechanisms (CBAMs), which address the risk of carbon leakage imposed by the implementation of increased carbon pricing. In response to the planned implementation of the EU's CBAM, China could strengthen multilateral engagement in international fora such as the WTO and G20, to discuss key issues around improving the compatibility of the EU CBAM with WTO rules and the Paris Agreement. This includes on what basis to justify the inclusion of climate and environmental policies, the adoption of a common approach for measuring embodied carbon emissions in international trade, and the use of CBAM revenues. If an International Carbon Price Floor (ICPF) were put in place by major emitters, as proposed by the International Monetary Fund (IMF), it could assist China to leverage the role of fiscal policy in support of its dual carbon goals, with the potential of mitigating challenges posed by the EU CBAM, while channelling carbon pricing revenues collected by high-income countries to low-income countries. China could also explore international cooperation on carbon markets as a longer-term solution, but reform to China's domestic ETS is needed before it can be linked to other international ETSs.

Greening the Belt and Road Initiative to foster a just energy transition

China can and must also deliver on its international climate pledges through the Belt and Road Initiative (BRI) in support of the implementation of the Paris Agreement, the Convention on Biological Diversity and the Sustainable Development Goals (SDGs). China has committed to developing a green BRI jointly with 149 member countries, prioritising policy coordination, and scaling up investments in sustainable infrastructure, green supply chains and sustainable financing. However, BRI investments and financing decisions have not yet factored in the physical and transition risks of climate change. By turning the challenges of decarbonisation into

opportunities, adopting a whole-of-government approach will support China to develop coordinated institutional action to unlock climate adaptation and mitigation investments in BRI countries.

As the largest trading partner and major investor for Indonesia and South Africa, China could play a key part in accelerating the just energy transition in those countries through partnerships. It is crucial for BRI investors to minimise future financial losses by accelerating the early retirement of coal-fired power plants and to deliver on international climate commitments by scaling up renewable energy investments, which can be achieved in collaboration with the Energy Transition Mechanism (ETM) in Indonesia and the International Just Energy Transition Partnership (JETP) in South Africa. China's further efforts in greening the Regional Comprehensive Economic Corridor (RCEC) in Indonesia will provide an opportunity for the development of the world's first integrated sustainable supply chains of solar photovoltaic (PV) and electric vehicle batteries. BRI investors could also tap into the potential of green hydrogen development in South Africa.

Exploring China's policy responses through a Climate Club

A well-designed 'Climate Club', as called for by the G7 Leaders in 2022, could leverage the potential of G20 and G7 cooperation to accelerate the net zero transition. An independent report by LSE commissioned on behalf of the German G7 Presidency proposes that the Climate Club is jointly launched by G7 and developing countries to drive forward ambitious and inclusive leadership. The proposal is organised around three pillars: building partnerships, managing policy diversity and fostering sectoral alignment. China could take up the role of co-chair of the Club with Germany to shape the new era of global energy and climate governance in pursuit of shared priorities and prosperity. China could shape finance and technology partnerships with other Club members by implementing Country Platforms (CPs), accelerating the sustainable energy transition in BRI countries, supporting the closing of climate financing gaps in lower-income countries and leveraging the role of higher education sector for joint research and collaboration.

The proposed Climate Club will function as the home or secretariat for public climate finance under the UN framework, in partnership with existing initiatives such as the Coalition of Finance Ministers for Climate Action (COFM). By joining the COFM, China would mainstream climate action into its international development financing, supporting China-initiated multilateral development finance institutions and policy banks with innovative financial instruments for the implementation of COP26 commitments on climate finance in BRI countries.

To minimise trade friction while accelerating climate action, the Climate Club could serve as a platform for members to discuss climate-related trade policy such as green subsidies and improve coordination on linking international carbon markets, for example. China could accelerate the industrial decarbonisation agenda through enhanced participation in multilateral initiatives and, through the Global Arrangement on Sustainable Steel and Aluminium, trade barriers could be removed and longstanding domestic industrial capacity challenges be addressed.

Conclusion and policy recommendations

China has a crucial role in addressing the climate–trade nexus on the international stage. In the lead-up to COP27 and the G20 Summit in November 2022, China can fill a vacuum in climate-trade diplomacy along with G20 countries to develop joint solutions for accelerating low-carbon trade and investments through policy harmonisation, which would be particularly beneficial to lower-income countries.

Policy recommendations for China

1. China could strengthen climate–trade diplomatic engagements at the multilateral, plurilateral and bilateral levels, including taking a leadership role in reinvigorating the negotiations of the Environmental Goods Agreement under the WTO and accelerating

diplomacy with the EU to ratify and implement the EU-China Comprehensive on Investment (CAI).

2. China could strengthen policy coordination with the WTO and G20 to discuss trade implications for the Carbon Border Adjustment Mechanism (CBAM) proposed by the EU, while moving forward with international cooperation on carbon pricing, primarily through a carbon price floor.
3. China's new international development cooperation mechanism, the third-party market cooperation, could support BRI investors to accelerate early retirement of coal plants by factoring in climate-related risks and scaling up investments in renewable energy and adaptation and resilience by delivering on green BRI commitments, primarily in Indonesia and South Africa.
4. To foster G20–G7 cooperation, China and Germany could take up the role of joint co-chairs in the Climate Club proposed by the G7, to encourage the financing of a just energy transition in BRI countries through Country Platforms, leveraging the role of the higher education sector to enhance joint research on low-carbon technologies, and accelerating the domestic industrial decarbonisation agenda.
5. An increased focus on the health co-benefits of climate action is a key argument to persuade Climate Club members to prioritise the development of carbon pricing and phase out fossil fuel subsidies, while also justifying the trade friction that may occur over CBAMs and the adoption of green subsidies to support low-carbon trade competitiveness.

1. Introduction

Fostering synergies between trade policy and climate commitments is particularly important for China as the world's largest manufacturer, trading nation and emitter of greenhouse gas emissions. In the face of the 'code red' for humanity issued by the international scientific community as global temperatures continue to rise due to human activity, this report sets out how China can strengthen climate-trade diplomacy through negotiations in trade and investment agreements to achieve the mutually reinforcing objectives of climate and development. This includes exploring the potential impacts and benefits of climate policies such as carbon pricing on carbon leakage and trade competitiveness, and how to improve the compatibility of carbon border adjustment mechanisms (CBAMs) within the multilateral trading system and the The United Nations Framework Convention on Climate Change (UNFCCC). The impacts of climate change are already affecting international trade, and China's flagship international cooperation mechanism, the Belt and Road Initiative (BRI), has a significant role to play in supporting lower-income countries to accelerate the low-carbon energy transition by scaling up investments and green supply chains. Looking to recent proposals of a Climate Club, the report also discusses how major emitters and economic powers must work together to put the world on track to limit global temperature rise to below 1.5°C.

Impacts of climate change on international trade

Through an increase in the frequency, magnitude and duration of extreme climate and weather events, climate change has been identified as the biggest health threat of the 21st century (The Lancet, 2009). At the same time, the economic consequences of climate change are becoming increasingly tangible and pose several risks to the global economy. Heatwaves, for example, generate economic losses due to diminished physical health, labour productivity and labour supply – particularly affecting the agriculture, construction and manufacturing sectors (Romanello et al., 2021). These heatwave-related damages totalled an estimated 1.35% of China's GDP in 2020 (Cai et al., 2021). The resulting economic impacts will in turn affect supply chains. Climate change has also been shown to undermine gender equality through detrimental impacts to female workers, exacerbating the gender pay gap in South Africa, for example (Shayegh and Dasgupta, 2021). India has recently experienced extreme heat causing widespread death and illness as well as damage to crops, and triggering an export ban on wheat to enhance domestic food security (Paria and Srivastava, 2022). As of June 2022, 86 countries had imposed trade-related policies on food production and fertilisers, worsening global food price inflation (Espita et al., 2022).

Trade implications of geoeconomic fragmentation

As the world navigates multiple crises, revitalising global partnerships is imperative to achieving a green, resilient and inclusive recovery. The COVID-19 pandemic has plunged the global economy into a deep recession that is fuelling a backlash against globalisation. Further highlighting the fragility of multilateralism, the Russian invasion of Ukraine has generated global economic shockwaves with the largest food and energy price shocks since the 1970s and is placing the global economic recovery at an increased risk of stagflation (World Bank, 2022a). The impacts of the war to date have caused a 1% decline in total export volume, reducing global GDP by 0.7% (World Bank, 2022b), while disruptions to global and regional supply chains have caused shortages in manufacturing industries, causing prices to rise. The future of global trade and investment will largely be shaped by the policy responses of national governments, which will require a coordinated approach to sustainable economic recovery.

The significance of China's position in reshaping climate and trade governance towards the net zero transition

As the world's second largest economy and largest trading nation, China accounted for nearly 15% of global exports of goods between 1978 and 2020 (UNCTAD, 2021a). China was also the world's second largest contributor to cumulative CO_2 emissions between 1850 and 2021 (Evans,

2021). Through multilateral engagement, China is participating in international action on climate change and environmental protection. Recent examples include chairing the UN Biodiversity Conference (COP15) for the development of the Post-2020 Global Biodiversity Framework and co-chairing (with the United States) the G20 Sustainable Finance Working Group for the development of the G20 Sustainable Finance Roadmap. As stated in the China-US *Joint Glasgow Declaration on Enhancing Climate Action in the 2020s*, both countries are committed to maximising the societal benefits of a low-carbon energy transition while scaling up support for climate adaptation and resilience in developing countries. Following President Xi's commitment that China will stop building new coal power plants abroad, China's Global Development Initiative was launched in September 2021 to accelerate the implementation of the Sustainable Development Goals (SDGs) (China's Ministry of Foreign Affairs [MFA], 2022).

Occupying a central position in international trade and foreign direct investment, China can play a key role in driving the environmentally sustainable recovery of global trade. China is the world's largest manufacturer, accounting for 30% of the global manufacturing output in 2021 (The State Council, 2022), and is among the largest investors in Asia and Africa. A strong rebound in China's foreign trade volume, which increased by 10.3% in the first half of 2022, signals a rapid economic recovery from the pandemic and China's continued strong position as an international trading partner (Xinhua, 2022). However, in the context of the global energy transition away from fossil fuels, China's domestic and international economic competitiveness may be at risk from the adverse impacts of climate change, particularly given that many more countries are now considering introducing carbon pricing mechanisms as part of the post-pandemic green stimulus packages.

Furthermore, the pressing challenges of deglobalisation and supply chain disruptions will have a substantially greater impact on China than many other countries, given its role as the 'world factory' and the regional trade routes that run through the Belt and Road Initiative (BRI) countries. Therefore, China now needs to strengthen international policy cooperation on climate change and trade to reshape global supply chains into more sustainable models, which will have mutual benefits for both its domestic and international development agenda. Doing so requires China to leverage international trade and trade policy to reach climate goals, while scaling up investments in sustainable infrastructure and strengthening trade integration at regional and global scales. This would deliver sustainable development benefits, especially in the Global South, such as improving the health of human and natural systems, generating economic growth and creating jobs.

Structure of the paper

- Chapter 2 examines the ways in which climate change measures and policies intersect with international trade and reviews how China's trade policies have supported, and could further support, its climate policy objectives and promote greater sustainability at the multilateral, plurilateral and bilateral levels.
- Chapter 3 explores the benefits of international cooperation on carbon pricing and China's responses to carbon border adjustment mechanisms (CBAMs).
- Chapter 4 presents the challenges and opportunities of expanding sustainable regional trade and investment through the Belt and Road Initiative (BRI).
- Chapter 5 discusses China's climate diplomacy and policy responses to the establishment of an international 'Climate Club' through engagement with the G7 and G20 countries.
- Chapter 6 provides concluding remarks and policy recommendations.

2. Negotiating the climate–trade nexus and China's diplomacy

This chapter explores an often-overlooked area in China's international climate diplomacy: the climate–trade nexus. It begins by exploring the ways in which climate change measures and policies intersect with international trade. Then, it examines how China's trade policies have supported, and could further support, its climate policy objectives and promote greater sustainability in line with its commitment to honour the Paris Agreement and fully implement the 17 UN Sustainable Development Goals (SDGs). Looking specifically at EU–China cooperation, the chapter examines the recently concluded EU-China Comprehensive Agreement on Investment (CAI), especially its Investment and Sustainable Development chapters. Finally, it explores the implications of EU–China cooperation for China's engagement at the multilateral, plurilateral and bilateral levels for further negotiating a symbiotic relationship between climate change and trade.

The significance of the climate–trade nexus

The interlinkages between climate change and international trade are complex and multifaceted. Adam Smith compellingly argued that free markets and free trade would allow countries to "take advantage of their comparative advantage, with all nations benefitting as each one specialises in the areas in which it excels" (Stiglitz, 2007; Smith, 2000). In 1992, the United Nations Conference on Environment and Development led to the adoption of the United Nations Framework Convention on Climate Change and the signing of the Rio Declaration on Environment and Development, which established a link between sustainable development, economic growth and environmental protection. The declaration called on all countries to "cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation" (Rio Declaration on Environment and Development, 1992).

Trade and mitigating climate change are often viewed as incompatible: on one hand, the environment must be sacrificed to achieve a certain level of economic and trade growth; on the other, economic growth needs to be undermined to cultivate environmental sustainability. However, trade liberalisation, the green economy, environmental protection and sustainable development are not necessarily incompatible (Dryzek, 2013). Economic and environmental factors are interdependent, and success in one sector requires sustained, complementary action in others. Measures to address climate change must be compatible with policy ambitions for economic growth and human advancement. According to a joint World Trade Organization (WTO) and United Nations Environment Programme (UNEP) report, "reducing or eliminating import tariffs and non-tariff barriers for climate-friendly goods and technologies should reduce their price and therefore facilitate their deployment at the lowest possible cost" (WTO, 2009). Trade liberalisation of these so-called 'climate-friendly goods' would incentivise producers and "provide them with domestic expertise to expand the production and export of these goods" (ibid.). Yet our understanding of the relationship between trade agreements and climate change is insufficient, despite the inclusion of more clauses relating to climate goals in trade agreements signed over the last few decades, which illustrates an attempt to build a more supportive relationship between trade and climate change (Griffin et al. 2019).

International trade agreements and climate pledges

There is increasingly evident potential for making use of climate provisions in trade agreements and trade-liberalising commitments in climate instruments such as countries' national climate plans, known as nationally determined contributions (NDCs) submitted to the UNFCCC for the implementation of the Paris Agreement (Laurens et al., 2022). Trade openness can enhance international efforts to mitigate and adapt to climate change, for example by promoting an efficient allocation of the world's resources, protection and preservation of the environment, raising living standards and improving access to environmental goods and services (World Bank,

2009). It can also support the continued treatment of environmental impacts as externalities. Freer and fairer trade is not an end in itself; it can support important human values and welfare goals in accordance with the objectives of sustainable development. There is ample untapped potential for decision-makers to go further in revising or making use of climate provisions in trade agreements and trade-liberalising commitments in climate instruments (ibid.). Trade agreements and climate pledges honouring the Paris Agreement can generate win-win solutions for promoting economically beneficial trade flows and tackling the climate crisis. The Marrakesh Agreement that established the WTO clearly indicated the link between sustainable development and trade liberalisation, and is restated in the WTO's ministerial-level Trade and Environmental Sustainability Structured Discussions: "international trade and trade policy can and must support environmental and climate goals and promote more sustainable production and consumption" (WTO, 2021a). In the interest of achieving a just transition to carbon neutrality and the SDGs, certain provisions in trade agreements could serve to reduce trade barriers to promote the diffusion of climate-friendly goods and services.

The intersection of trade policy and climate policy

Trade policy has a crucial role in accelerating investment in climate mitigation and adaptation and sustainable value chains, which contribute to enhancing energy security, food security and positive health outcomes. Trade policy can facilitate trade in renewable energy, which will support countries to enhance export competitiveness through a low-carbon competitive advantage, resulting in creating new green growth opportunities. Trade also promotes environmental goods and services. Doing so, according to the WTO, requires a removal of tariff and non-tariff barriers to enhance access to environmental goods and services across markets and reduce the capital costs of renewable energy infrastructure. Finally, trade policy is critical to strengthening climate adaptation and resilience in support of post-disaster recovery: removing export restrictions can enable essential access to medical, food and water supplies for poor populations. Trade can play a role in enhancing economic resilience against climate-related disasters while improving productivity growth, particularly for small and medium-sized enterprises (SMEs) by, for example, minimising food insecurity risk arising from changing patterns of competitive advantages due to the impacts of climate change, and facilitating the adoption of climate-resilient crops and other technologies useful to smallholder farmers. Trade in services is important to improve cross-border labour force mobility, as a decline of job opportunities in climate-affected sectors will in turn lead to a rise in the services sector.

Removing technical barriers to trade – both tariff and non-tariff barriers – is key to the promotion of environmental goods and services. Existing tariff structures and non-tariff measures work in favour of emissions-intensive industries, meaning that there are significant barriers to low-carbon trade. Tariffs on environmental goods are very high at 11% in low-income countries and tariffs for renewable energy-related products are still around 10–14% (Brenton and Chemutai, 2021). Despite some countries having low tariffs on environmental goods and services, high non-tariff measures persist in the form of regulatory barriers, such as certifications, standards and local content requirements.

When considering the challenge of climate change within the multilateral trading system, there is a question over to what extent green subsidies have a role, and if it should be increased (WTO, 2022a). A green subsidy is an important trade and industrial policy that offers export incentives, which are also a key part of solutions to encourage low-carbon technological innovation. However, there are many WTO disputes in relation to export subsidies because current trade rules do not allow governments to support the producers of renewable energy goods or the industry, and because some countries may view subsidies as a means of advancing domestic economic growth at the expense of other countries. In the case of the EU carbon border adjustment mechanism (EU CBAM), this aims to address import-related rather than export-related carbon leakage, meaning that export rebates may not be considered. CBAMs might provide some flexibility to incorporate export-related leakage, which would allow countries to promote green export performance by offering export subsidies, despite it being prohibited under the Subsidies

and Countervailing Measures (SCM) Agreement. This stresses the importance of international cooperation on the design of subsidies through international forums such as the WTO and G20, which will facilitate countries to build a mutual consensus and recognise the role of subsidies in support of climate-compatible development.

The climate-trade nexus and the SDGs

Trade can be mobilised to simultaneously address climate change and achieve the SDGs (Monkelbaan, 2017). The effective utilisation of trade as a tool for addressing the climate crisis, minimising environmental costs while promoting trade liberalisation, speaks directly to the implementation of the world's blueprint for global sustainable development, the 2030 Agenda for Sustainable Development. Adopted by all UN member states in September 2015, the 2030 Agenda was an urgent call for action from a global partnership of developed and developing countries. The adoption of the 2030 Agenda and the Paris Agreement in 2015 established a strong foundation for the coherent implementation of climate action and sustainable development objectives across all levels and sectors. The implications of climate governance for international trade on the one hand, and the implications of trade integration for climate change on the other, further point to possible ways forward for China's international diplomacy to contribute to both trade and climate objectives. The key issue is to support an optimal combination of trade liberalisation and climate policies to harness the benefits of trade while minimising the environmental costs of China's development and diplomacy.

The climate–trade nexus in developing countries

Understanding the climate–trade nexus is especially relevant for developing countries that rely heavily on trade for export earnings and for energy and food imports, especially if they depend on exports from sectors that will be particularly badly affected by climate change impacts (UNCTAD, 2021). Developing countries would need to "make structural changes in their economies to adapt their trade profiles so as to avoid or overcome disruptions caused by climate change" (ibid.). Trade agreements could enable countries to reach their climate goals by removing tariffs, harmonising standards on environmental goods and eliminating distorting subsidies on fossil fuels (Balogh and Mizik, 2021). Fostering synergies between trade policy and climate policy is particularly important for China as the world's largest developing country.

China has gradually intensified its contribution to international efforts to fight climate change and continues to engage through updating its NDC under the Paris Agreement and through its commitment to reach carbon neutrality by 2060. Examining the nexus between climate change and trade is particularly important for China, given the development and modernisation of its economy. China's economic development has been coupled with a growth in its carbon emissions, giving rise to concerns about the detrimental environmental impacts. China is also the largest trading partner for most economies and its economic growth model is significantly reliant on exports, with the country firmly integrated in global supply chains.

China has increasingly shown its leadership potential in the solar panel industry. Chinese dominance in solar supply chains has enabled it to become a significant contributor to the development of renewable energy, thus promoting the global clean energy transition. Trade policy should be seen as a vehicle for sustainable development and China's green transition – and in advancing the green development of the Belt and Road Initiative (BRI), especially considering China's growing leadership role in global climate governance.

Trade agreements and rules reflecting climate and sustainability concerns have the potential to enhance synergies between trade and climate commitments and integrate environmental protection and economic growth. China would need to develop a unique trade–climate resilience pathway that paves the way for its trade policy to make a positive contribution to climate change mitigation and sustainable development. Such trade policies would need to create the right enabling environment for climate action at home and abroad and seek ways to support developing countries, including China, to meet their climate-neutrality goals.

The climate–trade nexus and EU–China diplomacy

EU–China trade relations are based on the EU–China Trade and Cooperation Agreement of 1985, and the establishment of the China–EU Comprehensive Strategic Partnership in 2003. The importance of EU–China trade negotiations is reflected in the establishment of the EU-China High Level Economic and Trade Dialogue, which started in 2007 as the strategic forum for all matters relating to the bilateral trade and investment relationship. Now, the negotiation of the landmark EU–China Comprehensive Agreement on Investment (CAI) is a further major milestone in the EU–China relationship since diplomatic relations were established. The CAI is committed to building an economic relationship based on openness, reciprocity and mutual benefit, ensuring non-discrimination, a level playing field, transparency, and a predictable and rule-based investment environment (European Commission 2022a).

The CAI was agreed on 30 December 2020 after 35 rounds of negotiations over the course of seven years, and is the most ambitious agreement that China has ever concluded with a third party (Chen, 2022). It is also significant as it marks the first time that China has agreed to ambitious provisions on sustainable development in a trade agreement. It recognises that economic development, social development and environmental protection are interdependent and mutually reinforcing dimensions of sustainable development. China and the EU are two of the world's largest trading partners and China's relationship with the world's largest trading bloc – as strengthened through the 'Investment' and 'Sustainable Development' chapters of the CAI – could serve as a blueprint for China's future climate and trade diplomacy and integration.

In addition to trade-related rules, the CAI will also be the first agreement for China to "deliver on obligations for the behaviour of state-owned enterprises, comprehensive transparency rules for subsidies and commitments related to sustainable development" (European Commission, 2020b). Since the first formal round of negotiations in 2013, the EU and China have endeavoured to negotiate a comprehensive investment agreement to create a better balance in their trade relationship by levelling the playing field. The implementation of the CAI will bind China and the EU into a values-based investment relationship that is underpinned by the principles of sustainable development.

The EU–China CAI reaffirmed commitment from both parties to promote the development of investment in a way that contributes to the objective of sustainable development for present and future generations in a manner complementary to their efforts under existing bilateral and multilateral mechanisms (European Commission, 2021a). The CAI states the intention to ensure that this objective is "integrated and reflected" in EU–China investment relationships.

Article 6 of the Agreement, 'Investment and Climate Change' articulates three areas in which China and the EU would collaborate:

a. Effectively implement the UNFCCC and the Paris Agreement, including commitments with regard to Nationally Determined Contributions.
b. Promote and facilitate investment of relevance for climate change mitigation and adaptation, including investment concerning climate-friendly goods and services such as renewable energy, low-carbon technologies and energy-efficient products and services, and by adopting policy frameworks conducive to the deployment of climate-friendly technologies.
c. Cooperate with the other parties on investment-related aspects of climate change policies and measures, bilaterally and in international forums, as appropriate.

The main part of the trade negotiations have now concluded, but the CAI has not yet been ratified and has therefore not entered into force. Talks on ratifying the agreement are currently frozen due to tense restrictive measures imposed by the EU and China in March 2021. The CAI should therefore not be seen as a silver bullet, but strengthening the EU-China investment relationship (as the CAI would if ratified) would bolster the opportunities of European firms while

also establishing a reliable foundation between the two powers and laying the groundwork for driving environmental progress in the sustainability chapter of their relationship (Wuttke, 2022). The ratification and implementation of the CAI would be a timely boost to regional economic integration in a challenging context exacerbated by geopolitical tensions. For full ratification to occur, increased political momentum is needed between the EU and China. Its implementation would have a considerable positive impact on other countries and international actors as an example of a fair and free trade system negotiation that does not shy away from addressing the climate crisis and provides a strategic approach to climate and trade cooperation.

Opportunities for China's climate-trade negotiations

The CAI would provide incentives for the multilateral trading system to contribute to furthering the symbiosis between free and fair trade and addressing the climate crisis. Promoting international dialogue and cooperation on investment-related environmental issues and mainstreaming sustainability into trade policies, as in the flagship example of the CAI, could not only complement climate policies but also further enable the identification of pathways to better align trade and climate in support of sustainable development. The numerous ways in which trade-related policies can support climate goals include trade negotiations on phasing-out fossil fuel subsidies, setting international rules for settling disputes on renewable energy technologies and creating a market for these green products. Trade cooperation in these areas could support countries to transition to a low-carbon future, accelerate the transition process and lower its costs. Promoting sustainable development in international trade can offer important export opportunities for China, including the export of renewable energy equipment, high-speed rail, ultra-high voltage direct current (UHV DC) transmission, electric vehicles and low-carbon electric equipment (e.g. heat pumps and refrigeration technologies).

The multilateral level

At the multilateral level, the international trade regime could potentially restructure market relationships in a climate-friendly manner by providing incentives for climate change mitigation and adaptation (Jakob et.al., 2022). Given the importance of multilateral environmental agreements, China would benefit from continued dialogue and sharing of best practice on issues where trade, environmental and climate policies intersect at international forums such as the WTO, of which sustainable development and the protection and preservation of the environment are fundamental goals (WTO, 2021a). Indeed, China is actively involved in the work of the WTO Committee on Trade and Environment; the Structured Discussions on Trade and Environmental Sustainability (TESSD) bring scientific and data-based evidence to deliberations and reiterate the commitment to continued dialogue and enhanced transparency.[1] China should further invigorate negotiations at the TESSD and cooperate with WTO member states and external actors.

Climate-related trade disputes have been a long-term challenge in the multilateral trading system. The number of antidumping (AD) or countervailing duty (CVD) investigations has increased sharply, which particularly affects the delivery of China's international climate action in BRI countries. The World Bank's 'Temporary Trade Barriers Database' states that since 2009, China's exports, primarily of iron and steel products, have been the main subject of CVD investigations and since 2017, China has started to initiate CVD actions (WTO, 2022a). In the context of climate and trade, the solar panel disputes initiated by the US in 2011 have made the current AD rate for Chinese solar photovoltaic (PV) imports rise by almost 240% (Benson and Reinsch, 2022). This trade sanction prompted Chinese producers to gradually relocate solar supply chains in Southeast Asia, making China's solar exports increase by about 60% in 2021 to US$28.4 billion, according to data from China's Ministry of Industry and Information Technology (MIIT) (Xue, 2022). Still, the US considered imposing tariffs on low-cost solar panels made by Chinese manufacturers in Southeast Asia (Reuters, 2022). Although the US ultimately decided to waive

[1] https://www.wto.org/english/tratop_e/tessd_e/tessd_e.htm

tariffs for two years, this created long-term investment uncertainty for Chinese investors. Through a coordinated approach, multilateral climate action needs to be emphasised as a top priority over competing interests for market access and domestic competitiveness.

A promising precedent for success in climate-conscious multilateralism can be seen in the positive steps taken at the 12th WTO Ministerial Conference. After over 20 years of negotiations, the first WTO agreement in support of environmental objectives concluded with member countries agreeing to eliminate the most harmful fisheries subsidies, estimated at US$22 billion annually, in support of the SDG on conserving 'life below water'. This milestone multilateral trade agreement contributes to a sustainable blue economy by tackling the depletion of marine resources and illegal overfishing. It also shows a growing recognition of the negative environmental consequences of government subsidies. The significance of the UN's 'One Health' approach[2] has been accelerated by the COVID-19 pandemic and, as a result, a new agreement on eliminating fossil fuel subsidies could be developed by member countries with a shared ambition in support of the SDG on 'climate action'.

Together with G20 countries, China could step up engagement with the WTO and G20 on the reduction of fossil fuel subsidies, a move that is consistent with the COP26 commitment on coal phase down. The Organisation for Economic Co-operation and Development (OECD) and International Energy Agency (IEA) estimate that government support in major economies for fossil fuel subsidies totalled US$351 billion in 2020 (WTO, 2022b) while the IEA estimates that China's fossil fuel subsidies were about US$30 billion and India and Indonesia's were both around US$20 billion in 2019 (Gracia-Herrero and Tagliapietra, 2021). As China has already taken a leading role in the WTO discussions on trade and environmental sustainability and on plastic pollution, it would be a natural next step for China to participate in the joint research and capacity building of the Fossil Fuel Subsidy Reform (FFSR) initiative (WTO, 2022b), which will support China to gain an in-depth understanding of the health and environmental impacts of harmful fossil fuel subsidies.

The plurilateral level

At the plurilateral level, China could facilitate and encourage investment favouring green growth by contributing to the negotiations on environmental goods. On 8 July 2014, a group of WTO members launched plurilateral negotiations for the establishment of the Environmental Goods Agreement (EGA), which seeks to promote trade in key environmental products such as wind turbines and solar panels. The number of participants has since grown, with the current total representing 46 WTO members, although the agreement is not yet finalised.[3] The negotiations have emphasised that trade needs to be part of the solution to climate change. The group envisages trade liberalisation of climate-friendly goods and "explores opportunities and possible approaches for promoting and facilitating trade in environmental goods and services to meet environmental and climate goals, including through addressing supply chain, technical and regulatory elements" (WTO, 2021a). The negotiations could result in "fewer and lower barriers to trade in environmental goods and services, and therefore improve global market access to more efficient, diverse, and less expensive goods and services, including goods that can contribute to climate change mitigation and adaptation" (WTO, 2009). Promoting and facilitating the global uptake of new and emerging low-emissions and other climate-friendly technologies, while also eliminating tariffs on important environment-related products, can help to achieve environmental protection and climate change mitigation goals.

In December 2016, the parties sought to enter the final stage of the EGA negotiations and finalise the agreement, but negotiations collapsed. The most fundamental issue was that negotiators failed to reach consensus on what constituted an 'environmental good' and how broadly that

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[2] This is an integrated approach to addressing the health of humans, animals and the environment, including zoonotic diseases like COVID-19. Read more at: https://www.who.int/news-room/questions-and-answers/item/one-health

[3] https://www.wto.org/english/tratop_e/envir_e/ega_e.htm

definition should apply across different sectors.[4] The EGA negotiations have still not yet resumed. However, the agreement is something that China would benefit from, and it should continue to negotiate with other parties on the liberalisation of environmental goods. China could strengthen cooperation with participants of the EGA by exchanging experiences and examples of best practice related to environmental impact assessments for investments. Furthermore, a plurilateral agreement can create rights for non-members on a 'most-favoured-nation' (MFN) basis. Thus the benefits of the EGA are expected to apply to the entire WTO membership, so that all WTO members will enjoy improved conditions in the markets of the participants to the EGA. China and the EU should take the lead in reviving the negotiations on environmental goods at the WTO.

Regional trade agreements on the Regional Comprehensive Economic Partnership (RCEP) and African Continental Free Trade Area (AfCFTA) are also key to facilitating trade in green technologies, investment and value chains. Trade can promote technology and knowledge transfers through global value chains, which will enable countries to reap the benefits of capacity building that promotes productivity growth. RCEP is the world's largest free trade agreement, and the first multilateral trade agreement involving China, which seeks to pave the way for deeper regional economic integration among 15 regional members (i.e. ASEAN+3, Australia and New Zealand). By eliminating 92% of tariffs in traded goods, the role of RCEP in strengthening regional value chains and attracting investment is particularly important for the manufacturing sectors in Southeast Asia. However, only three provisions in the RCEP are related to environmental protection. Further amendments are needed to incorporate climate and sustainability considerations into trade agreements (UNESCAP, 2022). Likewise, climate and environmental sustainability factors could also be discussed in the AfCFTA, mainly supported by China in terms of financial and technical assistance (China Daily, 2021). If climate-related trade agreements are on the agenda, Southeast Asia and Africa can benefit from 'leapfrog development' that bypasses fossil-fuel based economy to low-carbon and climate-resilient pathways, diversifying their exports, reducing poverty and improving human and natural capital.

The bilateral level

At the bilateral level of China's climate diplomacy, seizing the climate–trade opportunity could not only enhance climate cooperation but also become the engine to drive forward progress in the world's most consequential relationship: China–US relations. In the context of heightened geopolitical competition between the US and China, it has never been more important to find opportunities for cooperation.

First, to successfully implement the Paris Agreement, it would benefit both China and the US to increase support and cooperation for multilateral climate negotiations, not only under the UNFCCC processes, but also to support the integration of climate considerations into international organisations such as the WTO and the UN Food and Agriculture Organization (FAO), which have increasing clout in climate conversations.

Second, it is important to note that China's pursuit of decarbonisation is part of its broader economic modernisation goals and that tackling climate change is rooted in domestic concerns of environmental pollution. Similarly, tackling climate change is related to domestic politics in the US. This domestic primacy in both China and the US requires them to adopt a multidimensional diplomatic strategy and maintain the regular exchange of information on climate–trade developments.

The *U.S.-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s* highlighted the importance of US–China climate cooperation in this critical decade, but it did not mention the potential role of trade cooperation in accelerating the transition to carbon neutrality. Beijing has repeatedly stated that climate is not a 'standalone issue' in US–China relations; it would be important to include trade-liberalising commitments in their cooperation on the climate as well as

[4] Negotiations on trade and the environment are part of the Doha Development Agenda launched at the Fourth WTO Ministerial Conference in Doha, Qatar, in November 2001.

the negotiation and implementation of climate provisions in their cooperation on trade. This could encourage the alignment of climate and trade strategies in China's engagement with the US.

Third, the US and China can increase their cooperation on policy design and product standards. China has advantages in manufacturing and application, while the EU and US have advantages in technology and market design, so cooperation could produce mutual benefits. For example, China's PV manufacturing could provide high-quality and low-cost PV module products, solar power station construction and maintenance services, while the US could provide advanced power station operation experience. Working together in this way can help to build clean energy systems in developing countries, which would benefit the Global South.

3. Moving forward with the international carbon pricing agenda

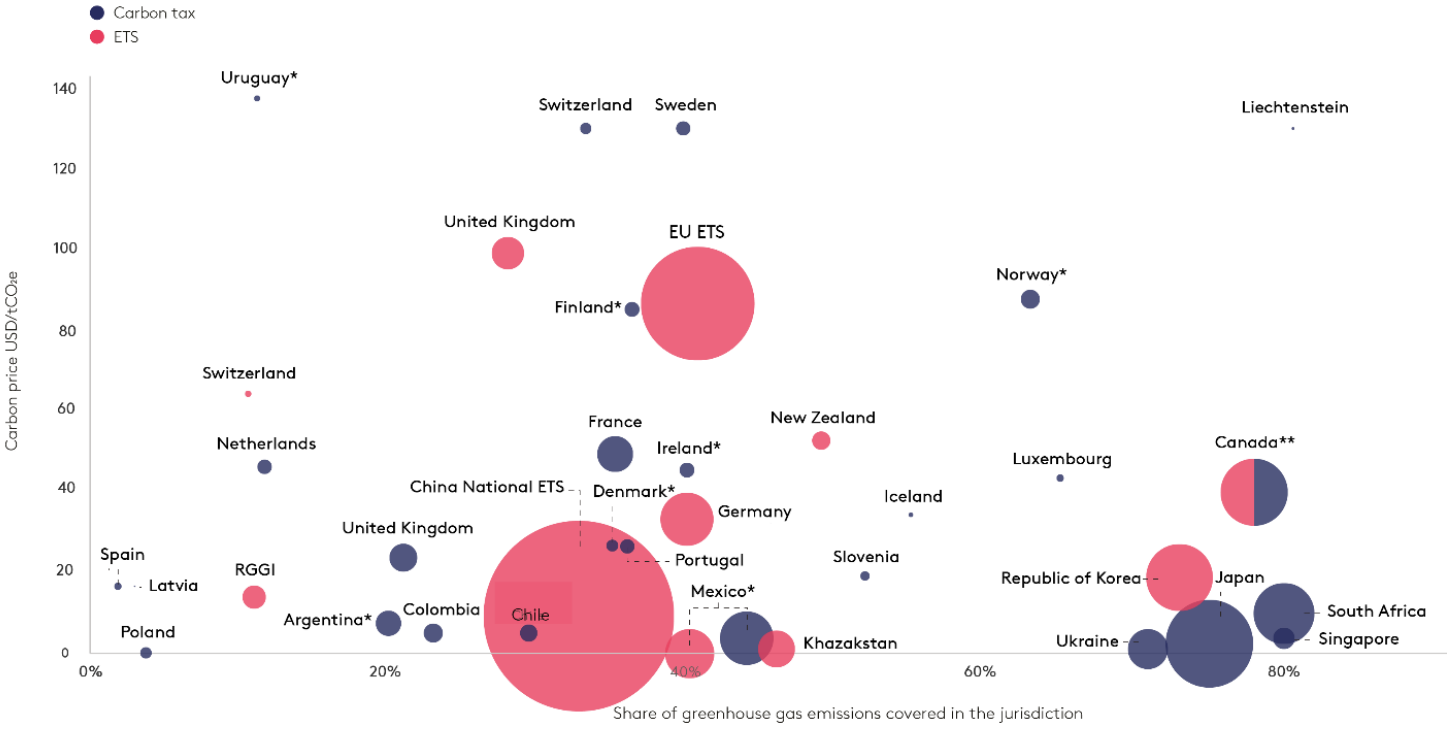
This chapter explores the role of carbon pricing mechanisms in reducing greenhouse gas emissions and incentivising investments towards more sustainable production and consumption patterns. The development of a carbon pricing agenda through international cooperation will enable China to address domestic climate challenges while reaping a wide range of socioeconomic benefits as part of the energy transition. Carbon Border Adjustment Mechanisms (CBAMs) are the solution to addressing the risk of carbon leakage imposed by the introduction of high carbon prices. Such multilateral climate action would support China to decarbonise its industrial sectors and thus improve its low-carbon trade competitiveness.

The development of a carbon pricing agenda in China: key challenges

Explicit carbon pricing through an emissions trading scheme

Carbon pricing through an emissions trading scheme (ETS) is the main market-based instrument to accelerate a low-carbon energy transition in support of China's 'dual carbon' goals (peaking carbon emissions before 2030 and becoming carbon-neutral before 2060). China's carbon markets consist of three main parts: the national ETS; regional pilot ETSs; and the voluntary carbon market (VCM), known as China Certified Emissions Reductions (CCERs). China has the world's largest carbon market, with its national ETS covering around 40% of the country's total emissions (see Figure 3.1) (World Bank, 2022). Operational since July 2021, China's national ETS aims to reduce approximately 4.5 billion tonnes of carbon emissions per year in the power generation sector (China's Ministry of Ecology and Environment [MEE], 2021).

Figure 3.1. Absolute emissions coverage, share of emissions covered and prices for carbon pricing instruments (CPIs) across jurisdictions



Source: World Bank (2022)

During the first compliance period of the national ETS between July and December 2021, free allowances or permits were distributed to 2,162 regulated entities and 179 million tonnes of carbon emissions were traded, with a total transaction value of CNY 7.66 billion (US$1.1 billion) (ibid.).

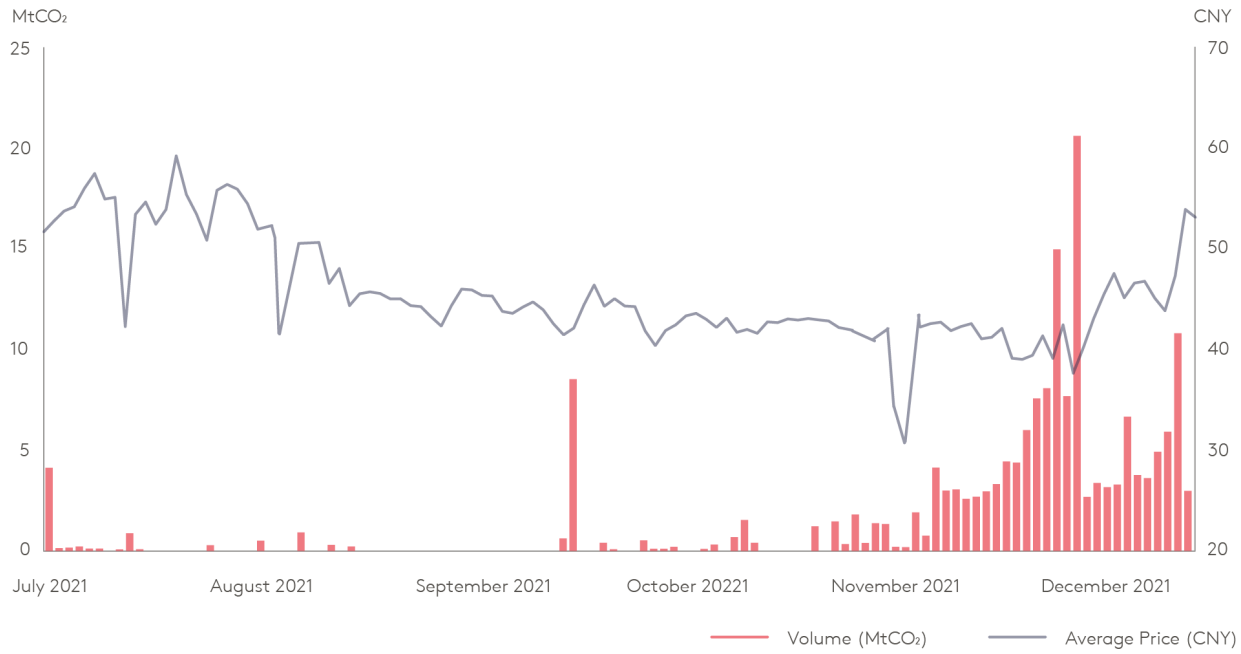
With a 99.5% compliance rate from participating entities, the compliance period closed with the price of carbon at CNY 54.22 (US$7.8), a 13% increase from the starting price of CNY 48 (US$6.9) (International Carbon Action Partnership [ICAP], 2022). With carbon allowances trading at an average 2021 price of CNY 42.85 (US$6.12) per tonne of carbon dioxide equivalent (tCO_2e) (MEE, 2022a), the national ETS price was well below the range of US$40–80/$tCO_2e$ by 2020 and US$50–$100/tCO_2e by 2030 that the High-Level Commission on Carbon Prices considers a meaningful carbon price to meet the Paris climate goals (Stiglitz et al., 2017). Further changes are needed if China's national ETS is to make a significant contribution to reducing carbon emissions.

Some policy design challenges have undermined the effectiveness of China's ETS. Initially, China's national ETS was established to roll out a tradable performance standard (TPS) based on the emissions intensity of each fuel and technology (IEA, 2021). A TPS is a rate-based emissions pricing instrument, which is less effective in terms of carbon mitigation and cost-effectiveness than a carbon pricing instrument, which works through a cap-and-trade system, i.e. a mass-based ETS (Yang and Goulder, 2021). China has launched regional ETS pilots in seven provinces and cities since 2013, covering 16% of total carbon emissions in 32 sectors (Stoerk et al. 2019). These use both mass- and rate-based designs; the latter of which are shown to create less regulatory pressure on firms and result in lower carbon prices than in a mass-based cap-and-trade system (Cui et al., 2021). This implies that the fragmented ETS system in China may not encourage the shift towards low-carbon power generation as effectively as a unified TPS or full ETS would. These policy issues reveal problems arising from the lack of a nationwide emissions cap under the national ETS, in the form of either an absolute cap on tonnes of carbon emissions or a cap on carbon intensity.

Without setting an emissions cap, the oversupply of carbon permits puts downward pressure on prices, making them insufficient to reflect the social costs of carbon. Sector coverage is also limited to the power sector under the national ETS, which is inconsistent with China's emerging policy priority of industrial decarbonisation (MEE, 2019). Importantly, the method for allocating allowances is free distribution rather than auctioning. The latter can have the effect of driving up carbon prices when companies are required to buy an increasing proportion of allowances. For example, Guangdong's regional carbon trading scheme set a cap-and-trade system with the highest trading volumes in China, using auctioning for 10% of the total allowances (Zeng et al., 2021). A cap-and-trade system would allow the ETS to send strong and consistent carbon price signals that incentivise emissions reduction activities.

In addition to the over-allocation of free allowances, low ETS prices are driven by limited demand for carbon trading among regulated entities, due to high compliance costs. Goulder et al. (2019) find that the compliance cost under a TPS system is about 35% higher than under a cap-and-trade system. Figure 3.2 shows that trading volumes were mostly low between July and December 2021, with some price fluctuations towards the end of the compliance period, where most transactions were concentrated. This suggests that low ETS prices have not sufficiently encouraged participating entities to proactively reduce emissions. This could be because they perceive compliance with the ETS as a mandatory requirement that will limit rather than enhance market opportunities.

Figure 3.2. China's national ETS average price and volume in 2021



Source: International Carbon Action Partnership (2022)

Carbon data quality is another major concern. An ETS in its early stages of development aims to build a reliable monitoring, reporting and verification (MRV) system that encourages regulated entities to monitor and report their emissions accurately, supporting policymakers to make further decisions on setting an emissions cap. However, the quality of carbon data is undermined by inaccurate reporting. Following an inspection, the Ministry of Ecology and Environment (MEE) found at least four cases in which the regulated entities had submitted falsified or unverified carbon emissions data in order to avoid paying for the excessive emissions generated over their allocated allowances (MEE, 2022b). Unreliable information of this kind can lead to market distortions that significantly undermine the credibility and effectiveness of the national ETS.

Carbon leakage is a significant challenge facing regional carbon trading schemes. The IPCC defines carbon leakage as "the increase in CO_2 emissions outside of countries taking domestic mitigation action divided by the reduction in the emissions of these countries" (IPCC, 2007). For China, there is a risk of carbon leakage occurring at a regional level as firms relocate their polluting activities to areas not covered by an ETS. The regional ETSs play a role in gradually shifting regulated entities from regional pilots to the national ETS over time. As of June 2021, nearly 3,000 regulated entities in China were involved in regional ETS pilots, with a cumulative transaction volume of 480 million tCO_2e at CNY 11.4 billion (US$1,63 billion) (Liu et al., 2022). The regional ETS pilots have proven to be effective in reducing the emissions of regulated firms and accelerating innovation in low-carbon technologies, leading to a 16.7% reduction in total emissions and a 9.7% reduction in emissions intensity (Cui et al., 2017; 2018). However, the study finds a 9% increase in the carbon emissions of non-ETS regulated firms within the same ownership network as regulated firms. This shows carbon leakage occurring through the relocation of production activities to subsidiaries outside ETSs (Cui et al., 2022). A consequence of carbon leakage is an increased risk of pollution transfer, which may also result in a reversal of China's progress in air quality improvement.

In response to these challenges, the MEE regulator outlined a number of policy priorities to reform the ETS, including improvements in data quality, expansion of the ETS's sector coverage, and integration of the national and regional ETSs into a 'single carbon market' (The State Council, 2022). Nonetheless, the administrative costs of ETS reform are high due to the complexity of implementation and enforcement. Outside of the compliance market, China will create an enabling environment for more and better quality carbon reduction projects in the CCERs system,

which relates to companies' voluntary trading of carbon credits to meet corporate climate targets in support of the low-carbon transition. For example, carbon offset credits will be developed as financial products and investable assets, boosting liquidity to meet investment demands from long-term investors.

Implicit carbon pricing through environmental taxes

With the introduction of environmental taxes to support green fiscal tax reform, low tax rates and institutional barriers are unable to incentivise low-carbon innovation. Following the announcement of the Environmental Protection Tax Law in 2016, environmental taxes were implemented in 2018 to tackle environmental pollution, specifically air pollution (The National People's Congress, 2018). The tax rates imposed on the two air pollutants sulphur dioxide (SO_2) and nitrogen dioxide (NOx), in the range of CNY 1.2–12 (US$0.18–1.8) per unit of pollution equivalence, also contributed to efforts to tackle climate change (State Taxation Administration [STA], 2020). However, tax is not levied on the most harmful fine particulate matter ($PM_{2.5}$) or on ground-level ozone pollutants (i.e. ozone formed by the reaction of NOx and volatile organic compounds [VOCs]), which are the leading causes of premature deaths attributable to air pollution in China (Yin et al., 2020).

The environmental tax revenues account for a very small share of the country's total tax revenues and are insufficient to mobilise the domestic resources needed to achieve the dual carbon goals (Wang and Yu, 2020). According to the State Taxation Administration (STA), environmental tax revenues fell from CNY 20.56 billion (US$2.94 billion) in 2018 to CNY 19.9 billion (US$2.84 billion) in 2020, even though the number of taxpayers increased (STA, 2021). This is due to greater flexibility in tax collection, where polluters are eligible for tax reductions of 25% and 50% respectively if they can achieve 30% and 50% reductions in national and local ambient air quality standards. In addition, the lack of cross-sector collaboration between the MEE and the STA and low levels of public awareness or understanding of the role of green fiscal policy are major institutional challenges that weaken the domestic implementation of environmental taxes (Zhu and Zhou, 2022).

Box 1 Carbon pricing mechanisms

As embedded in a broader climate mitigation policy mix, carbon pricing mechanisms have been widely considered to be powerful market-based instruments to correct the market failure of greenhouse gas emissions (Stern, 2021). The World Bank defines carbon pricing as an instrument that puts a price on the external costs of greenhouse gas emissions generated by the use of fossil fuels, equivalent to a value per tonne of carbon dioxide emitted (World Bank, n.d.). There are two types of carbon prices: explicit and implicit, which are widely used to internalise the cost of greenhouse gas emissions. Effective carbon pricing mechanisms involve three key elements: adopting a meaningful carbon price to account for the distributional impacts of carbon pricing revenues; implementing a customised approach for the different country contexts; and being part of a broader policy package. As documented by the World Bank, there are 68 global explicit carbon pricing initiatives comprising 36 carbon taxes and 32 ETSs with coverage of approximately 23% of global greenhouse gas emissions (World Bank, 2022).

Carbon taxes and emissions trading systems (ETSs) are the two main carbon pricing instruments and they have different key features. A carbon tax is a tax rate imposed by the regulator on the carbon content of fossil fuels whereas ETSs, also widely known as cap-and-trade systems, create a market in which participating entities trade allowances under an overall carbon emissions cap which is reduced over time. The market price for carbon emissions is driven by the supply and demand for such allowances. In principle, an ETS can provide greater certainty over emissions but greater uncertainty over prices, while the reverse is true for a carbon tax. In practice, both ETSs and carbon taxes may approximate a hybrid system over time in a dynamic setting. For example, ETSs may include price stability mechanisms, price floors, or adjustments in the quantity of

allowances, thereby reducing uncertainty in carbon prices. At the same time, carbon tax rates can be adjusted periodically to ensure emissions goals are met (Parry et al., 2022).

The main advantage of a carbon tax is its simplicity in implementation and enforcement (Avi-Yonah and Uhlmann, 2009). It can also be applied at upstream, midstream and downstream levels of the production chain (Parry et al., 2022). By comparison, ETSs are more complicated to administrate and their coverage is more limited. ETSs are usually applied to downstream production in large stationary sources in the power and industrial sectors, which have pre-existing regulations to address local pollution. ETSs require robust institutional capacity to monitor and report emissions and to supervise allowance registries and market trading.

There is no significant difference in the distributional impacts of carbon pricing on income distribution as carbon prices, either through carbon taxes or ETSs, can carry through to indirectly increase the prices of goods and services as well as fuels and electricity (ibid.). The disproportionate impact of carbon pricing on low-income households can be minimised by measures to offset the costs of carbon for these groups and improve political acceptability. For example, the use of carbon tax revenues is particularly effective for creating social safety nets in the form of cash transfers to support low-income households. By auctioning allowances, ETS revenues can be used to provide just transition assistance to vulnerable communities, as in the case of Germany.

Crediting mechanisms and internal carbon pricing are also important types of explicit carbon pricing mechanisms. Crediting mechanisms refer to tradable carbon credits created by voluntary emissions reduction activities. Carbon credits can be issued either through national governments or through international mechanisms such as Article 6.4 under the Paris Agreement, which aims to replace the Clean Development Mechanism (CDM) under the Kyoto Protocol with a new Sustainable Development Mechanism (SDM). The emissions reduction credits generated can be used by companies either to meet their compliance requirements under a carbon tax or ETS or to meet their voluntary commitments under the VCM.

Internal carbon pricing is a tool used by various private companies, financial institutions, governments and multilateral development banks (MDBs) to guide investment decisions and raise revenues for climate mitigation and/or adaptation programmes and projects. The adoption of internal carbon prices can help companies reallocate resources towards low-carbon business models and R&D investments. Internal carbon prices can also assign a financial value to both emitted and avoided CO_2 emissions that reveals the corporate risks and opportunities within operations and supply chains (Stiglitz et al., 2017). Internal carbon prices are known as 'shadow carbon prices' and are used by MDBs in the economic analysis of investment project financing (World Bank, 2017).

An implicit carbon price refers to non-price-based policies that implicitly estimate the monetary value of carbon emissions (World Bank, 2019). These include policy instruments such as the removal of fossil fuel subsidies, energy taxation or fuel excise taxes, and policies and subsidies that support renewable energy and energy efficiency, as well as standards and regulations.

The development of a global carbon agenda: a window of opportunity for China

It is imperative that individual countries recognise how the benefits of international cooperation on carbon pricing can help them deliver on their climate commitments. While there has been a spike in carbon prices, reaching a record high of almost €100/tonne under the EU ETS (Chestney et al., 2022), the global average carbon price was still at $3/tonne in 2020 (Parry, 2021). Due to individual economies' insufficient and uncoordinated climate mitigation efforts, the international community will be unable to deliver on climate goals unless action is ramped up. By acting as a strong and consistent price signal, collective action in setting a carbon price at an adequate level can reduce mitigation costs with efficient emissions reductions, preventing distortions in trade

and capital flows while aligning financial flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development (Stiglitz et al., 2017). This will in turn improve a country's comparative advantage in low-carbon manufacturing capacity and productivity growth. The International Monetary Fund (IMF) estimates that the global energy transition away from coal would generate US$78 trillion in socioeconomic value, which all countries could benefit from (Adrian et al., 2022).

International cooperation on carbon pricing through carbon taxes is a more effective solution than ETSs in addressing the urgency of energy and climate crises. The adoption of the Paris Rulebook at COP26 was a groundbreaking outcome in relation to Article 6 on carbon markets (Leva and Vaughan, 2021). Article 6 of the Paris Agreement allows participating countries to voluntarily cooperate with each other to achieve emissions reduction targets set out in their respective NDCs to reduce compliance costs that can speed up mitigation actions. This means that a country will be able to transfer carbon credits generated by emission reduction projects to help other countries meet their climate targets. However, the process of reaching a common approach to Article 6 cannot be completed until 2030 due to the complex nature of administrative systems (Asian Development Bank [ADB], 2020). The EU ETS reform has also proven that attempts to improve the policy design are politically difficult and carry increased administrative burdens (Tvinnereim and Mehling, 2018). The 2021 G20/OECD 'Inclusive Framework on Base Erosion and Profit Shifting' (BEPS) initiative to close tax loopholes and tax evasion is a leading example of international tax cooperation. Collective efforts like this will be vital to moving forward with international carbon tax cooperation.

By progressing with international cooperation on carbon taxes, China could reap the benefits of strengthened domestic resource mobilisation (DRM). International cooperation is crucial to enabling individual countries to build and maintain the public trust needed to jointly deliver on SDG 17 on DRM, which aims to mobilise domestic funding for development. DRM represents about half of the funding resources needed to close climate financing gaps, with international climate finance the other half (Bhattacharya and Stern, 2021). In the face of stretched public finance, carbon tax revenues can be a significant source of government funding to address the substantial financing challenges in achieving China's dual carbon goals. The Energy Foundation China (EFC) estimates that China requires at least CNY 140 trillion (US$20 trillion) of climate-related direct investments by 2050 (EFC, 2022).

Co-benefits of carbon pricing

A focus on the co-benefits of carbon pricing and an understanding of its distributional impacts would help policymakers to undertake climate action within national development policies. Emphasising the social, environmental and economic co-benefits of climate action would enhance political acceptability and reduce social opposition. Ninety per cent of the world's youngest and most competitive coal-fired power plants are in emerging and developing economies, mostly in Asia (Birol and Malpass, 2021) and policymakers are reluctant to retire them earlier than scheduled. However, there are substantial health benefits linked to climate mitigation policies, particularly through a reduction in air pollution, increase in active transport and healthier diets, which would accrue to national governments (Haines et al., 2009). The strong integration of climate mitigation and adaptation actions can maximise health co-benefits, substantially improving labour productivity and reduced income and social inequalities, which are instrumental to productivity growth and economic diversification. To ensure carbon taxes are not socially regressive, policies and measures are needed to develop a fair distribution of carbon tax revenues. These could be of cash transfers distributed to compensate low-income communities or increased investments in climate adaptation and resilience, both of which reduce poverty and inequalities.

China could enjoy much greater health and economic co-benefits from climate mitigation policies than those that would result from clean air policies. With the implementation of air pollution prevention and control measures during the 13th Five-Year Plan (2016–2020), the estimated health-related economic benefits (approximately CNY 2.49 trillion) far outweighed the policy costs (CNY 1.78 trillion). This prevented 380,000 premature deaths, created 5.76 million jobs and

increased China's GDP by CNY 2.2 trillion (US$314 billion) (CAEP and EFC, 2022). However, without ambitious climate mitigation actions, it has been widely recognised that clean air policies alone are insufficient to achieve the dual carbon goals and air quality objectives (Xue et al., 2022). If China moves forward with a carbon tax agenda, a wide range of health benefits could be unlocked through the decarbonisation of energy, industrial, transport, agriculture and trade systems (Whitmee et al., 2015). For example, by reducing local air pollution-related deaths alone, the health co-benefits of a carbon price of US$50 would be equivalent to an increase of around 3% in GDP by 2030 in China compared to the economic costs of almost 0.5% of GDP (IMF/OECD, 2021). More broadly, creating a healthy environment to support ageing populations will reduce inequalities and vulnerabilities by lowering the fiscal burden and public health expenditures on low-income households.

Impacts of carbon pricing

This section explores the potential negative impacts of carbon pricing on carbon leakage and international competitiveness and the policy solutions – in particular, the carbon border adjustment mechanism proposed by the European Union (EU CBAM). While aiming to address the risk of carbon leakage for emissions-intensive, trade-exposed (EITE) sectors, the EU CBAM can be politically challenging to reconcile with international trade laws and the principle of 'Common But Differentiated Responsibilities' (CBDR). This section also presents an in-depth analysis of the trade and climate implications for the EU CBAM in terms of consistency with the relevant WTO rules and the Paris Agreement.

Carbon leakage

Carbon leakage is a spillover effect of carbon pricing that has environmental consequences. As introduced earlier, carbon leakage occurs when firms in countries with ambitious climate policies are concerned about losing competitiveness to countries with laxer climate policies. As a result, they relocate their emissions-intensive production abroad, offsetting domestic action in emissions reductions. Carbon leakage is usually measured in leakage rates, i.e. the change (increase) in foreign emissions relative to domestic emissions due to carbon pricing (Bohringer et al. 2022). A sector's carbon leakage risk is determined by carbon intensity and trade intensity, where the former assesses an increase in relative cost and the latter examines whether this sector can pass carbon costs through to product prices (Sato et al., 2013).

The risk of carbon leakage is typically higher in EITE sectors, such as steel, aluminium and cement (Mehling et al., 2019) because industrial emissions are mostly linked to the production of basic materials that are hard to decarbonise. There is no empirical evidence that climate policy induces carbon leakage. The phased implementation of the EU ETS between 2005 and 2020, for example, has not caused carbon leakage (Naegele and Zaklan, 2018). This is because EITE sectors remain largely protected from high emissions reduction costs through exemptions or compensations (e.g. free allocation of allowances) and carbon prices have historically been low (Sato and Burke, 2021). There is also no evidence from other examples that domestic climate policies increased international carbon leakage over the past two decades (Eskander and Fankhauser, 2021).

International competitiveness

There is some uncertainty around the impact of carbon pricing on competitiveness, and this requires further investigation. However, many studies find the impacts of carbon pricing on competitiveness to be limited, given the oversupply of emission allowances under the EU ETS, for example. For this reason, there have been minimal impacts on the competitiveness and profitability of regulated firms, although a few sectors such as chemicals, non-metallic mineral products and electricity have seen some impacts (Verde, 2020; Dechezlepretre et al., 2018). In the view of Venmans et al. (2020), carbon pricing has a small and positive effect on productivity and innovation, particularly through a significant increase in patenting, despite the small negative competitive effects expected on net imports and foreign direct investment outflows.

Environmental policies with a focus on air quality management have proven to stimulate innovation and international competitiveness. The Porter hypothesis argues that polluting firms can benefit from more stringent environmental policies that result in a net positive effect on the competitiveness of regulated companies (Albrizio et al., 2017). This is illustrated in the example of the EU's clean air strategy, which has acted as a driver of economic development through innovation, competitiveness and trade flows (Amann et al., 2017). Positive effects derive from 'first-mover' advantage, for example improving innovation capacities through patenting and learning, knowledge transfer and resource efficiency, and R&D expenditures and investments. This helps countries to quickly gain a position of international competitiveness compared to 'late-mover' countries (Dekker et al., 2012).

Box 2. EU Carbon Border Adjustment Mechanisms

Carbon Border Adjustment Mechanisms (CBAMs) are trade-based climate policy solutions that address the risk of carbon leakage imposed by the implementation of carbon pricing. The rationale of CBAMs is to create a level playing field for products across jurisdictions without implementing ambitious carbon prices. CBAMs act as a market signal that encourages other countries to ramp up their climate ambitions and actions, accelerating the net zero transition as a result. In July 2021, the European Commission adopted a CBAM proposal that targets imports of carbon-intensive products in the power, iron and steel, aluminium, cement and fertiliser sectors. This is considered an essential policy tool under the European Green Deal in support of the EU's 2050 net zero goals. The EU CBAM is intended to equalise carbon costs across foreign and domestic producers (European Commission, 2021b). However, a tariff is imposed on imported goods based on the emissions released during their manufacturing process, which is equivalent to explicit or implicit domestic carbon prices.

The EU CBAM will be implemented from January 2023 to 2025 in a pilot phase, followed by a 10-year transition period, during which time the free allocation of allowances would be gradually phased out under the EU ETS. EU importers would need to purchase emissions certificates at the EU ETS price to cover the carbon content of the imported products, or 'embodied' carbon emissions. During the period of phasing out of free allowances, the EU CBAM can still protect the industrial competitiveness of key EITE industries from the risks of import-related carbon leakage (due to a loss of competitiveness against markets with weaker environmental regulations that are exporting to the EU). However, the EU CBAM does not address export-related leakage, which would result in a 6.8% export market loss (ERCST, 2022).

The EU CBAM can play a significant role in supporting the international climate agenda. A significant source of the CBAM revenues could be distributed to lower-income countries to accelerate the decarbonisation agenda. Similarly, the CBAM can also incentivise EU trading partners to introduce more ambitious climate policies and measures. For example, they could avoid paying the carbon border tariff by introducing non-pricing measures to reduce emissions embodied in their exported products. Importers are allowed to claim a reduction in carbon border adjustment taxes as long as explicit carbon prices are paid in the producing country.

Reactions to the CBAM from the EU's trading partners vary across countries. Some, such as Canada and the UK, are exploring the establishment of CBAMs (Government of Canada, 2021; UK Parliament, 2022) while in the US, despite the CBAM proposal by the US Congress (Carbon Credits, 2022), this was not reflected in the recently adopted Inflation Reduction Act. The BRICS countries (Brazil, Russia, India, China and South Africa) have concerns about the EU CBAM on the grounds of compatibility with the WTO rules and the principle of CBDR (South African Government, 2021; MEE 2022).

Trade implications of the EU CBAM

Concerns over trade competitiveness

Some countries are particularly concerned about the negative impact of an autonomous CBAM on international trade. The introduction of CBAMs would be expected to cause a decline in global demand for imported products, which would in turn drive down export prices of energy-intensive goods, leading to negative 'terms of trade' effects (i.e. the ratio of export prices to import prices). In this context, trade deterioration will decrease export volumes, especially in developing countries, causing deficits in the balance of payments through negative productivity shocks that affect the GDP growth rate (Miniane, 2004). Others find that low-income countries would be hardest hit by the negative terms of trade effect if more developed countries lead by introducing CBAMs (Weitzel et al., 2012).

The literature includes a mix of positive and negative responses to the impact of the EU CBAM on China. With the introduction of the EU CBAM, some EU imports from China would decrease: iron and steel by 8% and aluminium by 9% (Glaser and Caspar, 2021). However, the potential overall impacts of the EU CBAM on China's trade and competitiveness are likely to be small (Assous et al., 2021). Its impact on China's GDP could be negligible, given that China's exported products to the EU only account for 0.4% of China's total exports (He et al., 2022). If embodied carbon emissions are extended to cover direct and indirect emissions along value chains, China, Russia and India would incur the greatest losses. For example, China's steel exports to the EU would decrease by almost 20%. On the other hand, analysis by the United Nations Conference on Trade and Development (UNCTAD) suggests that the EU would experience real income losses of US$53 billion with domestic carbon prices at US$44, whereas countries like the US and China would benefit from positive income effects and fossil fuel exporters would experience losses (UNCTAD, 2021). In addition to income effects, the impact of the EU CBAM on employment and wage effects in most economies are very small; below 0.1% (ibid). However, the existing policy-relevant research has only considered the effects of the CBAM in isolation. As the objective of the EU CBAM is to maintain a level playing field while EU ETS prices increase, it would be appropriate to further examine the impacts of increased carbon pricing and the CBAM in tandem.

The relevance of WTO rules in supporting the EU CBAM

The multilateral trading system is vital in supporting environmental and climate goals. The main objective of the WTO is to ensure a global trading system that reduces trade barriers and avoids trade distortions and protectionism, but sustainable development and environmental protection are also at the heart of the multilateral trading system (WTO, 1994). The fundamental principle of the WTO is 'non-discrimination obligations', whereby members cannot discriminate between trading partners on 'like' products, according to Article I of the General Agreement on Tariffs and Trade (GATT) on the most-favoured-nation (MFN). GATT Article III on the National Treatment Principle states that WTO members should apply equal treatment to domestic and imported products in terms of internal taxation and regulation, regardless of the country of origin and production methods.

Legal scholars have proven that, in principle, CBAMs could be designed to be compatible with WTO rules by allowing countries to apply import charges and export rebates not exceeding indirect domestic taxes on 'like' domestic products, prior to applying the justifiability in discriminatory measures under Article XX (Parry et al., 2021). WTO rules allow members to implement differentiated measures between 'like' products and imported and exported products, provided the necessary measures are justified by legitimate objectives (WTO, 2020). With regard to 'likeness' in Article III, a determination of likeness for domestic and imported products is positively correlated with their competitive relationship, which is linked to production and process methods (PPMs) (Low et al., 2011). There are two types of PPMs: product-related and non-product-related (npr-PPMs), which refer to ways in which a product is made using different types and standards. Incorporating PPMs in the context of climate policies means to take into consideration the social and environmental cost of products, resulting in incentivising producers

and consumers towards low-carbon products. However, for product-related PPMs, it would be technically difficult to determine whether a tonne of steel is made with clean or carbon-intensive energy, for example. Assessing npr-PPMs is more controversial and needs consideration on a case-by-case basis.

If countries establishing CBAMs were found to breach WTO roles, Article XX would provide a legal basis for justifying GATT-inconsistent environmental policies and measures primarily for health objectives. The Article enables members two exemptions from GATT rules: taking policy measures to "protect human, animal, plant life or health", and "the conservation of exhaustible natural resources" (WTO, n.d.). In the traditional GATT case law of *US-Tuna*, it was deemed inappropriate to discriminate against imported products in terms of their environmental pollution (WTO, 2019). In the legal case of *European Communities-Asbestos*, the WTO dispute settlement system, the so-called Appellate Body, supported France to impose an import ban on asbestos and its related products produced by Canada, due to human health and labour safety considerations. As a major occupational health threat, the environmental health risks of asbestos fibres were the most important scientific evidence supporting the decision-making process of the Appellate Body, given that "health is both vital and important in the highest degree" (WTO, 2001). More broadly, factoring in the health impacts of climate change could provide robust evidence to improve the legal compatibility of CBAMs within multilateral trading systems. Doing so requires international research collaboration to gain a better understanding of the health co-benefits of climate and trade policies.

The adoption of a common approach to the measurement of embodied carbon emissions is also a key part of solutions to enhance the legal compatibility of the WTO principle of non-discrimination. The technical complexity of calculating carbon footprints is a major challenge that can cause increased administrative costs for exporters to meet border compliance. In the context of EU CBAM, the lack of a common methodology to measure the carbon content of the imported products among different trading partners would violate the WTO rules on the equal treatment of products. The low quality of carbon data is another major issue, especially for developing countries, making it even more difficult for them to measure Scope 3 emissions in their supply chains. Greater use of common industry benchmarks could therefore be established at the domestic or international level and increase the effectiveness of border carbon adjustments while reducing the risks of violating WTO rules (Brenton and Chemutai, 2021).

The consistency of the EU CBAM with the Paris Agreement

The EU CBAM could be designed in line with the principle of CBDR while creating a level playing field to accelerate climate action in countries that are trading partners of the EU. As discussed, a fair distribution of carbon pricing revenues can be a significant funding source to close climate financing gaps. The European Parliament considers revenues raised through the EU CBAM (estimated to be between EUR€5-14 billion per year) as the EU's own resource for supporting the implementation of the European Green Deal, by reducing regional inequality across the member states. In this regard, EU policymakers should also consider that CBAM revenues need to be a key part of the EU's financial contribution to international climate finance for the least developed countries (LDCs) (UNCTAD, 2021; Glaser and Caspar, 2021). Following Denmark's declaration as the first country to pledge the funding for loss and damage (Kaplan, 2022), the proceeds of CBAM revenues could be fairly distributed to LDCs through the creation of a Loss and Damage (L&D) Finance Facility, in support of the just transition agenda. These important equity considerations by EU policymakers would improve political acceptability and international support for the EU CBAM.

China's potential policy responses to CBAMs

1. Strengthen policy coordination and capacity-building through multilateral engagement in the WTO and G20

China could proactively strengthen engagement in the high-level policy dialogues supported by the WTO and the G20, both of which play a central role in accelerating climate action while managing trade friction. The existing forums can serve as a point of entry to enable China to bolster international coordination with the EU and other countries on the design and implementation of CBAMs. For example, the WTO Committee on Trade and Environment (CTE) was created to ensure that trade and environmental policies are mutually supportive (WTO, 2021b). An inclusive Coalition of Trade Ministers on Climate was recently established by the EU with members from Ecuador, Kenya and New Zealand to enhance ministerial-level dialogue on trade and climate policy (European Commission, 2022b). Similarly, the G20 is a successful platform for enhancing trust among member countries within multilateral trading systems. G20 member countries agreed to improve the integration of trade and investment policies with industrial policies, along with the importance of climate finance in encouraging sustainable investment for global economic recovery (Salinatri, 2022). The G20 can also support member countries to improve the legal compatibility of CBAMs with WTO rules, by facilitating the global policy dialogue on carbon pricing to discuss common methodologies for measuring implicit and explicit carbon prices (OECD, 2022).

2. Find win-win solutions through international coordination on the carbon price floor

International and regional cooperation on carbon pricing can support China to leverage the role of fiscal policy in support of dual carbon goals. In May 2022, China's Ministry of Finance (MOF) announced that by 2025 a tax policy framework will be developed to support low-carbon green development (MOF, 2022). In this context, the G20 in collaboration with the Asia Pacific Tax Hub can play an important role in supporting member countries like China to strengthen their institutional capacities on international carbon pricing initiatives through technical assistance and capacity building (G20, 2022). The International Carbon Price Floor (ICPF), a proposal by the IMF, would be at the centre of discussions. The ICPF aims to encourage a small number of key greenhouse gases emitters within the G20 to agree on the implementation of a minimum carbon price in a differentiated approach. This bottom-up approach is in line with the CBDR principle that allows countries in different income groups to implement differentiated carbon prices. For example, high-income countries should consider setting a carbon price at US$75, and middle- and low-income countries US$50 and US$25, respectively. Despite China being a middle-income country, the introduction of a carbon price of US$25 alone would go some way to help achieve China's NDC target by 2030 (Parry et al., 2021). In particular, a carbon tax levied upstream on fossil fuels (i.e. in the exploration stage of fossil fuel production) would make data fraud much more difficult, addressing the challenge of Chinese regulated firms misreporting data under the national ETS.

More importantly, setting up an ICPF can help to address the competitiveness concerns imposed by CBAMs and avoid the penalty being imposed by the EU CBAM on carbon embodied in imported productions from China. That being said, the introduction of a CBAM could be a lever to induce international carbon tax cooperation. This has the potential to make the CBAM superfluous as more countries ramp up their ambitions and actions (ibid.). With technical support from the Tax Hub, China and G20 countries can jointly discuss how to implement effective and inclusive carbon price floors in a coordinated approach, while exploring the ways in which an international fiscal transfer system can be established to channel carbon pricing revenues to low-income countries.

Implementation of the ICPF proposal by major emitters would accelerate the delivery of international climate finance to LDCs. The core idea of the ICPF is to take into consideration equity concerns, in which an international fiscal transfer system could be set up to compensate lower-income countries. If China moves forward with significant carbon pricing, other high

emitters such as the United States would need to match their ambitions with actions by adopting a US$75 carbon price at the national level. As the largest historical CO_2 emitter, the US needs to take a leading role in international cooperation over carbon tax. The resulting carbon tax revenues would significantly help to close the climate financing gaps in LDCs, such as through the delivery of US$100 billion in international climate finance, a doubling of climate adaptation finance, and the creation of a L&D Finance Facility (UNFCCC, n.d.). If the IMF ICPF proposal is turned into action, China could also consider imposing its own CBAM against other major trading partners (e.g. the US) that do not make this adjustment.

3. Explore linkage opportunities for the international carbon markets

In parallel with international cooperation on carbon taxes, international carbon markets could be further explored as the long-term solution by linking China's national ETS with the EU and other neighbour countries in Asia under Article 6.2 of the Paris Agreement. This allows countries to trade emission reductions or mitigation outcomes by establishing the linking of their domestic ETSs. This requires participating countries to estimate the emissions reductions incentivised by allowances trading and to translate this net volume of emissions into internationally transferred mitigation outcomes (ITMOs). These ITMOs are reflected through the Article 6 reporting systems that will allow countries to use emissions reductions through a linked ETS towards achieving their NDC target. The key feature of the new Glasgow rules is to prevent double counting for the ITMO carbon reduction credits. International linkages of carbon markets require strong political and economic relationships and similar climate ambition and action. Successful examples of this include the EU with Switzerland and California with Quebec.

Systematic domestic reform of China's ETS is needed before linking it with other international ETSs. To achieve the harmonisation of different ETS systems, it is important to ensure that countries are on a level playing field by setting similar emissions reduction targets and emissions caps, carbon price levels, sector coverage and market stability mechanisms (Citi, 2021). China could set an absolute cap on total emissions to address the underlying cause of low carbon prices. More regulatory measures need to be introduced to ensure that there are no price clashes in linking international carbon markets, which happened in the California-Quebec ETSs (Green, 2017). This requires a common solution for the allocation of allowances, for example auctioning, which can generate high carbon prices to speed up the energy transition. Further, the integration of digital transformation and dual carbon goals need to be part of the solutions to closing the data gaps. For example, harnessing digital technologies can improve the traceability of the Scope 3 embodied emissions in supply chains. Lastly, the carbon offset credits in China's voluntary carbon market (VCM) need to be recognised by regulators as an asset class, which is essential to attract institutional investors in climate mitigation and adaptation projects. This requires a focus on the quantification of co-benefits that can improve the quality of carbon credits, which will mobilise a large scale of early-stage financing from private investors (Rosales et al., 2021).

4. Fostering a just energy transition through the Belt and Road Initiative

The links between climate change and trade consist of two-way interactions. The multilateral trading system plays a crucial role in supporting climate mitigation and adaptation goals, but climate change is also the key driver of disruptions to international trade through its impacts to production and supply chains. Prominent examples include the 2011 flooding in Thailand that caused US$46.5 billion in economic losses and damages (World Bank, 2012) and, more recently, the devastating floods in Pakistan, estimated to have caused the country a 10% loss in GDP (Shah, 2022). Already weakened by the pandemic, global supply chains are under renewed stress following Russia's invasion of Ukraine, with devastating impacts on food and energy security. To deal with future energy supply shocks and climate-related disasters, enhanced multilateral action is needed to accelerate the energy transition away from fossil fuels. This requires pushing forward with a coordinated approach to integrating energy security into climate and trade policy. As a major exporter and investor in climate and energy infrastructure globally, China can play a vital role in strengthening regional and international trade and climate cooperation through the Belt and Road Initiative (BRI), particularly in the Asia-Pacific region and Africa.

This chapter presents an in-depth overview of China's global climate action through the BRI and how it can scale up investments in sustainable infrastructure and supply chains.

Green development along the Belt and Road

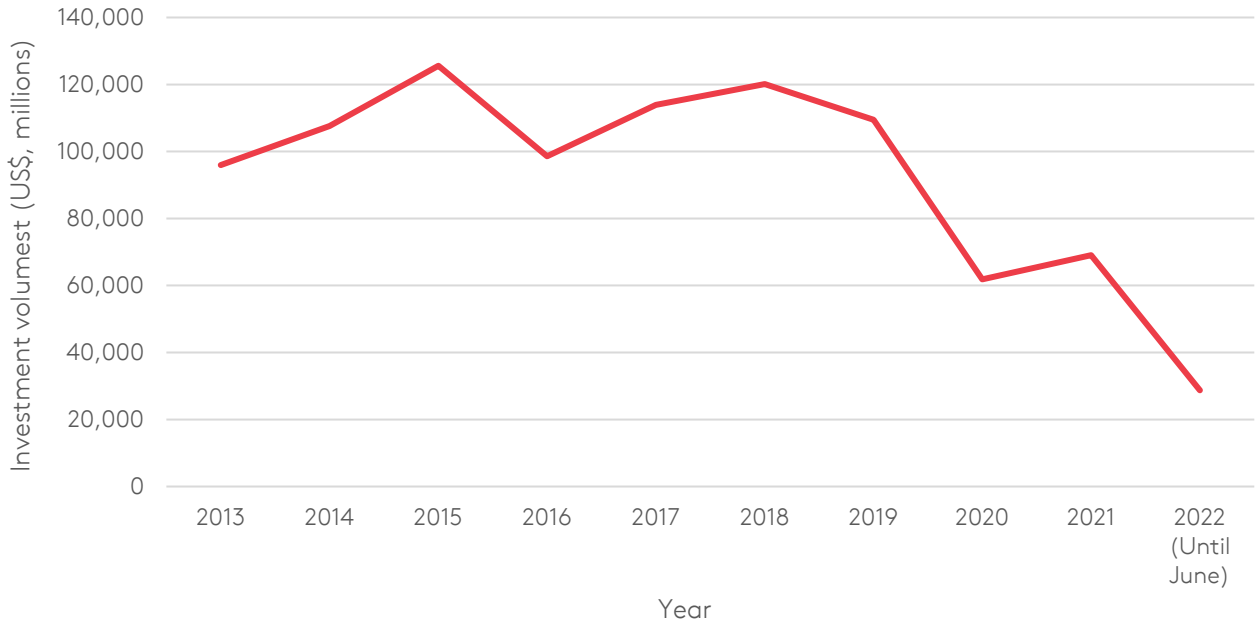
To support a sustainable global economic recovery, China has translated international climate commitments into concrete action through the BRI. In 2021 China upheld its commitment to stop building new coal projects abroad, and renewable energy investment volumes reached a new height of US$6.3 billion that year (Nedopil, 2022a).

The BRI was launched in 2013 as a major regional platform for development cooperation aiming to enhance policy coordination, infrastructure connectivity, trade and financial integration, and people-to-people connectivity in 149 member countries (Nedopil, 2022b; China Daily, 2022). While the BRI has played an important role in meeting infrastructure investment needs in developing countries, there has been a decline in these foreign direct investment flows since 2018. Between 2013 and 2021, total investment flows in BRI countries reached US$902.19 billion, with about 40% and 23% of this respectively going to the energy and transport sectors (Nedopil, 2022a; 2022c). BRI investments reached peak levels in 2015 at US$125.59 billion and continued to decline from 2018 onwards, dropping by more than half to US$60.5 billion in 2020 and stagnating at US$59.5 billion in 2021. Figure 4.1 below shows overall Chinese investment flows in BRI countries.

The main drivers of investment slowdown are low project returns associated with policy and regulatory uncertainties in BRI countries, as well as a lack of due diligence from Chinese investors resulting in BRI projects that negatively impacted the livelihoods of local communities (Baltensperger and Dadush, 2019). This may lead to the perception that China has been exporting domestic industrial overcapacities (e.g. excess supply of coal, steel and cement products in China being exported to less developed countries) to BRI countries, causing environmental degradation (Zhou, 2018).

To address the BRI project challenges, China has been committed to greening the BRI. The China International Development Agency (CIDCA) is China's institutional response to addressing the negative environmental and social impacts of BRI projects in the host countries. CIDCA is a foreign aid agency responsible for overseeing BRI project planning, approval, and monitoring and evaluation. The emerging policy priorities of CIDCA are to tackle the pressing issues of China–Africa debt relief, climate change and multilateral cooperation in developing countries (State Council, 2021).

Figure 4.1. Overall Chinese investment flows in Belt and Road countries (2013–2021)



Source: Green Finance & Development Center (2022)

The Chinese ministries in charge of BRI operations released three sets of policy guidelines between 2021 and 2022 that indicate China is transitioning from the 'hard' power of infrastructure investment to a 'softer' power through investing in the flows of regional and global public goods.

Green recovery through policy and infrastructure connectivity

Aligning BRI policies with the Paris Agreement is key to accelerating the global energy transition. China's Ministry of Commerce (MOFCOM) and Ministry of Ecology and Environment (MEE) jointly issued a policy document in July 2021, *Green Development Guidelines for Overseas Investment and Cooperation*, on aligning Chinese overseas investments for the BRI with the Paris Agreement, Convention on Biodiversity Diversity, SDGs and Green Investment Principles (GIP) (National Development Reform Commission [NDRC], 2021). This policy coordination will secure investor confidence to increase trade and investment flows to reach climate goals. The policy document points out that Chinese companies need to play a larger role in supporting the low-carbon transition, with a focus on strengthened environmental risk management and climate- and environmental-related disclosures. Meanwhile, companies must scale up sustainable infrastructure investment and leverage the role of partnerships to integrate into green global supply chains. The latter refers to the third-party market cooperation, China's international cooperation mechanism launched in 2019 by the National Development and Reform Commission (NDRC), which encourages Chinese companies and financial institutions (including the main BRI financiers[5]) or BRI investors to identify high-quality infrastructure project opportunities in developing countries and promote open and inclusive economic cooperation in collaboration with overseas investor companies from developed countries (State Council, 2019). China has signed such agreements, or Memorandums of Understanding (MoUs), with 14 developed countries including G7 countries, among them the UK, Japan, Canada, France, Italy, and Singapore and South Korea (NDRC, 2019).

[5] These include policy banks (i.e. China Development Bank [CDB], the Export-Import Bank of China [CHEXIM], and Agricultural Development Bank of China [ADBC], and the 'big four' state-owned banks (i.e. Bank of China, the China Construction Bank, the Industrial and Commercial Bank of China and Agricultural Bank of China).

The BRI investment and development cooperation agenda emphasises the need to meet international standards in the quality of project development, the development of corporate sustainable investment strategies and compliance with environmental protection responsibilities, by taking action to tackle environmental pollution, climate change and biodiversity loss throughout the project cycle (MOFCOM and MEE, 2022). Chinese project developers need to adopt international best practice from international financial institutions or the most stringent Chinese standards in host countries where a rigorous environmental and social policy framework, also known as safeguarding policies, are not present. Low-emissions technologies, equipment and materials need to be prioritised during the project construction stage.

Sector-specific requirements must be considered in project design. For example, in solar and wind renewable energy infrastructure investment, companies are required to minimise the potential detrimental environmental impacts of such projects. Hydropower project sites must not be selected at the expense of ecosystem health, instead taking adequate measures to protect aquaculture and wildlife and strengthen reservoir management. For oil and petrochemical projects, companies need to take measures to reduce environmental pollution and greenhouse gas emissions and enhance their monitoring capacity for addressing environmental risks.

China has adopted a comprehensive approach to promoting international cooperation on BRI green development. A policy guideline published by the NDRC focuses on decarbonising key sectors such as energy, transport and industrial sectors, as well as greening trade and finance, by 2025 (BRIGC, 2022). International cooperation on solar and wind energy investment through increased investment, supply chains and green financing is listed as a top priority while emerging low-carbon technologies such as smart grids, hydrogen, energy storage and carbon capture, use and storage (CCUS) are the primary areas of joint research and capacity building. China maintains a cautious approach to overseas coal projects that are under construction, while implementing low-emissions technologies and CCUS for coal plants to reduce air pollution and greenhouse gas emissions. Electrification of road and sea transport, together with green industrialisation, are other focus areas, which encourage companies to scale up green supply chains in renewables and electric vehicles and ferries. Tariff structures must be optimised to facilitate trade in value-added green products.

Green recovery through trade integration

The development of green supply chains is an emerging BRI policy priority, with a current focus on the soft commodity trade. China has declared that it intends to foster its participation in global supply chains in green manufacturing, which is still in the early stages (State Council, 2017). Lessons from how the COVID-19 pandemic exposed supply chain vulnerabilities have accelerated China's efforts to strengthen the resilience of global value chains (MOFCOM, 2020). The main advantages of global value chains are that they improve productivity growth and create more highly skilled jobs while reducing trade costs and improving international competitiveness. The Green Value Chain Institute, established by the MEE in 2020, aims to provide technical support to Chinese companies on promoting global value chains in environmentally friendly goods (CCICED, 2021). To enhance global value chain resilience, MOFCOM is developing a supply chain security index that will promote sustainability in soft commodity production. In addition to domestic progress on green supply chains, China's largest food trader is committed to developing a sustainable food value chain that addresses climate change to halt deforestation and improve food security (UK COP26, 2021a).

Green recovery through financial integration

China has been proactively scaling up sustainable financing to support investment in the clean energy transition in BRI countries. In 2021, 58 green bonds were issued overseas with a total value of US$21.47 billion, an increase of 162.8% from the previous year (Xinhua Finance, 2022). The sources of finance are primarily provided by China's national development finance institutions (DFIs) or policy banks such as the China Development Bank (CDB) and The Export-Import Bank of

China (CHEXIM), as well as state-owned commercial banks and enterprises, which use a number of financial instruments such as green bonds, green credit, and green insurance. Some green bond issuances followed the China-EU Common Ground Taxonomy to support the expansion of the overseas green bond market (PBOC, 2022).

On multilateral cooperation, CDB signed an MoU with the Green Climate Fund (GCF) to explore co-financing opportunities for climate mitigation and adaptation projects in developing countries (CDB, 2021). China is co-chairing the G20 Sustainable Finance Working Group (SFWG), together with the US, for the development of the Sustainable Finance Roadmap. Transition finance, which enables firms in carbon-intensive and hard-to-abate sectors to accelerate their decarbonisation process, is for the first time included as a key area of focus (G20, 2022a).

Challenges and opportunities for delivering the BRI green commitments

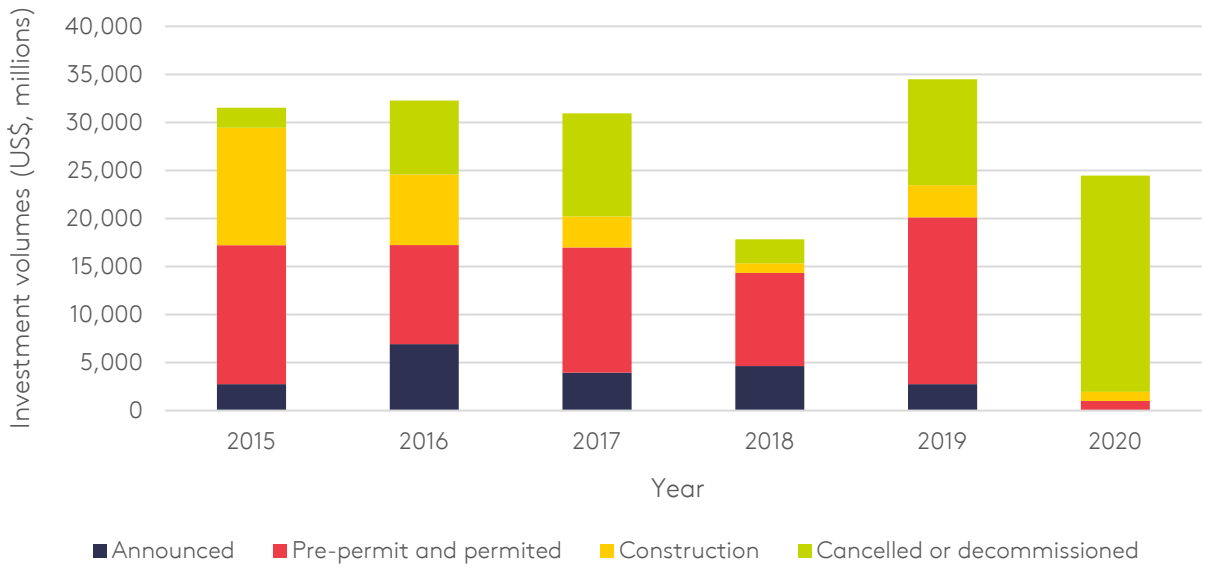
The continued upward trend of BRI investments in fossil fuels will not only put climate goals out of reach but will also lead to an increase in the climate-related financial risks of China's overseas fossil fuel assets. Between 2008 and 2019, China's overseas development finance in the energy sector has been concentrated in coal-fired power plants (Boston University, n.d.). China's major policy banks, CDB and CHEXIM, have provided loans for over 40GW of overseas coal power plants in developing countries, mainly in South and Southeast Asia (Nedopil et al., 2022a). Despite China's decision to end new coal projects overseas being an encouraging move for climate mitigation, over half of BRI energy investments in 2021 went to oil and gas projects (Nedopil, 2022a). In this regard, BRI lending and investment decisions have not yet factored in the physical or transition risks of climate change.

As central banks and supervisors emphasise, climate change-related physical and transition risks are a source of financial risk that can pose a long-term threat to economic development (BIS, 2021). Physical risks stem from extreme weather events, rising sea levels, warming temperatures and ocean acidification, for example, while transition risks are driven by changes in climate policies, technologies and consumer preferences. In the absence of policies to manage a steady transition away from fossil fuels, there is a risk that China's overseas fossil fuel assets will become stranded. If left too late, an abrupt adjustment to these investments carries therisk of suddenly eroding asset value and leaving investor portfolios exposed.

In the context of the global transition away from coal, Chinese investors may face longer payback periods on their existing coal projects in BRI countries as well as uncertainty around the returns the investments will generate. Fifty-two overseas coal projects were announced by Chinese investors between 2014 and 2020, but only one has gone into operation (in Bangladesh), 25 have been shelved and eight have been cancelled (Nedopil et al., 2022b). During the same period, over US$65 billion of Chinese overseas coal projects were shelved, decommissioned or cancelled, out of the US$160 billion total project investments. The value of coal projects that have been cancelled or decommissioned increased from US$2 billion in 2015 to US$25 billion in 2020. Furthermore, as indicated by Figure 4.2 below, the value of ongoing coal projects shrank from nearly US$30 billion in 2015 to less than US$2 billion by the end of 2020. In 2020, less than US$1 billion of coal projects were under construction, compared with over US$12 billion in 2015 (Nedopil, 2021).

> **The continued upward trend of BRI investment in fossil fuels will not only put climate goals out of reach, it will also increase the climate-related financial risks of China's overseas fossil fuel assets.**

Figure 4.2. Status of China's overseas coal investment pipeline (2015–2020)



Source: Green BRI Center at the International Institute for Green Finance (IIGF) of the Central University of Finance and Economics (CUFE), 2021

Coal projects are being cancelled because more countries are ratcheting up their climate ambitions. This has led to the implementation of carbon pricing policies and high financing costs – which increased by 38% between 2010 and 2020 (ibid.). Many coal projects have been delayed in their construction due to local environmental protests or requests from countries to redirect BRI financial flows from coal to renewable energy investments, for example in Egypt and Bangladesh.

China could work with BRI countries on the retirement of overseas coal-fired power plants through bilateral engagement and policy coordination. This would help Chinese investors to minimise financial losses from their overseas coal assets while prioritising the development needs of the host countries. Despite China having kept its promise of no new overseas coal financing in 2021, three coal-fired power plants in Bosnia, Indonesia and Vietnam announced by Chinese developers in the first half of 2021 are to be implemented (Nedopil, 2022a). Regardless of the economic risks they entail, coal projects along the BRI are also inconsistent with some countries' energy transition development objectives. Indonesia and Vietnam, for example, are signatories to the *Global Coal to Clean Power Transition Statement* (UK COP26, 2021b). China could initiate a bilateral policy dialogue with host countries on decommissioning coal to jointly identify feasible options on how coal financing can be redirected to renewable energy investments, simultaneously overcoming the issue of Chinese investors' anticipated financial losses.

The development of a transition finance agenda could guide BRI investors to accelerate the decarbonisation of their overseas fossil fuel-related stranded assets. Transition finance, which supports decarbonisation activities of firms in emissions-intensive and hard-to-abate sectors, is on the rise in China. Although a transition finance implementation plan not yet been fully developed, the National Association of Financial Market Institutional Investors (NAFMII) has released guidelines for piloting the development of sustainability-linked bonds (SLB) in the power, buildings, steel and petrochemical sectors, for example (CF40, 2021). The Bank of China issued the first SLB following the International Capital Market Association (ICMA) Climate Transition Finance Handbook, with funds to be used in the areas of gas combined heat and power (CHP), gas-fired electricity and waste heat to power (WHP) and power generation at cement plants (Bank of China, 2021). The People's Bank of China (PBOC) could develop a clear transition finance roadmap that directs Chinese companies and financial institutions to decarbonise their overseas fossil fuel investments, through issuance of sustainability-linked loans and bonds, for example. A

domestic monetary policy instrument introduced by the PBOC, the Carbon Emissions Reduction Facility (CERF), could also be extended to support Chinese investors to reduce financing costs for solar and wind power projects in BRI countries.

Adopting a whole-of-government approach will improve cross-sectoral collaboration between monetary, finance and economic authorities, which is crucial for the effective scaling up of green financing in BRI countries. In 2021, the PBOC released a green financing evaluation encouraging 24 major Chinese financial institutions (including the main BRI financiers) to scale up their domestic green financing operations (PBOC, 2021). The evaluation uses quantitative and qualitative indicators, comprising 80% and 20% of the assessment weight respectively. The quantitative part mainly looks at the total share of green financing (in the form of green loans and green bonds) in the regulated financial institutions' operations. The qualitative part evaluates the implementation status of domestic green financial policies and regulations, and the role of finance in supporting green and low-carbon investments. The PBOC could extend this domestic policy to help increase the share of green financing in Chinese financial institutions' overseas investment portfolios, accelerating the development of sustainable capital markets in BRI countries. The NDRC and the Ministry of Finance (MOF) could also strengthen coordination to provide policy support for climate-related infrastructure financing in BRI countries. This coordinated institutional action would support BRI investors to speed up the implementation of the Green Investment Principles for the BRI, alongside exploring the participation of state-owned enterprises and banks in the Glasgow Financial Alliance for Net Zero (GFANZ).

Greening the Belt and Road through partnerships

China will be taking further steps to ensure that BRI infrastructure investments are consistent with low-carbon and climate-resilient pathways, while recognising the development priorities of energy access and natural capital in the host countries. This paradigm shift in China's international development agenda underscores the key role of partnerships in support of a low-carbon transition in the Asia-Pacific region and Africa (MFA, 2021a; 2021b).

This section presents two case studies that examine China's potential role in promoting regional economic integration to support the expansion of low-carbon trade and investment opportunities; in Indonesia and Africa.

China is the largest trading partner and second largest foreign investor in Indonesia (Ji, 2022; Maulia, 2018) and the largest trading partner and fourth largest foreign investor in Africa (Mureithi, 2022; Fu, 2021). Southeast Asia and Africa are highly vulnerable to the impacts of climate-related extreme weather events, which can cause disruptions to global value chains through damage to infrastructure and communities. For example, heatwaves disproportionately impact outdoor workers in sectors such as agriculture, manufacturing and construction, which is already affecting labour supply and labour productivity (Romanello et al., 2021). Productivity loss from extreme heat alters patterns of comparative advantage, while heightening food insecurity, causing negative health impacts and worsening the economic outlook in climate vulnerable countries. By taking action to scale up sustainable infrastructure investment and green value chains, China can play an instrumental role in reducing climate change vulnerability and improving low-carbon competitiveness in BRI countries.

Case study 1: Accelerating the sustainable energy transition in Indonesia

The bilateral relationship between China and Indonesia has reached new strengths. As the second largest recipient of China's BRI investment in 2021, Indonesia is located at the centre of the BRI on the 21st Maritime Silk Road (Nedopil, 2022a). China and Indonesia have established a high-level bilateral cooperation mechanism, primarily deepening development cooperation through the BRI (MFA, 2021c). President Xi reiterated that China will provide a range of development support by linking its 'Dual Circulation' strategy with Indonesia's mid- and long-term national development strategies (MFA, 2022a), of which *Indonesia's Long-term Strategy for Low Carbon and Climate Resilience 2050* (LTS-LCCR 2050) is a key part (UNFCCC, 2021). Indonesian President Jokowi's

visit to Chinese President Xi in July 2022 saw both nations affirm their commitment to scaling up development finance in low-carbon green development (MFA, 2022b). China also expressed strong support for Indonesia's G20 Presidency in 2022, given the crucial role of the G20 in accelerating the global economic recovery. With enhanced bilateral cooperation, China can play a significant role in supporting a just energy transition and integrated green supply chains in Indonesia, in line with the G20 priority of a sustainable energy transition.

Increased climate ambition and action in Indonesia pose significant economic risks to BRI coal projects. Indonesia is committed to increasing the share of renewable energy in its national energy mix from just over 10% in 2021 to 23% by 2025, reaching peak greenhouse gas emissions by 2030 and carbon neutrality by 2060 (UNFCCC, 2022). Indonesia has pledged to phase out coal-fired power plants by 2040 (UK COP26, 2021b), but given that coal accounts for nearly 40% of the energy mix, this is conditional on international assistance (Ritchie et al., 2020). In aid of this goal, Indonesia will launch a coal retirement programme in 2030 (Fitriyanti and Putriastuti, 2021). More importantly, the Bali Energy Transitions Roadmap, endorsed by G20 member countries in September 2022 under Indonesia's Presidency, reaffirms the importance of accelerating the clean energy transition in terms of energy access, energy technologies and energy financing (G20, 2022b). This puts additional financial pressure on China's overseas coal assets that are being stranded.

The Energy Transition Mechanism (ETM) will create an economic opportunity that improves the risk-adjusted return profiles of Chinese investors in Indonesia. The ETM, launched by the Asian Development Bank (ADB) at COP26, aims to retire 50% of the coal-fired power plants and accelerate renewable energy investments in three pilot countries: Indonesia, Vietnam and the Philippines (ADB, 2021). Analysis by the University of Maryland finds that, to accelerate the coal transition by 2050, the economic benefits of phasing out coal subsidies and avoided health impacts of air pollution are as much as four times greater than the costs arising from stranded assets, coal retirement, coal workers' transition and state coal revenue losses (Cui et al., 2022). The ETM will encourage independent power producers (IPPs), which build and operate power plants and sell the electricity to state-owned utility companies, to renegotiate the existing coal contracts or power purchasing agreements without financial losses.

As a blended finance[6] vehicle, the key feature of the ETM is its financing structures, which take the form of a carbon retirement portfolio (CRP) that buys out and retires coal plants earlier than originally scheduled; coal asset owners do not take responsibility for coal decommissioning (Bazilian et al., 2021). This highlights the important role of concessional finance (i.e. a range of below-market interest rate financial products in the form of loans, grants and, to a lesser extent, equity investments [World Bank, 2021]) in de-risking coal retirement projects that can crowd in private sector participation, by helping offset the present value lost by retiring the plants early. The ETM Partnership Trust Fund managed by ADB could attract private investors through the use of concessional capital and increase its cash flows through developing a carbon credit scheme. A Just Transition Facility is provided to support just transition policies and programmes with technical assistance and financial support, which can bolster foreign investor confidence by compensating affected workers and communities in the interest of social welfare.

Closer collaboration between the third-party market cooperation mechanism and the ETM can build synergies to maximise development effectiveness in supporting climate goals in Indonesia. This means that BRI investors can engage with development partners and private financiers under the ETM to jointly deliver on climate action in Indonesia through the MOF. For example, in the case of the controversial construction of a coal power plant in Central Java, which operates under third-party cooperation (NDRC, 2019), China could identify this plant for early retirement in

[6] Blended finance is also known as blended concessional finance. The OECD defines blended finance as 'the strategic use of development finance for the mobilisation of additional finance towards sustainable development in developing countries': https://www.oecd.org/dac/financing-sustainable-development/blended-finance-principles/.

collaboration with the US and Japan and in so doing demonstrate a leading example of proactive action towards decarbonisation.

Similarly, BRI investors urgently need to deliver on President Xi's commitment to scaling up financing for green development by addressing the current lack of renewable energy development in Indonesia. Taking advantage of their complementary competitive advantages, Western companies could offer attractive project financing structures and low-carbon technologies while China provides the manufacturing capacity. This cooperation mechanism could unlock investments in emerging technologies cost-effectively, while fostering technology and knowledge transfers. In this context, Chinese investors could explore options for financing wind and solar power project investments with development partners and other private investors under the ETM.

Integrated sustainable supply chains in green industrial parks

Current BRI nickel mining investments are affecting ocean health, going against both China's foreign investment guidelines and Indonesia's 2050 long-term strategy. China is the largest importer of ferronickel from Indonesia, which accounts for about 84% of China's total imports (Bloomberg News, 2022). Since the launch of the BRI in 2013, China has supported the development of an integrated steel industry and a nickel production base in Indonesia's Morowali Industrial Park through private investment from China's Tsingshan Group, the world's largest producer of stainless steel and nickel, which holds 20% of the global nickel market (Sanderson, 2022). However, nickel mining activities using deep sea waste disposal harm the marine environment and local communities (Sanderson, 2020; EJAtlas, 2022). This low-cost method of dumping mine waste in the water has been used by many companies in developing countries, with detrimental consequences including hazardous air pollutants, contaminated water and biodiversity loss, including on coral reefs. Indonesia's food production and tourism sectors are heavily dependent on a healthy ocean, which is also vital to climate change mitigation, adaptation and resilience. Meanwhile, China's latest foreign investment guidelines emphasise that Chinese companies need to take responsibility for preserving biodiversity in BRI projects. Chinese investors must therefore strengthen mining waste management in BRI countries by prioritising more environmentally friendly methods, for example using an inland waste dam. China could follow the Global Industry Standard on Tailings Management, the first industry benchmark for the safe disposal of mine waste (i.e. tailings) (Global Tailings Review, 2020).

In response to Indonesia's discontinuation of nickel exports, Chinese investors can support Indonesia's advancement in global value chains. Although Southeast Asia more widely is highly integrated into the global economy, Indonesia is poorly integrated into global value chains, with a trade-to-GDP ratio (which reflects the relative importance of international trade to a country's economy) of 40%, well below the global average of 52% (World Development Indicators, n.d.). Indonesia's participation in global value chains declined between 2000 and 2017, meaning that the country was producing fewer intermediate goods and services (IsDB and ADB, 2019). As a result, President Jokowi announced that Indonesia will be shifting from being an exporter of raw materials to a producer of processed metals, enabling the country to move up regional and global value chains (Cabinet Secretariat of the Republic of Indonesia, 2021). Following its discontinuation of raw ore exports in 2019, Indonesia will continue to impose export bans on critical materials such as bauxite, copper and tin in the coming years to foster development in downstream industry by producing higher value goods. This signals to China that a surge in input prices is expected. The most cost-effective way to drive down the cost of the energy transition is to increase investments in local supply chains in Indonesia.

China can lead by example in greening the Regional Comprehensive Economic Corridor (RCEC), in support of green industrialisation in Indonesia. The RCEC, proposed by President Jokowi in 2017, aims to attract BRI investments in ports and industrial parks to boost economic growth and create jobs in North Sumatra, North Kalimantan, North Sulawesi and Bali (Belt and Road Forum, 2017). Meanwhile, President Jokowi aspires to develop the world's largest green industrial park, the PT Kalimantan Industrial Park in Indonesia, which began construction in late 2021. This marked a turning point for Indonesia showcasing its sustainable economic transformation. The

mega-project aims to attract US$132 billion in overseas investment to develop products including electric vehicle (EV) lithium-ion batteries and green aluminium powered by hydro and solar (Medina, 2021; Maulia, 2022).

However, at the same time, Indonesia passed the controversial Omnibus Law, which aims to create a favourable environment for foreign investment at the expense of environmental and social safeguards (UNCTAD, 2020; Mulyanto, 2022). China could intervene here to ensure international and Chinese standards are adopted in green industrial parks. For example, China could follow its stringent domestic emission standards for the iron and steel industry to support low-emissions steel development in Indonesia where they have not yet been directly introduced.

China can develop the world's first climate-smart, nature-positive and socially responsible integrated supply chains of solar photovoltaic (PV) and EV batteries in Indonesia's Kalimantan Industrial Park, in support of a just transition agenda. Chinese solar PV and EV battery companies have been expanding their overseas manufacturing plants in Southeast Asia. Solar PV manufacturer JinkoSolar has established China's largest overseas solar PV supply chain and associated R&D centre in Malaysia and increased upstream supply chain investment in Vietnam (Sylvia, 2020; WEF, 2022). Indonesia could be the next investment destination as the country aims to develop a regional export hub of EVs in Southeast Asia (Xinhua, 2021).

On sustainable supply chain management, China has been advancing environmentally-friendly technologies and practices at the China-Singapore Suzhou Industrial Park to foster innovation in green and digital transformation – and these could be scalable and replicable in Indonesia (UN-PAGE, 2019). Safe waste disposal, for example, is achieving economic efficiency and environmental benefits, which will contribute to more sustainable nickel mining in Indonesia. Social standards implemented in the Suzhou Industrial Park, such as eliminating gender discrimination in employment practices and providing adequate social insurance to workers could also be replicated in Indonesia. Digital technologies have a place in these green supply chains, as they can help improve transparency and traceability of carbon footprints, while identifying and mitigating environmental and social risks.

Case study 2: Achieving universal access to sustainable energy in Africa

As part of the China-Africa Cooperation Vision 2035, China is committed to scaling up renewable energy investments in Africa. Between 2010 and 2018, only one-quarter of total investment in Africa's energy sector investment (US$37 billion of US$148 billion) was provided by BRI financiers. This was predominately to fossil fuel and hydropower projects (Chiyemura et al., 2022). Despite the BRI investment portfolio seeing a strong shift towards African countries in 2021, the share of Chinese foreign direct investment to the region was still falling short of foreign direct investment (FDI) from the US, Japan and Germany combined (Nedopil, 2022c).

The 8th Forum on China-Africa Co-operation (FOCAC) Ministerial Conference highlighted a new form of bilateral cooperation that puts the low-carbon transition at the core of the BRI investments. The *Declaration on China-Africa Cooperation on Combating Climate Change* includes developing low-carbon and climate-resilient infrastructure investments while recognising the key role of the blue economy and natural resource management in sustainable economic growth pathways (MFA, 2021b). China's new climate cooperation with Africa can be a turning point to help close the region's climate financing gaps of almost US$1.3 trillion annually between 2022 and 2030, as it received only US$18.3 billion in climate finance between 2016 and 2019 (AfDB, 2022). China's role in scaling up international climate financing would create new jobs and reduce poverty in Africa, particularly given that climate change could push an additional 39.7 million people into extreme poverty in Africa by 2030 (Jafino et al., 2020).

China's increased focus on sustainable finance means that new financing mechanisms will be developed in Africa, as outlined in the *China-Africa Cooperation Dakar Action Plan (2022–2024)* (FOCAC, 2021). China will continue to provide concessional finance to Africa in support of infrastructure development, agriculture and industrial chains, while tapping into the Kunming Biodiversity Fund for climate adaptation and resilience projects.

The global net zero transition requires large-scale mobilisation of private capital into sustainable infrastructure investments. In aid of this, China has committed to reinforcing cooperation with the African Development Bank (AfDB) and Green Climate Fund (GCF) on climate financing. This puts a greater requirement on the BRI players to further explore blended financing structures through public and private partnerships and to strengthen institutional and knowledge capacities in project development.

Through the third-party market cooperation mechanism, BRI financiers' participation in an international Just Energy Transition Partnership (JETP) could facilitate engagement and collaboration with the AfDB to help advance SDG 7 on 'affordable and clean energy' in South Africa. The JETP was formed between South Africa, France, Germany, the United Kingdom and the United States at COP26 and will support the financing of a just energy transition through US$8.5 billion in grants over the next three to five years without adding to South Africa's debt (UK COP26, 2021c). The AfDB estimates that more than US$30 billion is needed for the energy transition to renewable energy in South Africa, which relies on coal for 75% of its energy needs. China could contribute by developing priority projects including renewable energy, green hydrogen and EVs in collaboration with JETP partners.

Through the BRI, China can unleash the potential of green hydrogen development in South Africa. Green hydrogen is defined as hydrogen produced by splitting water into hydrogen and oxygen using electricity generated from renewable sources (Chugh and Taibi, 2021). China is the largest producer of hydrogen, with 33 million tonnes produced per year, but 80% of it uses fossil fuels in its production, primarily coal and natural gas (Reuters, 2022). *China's Long-Term Plan for Hydrogen Development (2021–2035)* commits to fostering international cooperation on new hydrogen production technologies, supply chains, trade and infrastructure development. South Africa holds 75% of world's platinum resources, a key metal in hydrogen production and fuel cell technologies. South Africa's national hydrogen strategy, Hydrogen South Africa (HySA), aims to develop green hydrogen supply chains and improve domestic manufacturing capacities with international support. Hydrogen could play a crucial role in decarbonising hard-to-abate sectors in particular, and it could substantially boost the deployment of fuel cells for off-grid rural electrification in remote areas of South Africa. This will deliver 'triple dividends': enhancing energy security in critical infrastructure such as hospitals and schools; strengthening disaster preparedness and response with clean emergency power supply; and reducing carbon emissions. Through the services trade, local communities can benefit from improved job creation, noting the shortage of qualified engineers in the operations and maintenance of integrated fuel cell and hydrogen systems (World Bank, 2020).

5. Formulating an international Climate Club through G20–G7 cooperation

This chapter further explores the dynamics of the climate–trade nexus in China's diplomacy in light of the international 'Climate Club' proposal formally launched at the G7 summit in June 2022. The analysis focuses on China's engagement with the G7 and the efforts that China, the G7 and the international community could undertake to create an international Climate Club. It is designed to bolster thinking on this topic ahead of COP27 and the G20 Summit in Indonesia, due to take place in November 2022.

The idea of an international Climate Club

The idea of a climate club has been floating in the climate governance discourse for some time. It has gained currency particularly since the suggestion that the establishment of a climate club could overcome the challenge of free-riding, i.e. nations not making sufficient contributions to international climate action but benefitting from the work of those that are (Nordhaus, 2015). There is hope that a climate club could increase climate ambition, change incentives and reinvigorate the UNFCCC-led international climate negotiation process (Falkner et al., 2022).

As neither the stated ambitions for global climate action nor its current level of implementation are sufficient to achieve the goals of the Paris Agreement (IPCC 2021), the German government, as President of the G7 in 2022, initiated the establishment of a climate club aiming to increase the impetus for implementing of the Paris Agreement internationally. At the heart of the initiative is cooperation between countries that want to press ahead with the social and economic transformation needed to tackle climate change and a commitment to the full implementation of the Paris Agreement, in particular the Glasgow Climate Pact (G7, 2022a).

The *G7 Statement on Climate Club*, released on 28 June 2022, states that the group aims to establish a Climate Club to support the "effective implementation of the Paris Agreement". This would be built on three pillars: (i) advancing ambitious and transparent climate mitigation policies to reduce emissions intensities of participating economies; (ii)transforming industries jointly to accelerate decarbonisation; and (iii) boosting international ambition through partnerships and cooperation to encourage and facilitate climate action and unlock the socioeconomic benefits of climate cooperation, and promote a just energy transition (ibid.). The G7 aims to establish the Climate Club by the end of 2022. Creating the club would mark a true paradigm shift in international climate cooperation, "demonstrating that ambitious climate action is conducive to strong and sustainable growth for all economies" (Foreign, Commonwealth and Development Office, 2022).

China's engagement with the international Climate Club

The Climate Club proposal generates opportunities for China to engage with the G7 to enhance international climate diplomacy. There are opportunities for China to contribute to the club's design, which could not only support China to achieve its own carbon neutrality goals but also provide a platform to contribute to global net zero goals, specifically through political engagement with and economic support for countries in the Global South.

China's engagement with the Climate Club could be advanced through parallel routes. First, it would be vital to strengthen direct diplomatic channels for negotiation between the G7 and China. The G7 sent a clear message that it will invite major emitters to "intensify discussions and consultation", as the Climate Club is intended to be a highly ambitious intergovernmental forum, pushing for the full implementation of the Paris Agreement (G7, 2022a). Second, it would be beneficial to enhance participation in international processes to ensure open and cooperative engagement with international organisations. This could further catalyse a joint international

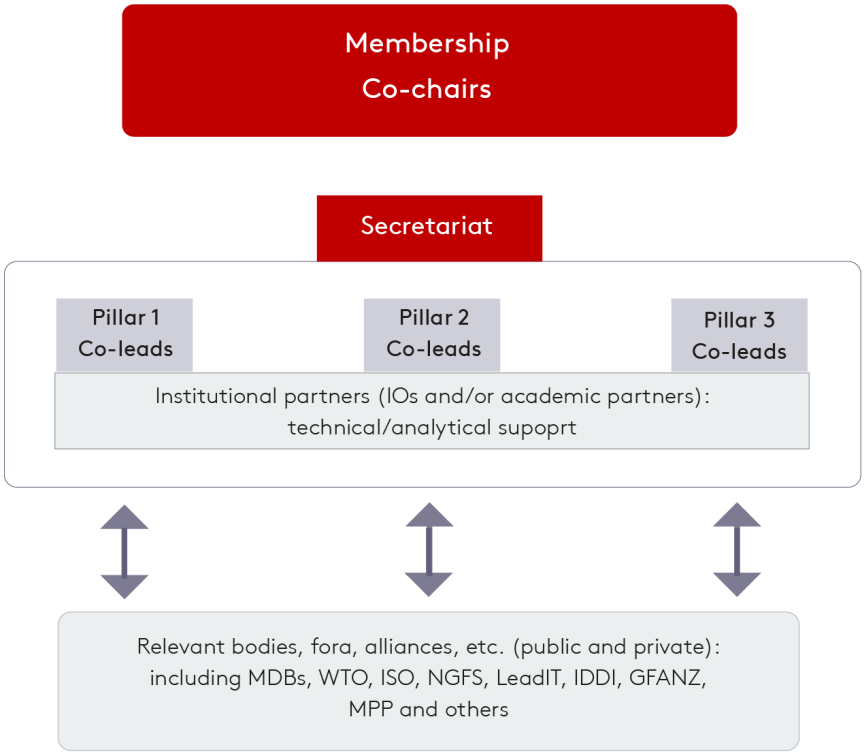
approach, linking the internal and external dimensions of climate policies and ensuring coherence across financing structures. The *G7 Statement on Climate Club* called on the OECD, IMF, World Bank, IEA and WTO to support this process in line with their relevant expertise. Catalysing governmental and non-governmental support for scaling up existing climate-related initiatives could bring together diverse actors to identify synergies between climate policies and trade measures.

The G7 proposal on collaborating and delivering on climate action through a Climate Club

An independent report commissioned by the German G7 Presidency in 2022 and led by Nicholas Stern and Hans Peter Lankes of the London School of Economics (LSE) has explored the idea of a Climate Club in detail (Stern et al., 2022). The following sections present an overview of their proposals and explore the implications for China, including the option for China to take on the co-chair role with Germany, to demonstrate its Climate Club leadership potential.

As shown in Figure 5.1 below, the proposed institutional structure follows multilateral initiatives like the G20 and the Coalition of Finance Ministers for Climate Action (COFM). The proposal to the G7 stresses the important role of co-chairs in driving forward inclusive leadership and that therefore the Climate Club must be launched by both G7 and non-G7 countries, bolstering Global North–South cooperation. Adopting a whole-of-government approach will be critical to ensuring that countries take ownership over the delivery of climate and development goals. To facilitate this, the head of the country delegation will be represented by the equivalent of the G20 Sherpa or emissary, supported by working groups from relevant ministries and institutional partners. The proposed secretariat of the Climate Club could include members with extensive expertise in climate and development from the relevant international organisations, but its independence would need to be assured.

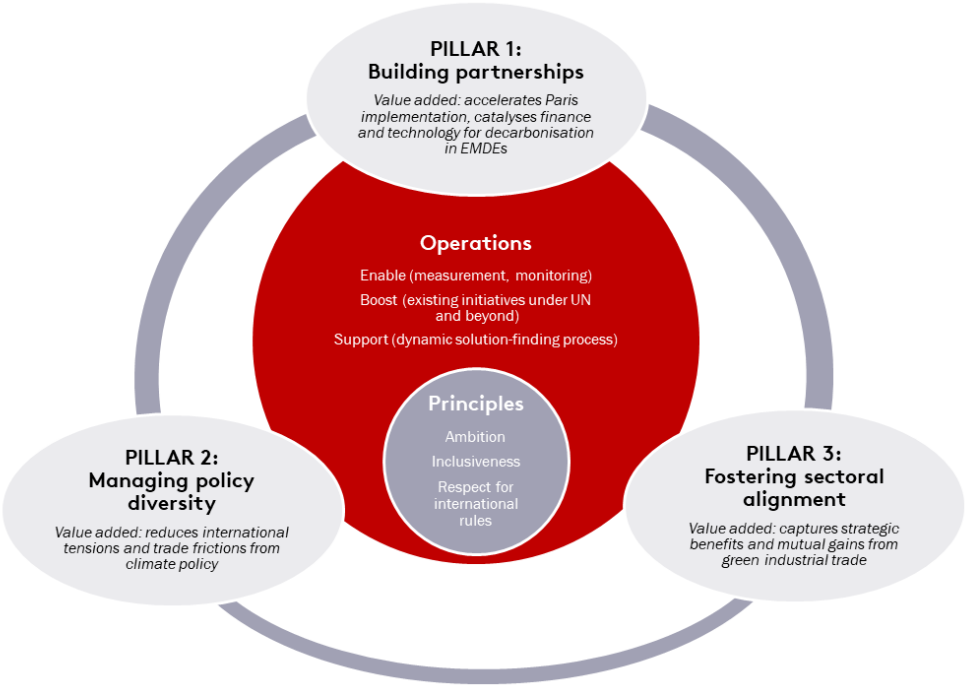
Figure 5.1. Proposed institutional structure of the Climate Club



Source: Stern et al., 2022

The core idea of the Climate Club is to complement, not replace, the existing international climate initiatives under the UN and G20 frameworks. Participating countries of the Climate Club can benefit from support in meeting their specific development needs through the three key pillars (see Figure 5.2). Countries with high climate ambition facing financial and technical capacity constraints and unequal distributional impacts across society as a result of the net zero transition would be motivated by the 'building partnerships' pillar. The second pillar, 'managing policy diversity', emphasises the role of the Club as an international forum for relevant countries to discuss and share their respective needs and concerns on climate and trade. Finally, the 'fostering sectoral alignment' pillar would give countries with green industrial commitments and policies a seat at the table to set the rules and standards for creating leading markets in low-carbon manufacturing.

Figure 5.2. Proposed pillars of the Climate Club



Source: Stern et al., 2022

China's potential policy responses to the G7 Climate Club

Pillar 1: Building partnerships

The centrality of international cooperation to Climate Clubs is in line with China's emphasis on the role of partnerships in supporting a low-carbon transition in BRI countries. The proposed first pillar of the G7 Climate Club is to support the net zero transition in emerging markets and developing economies (EMDEs) through finance and technology partnerships, with three options being Country Platforms, international climate financing and technology cooperation, as described further below (Stern et al., 2022). Simply put, realignment of capital towards sustainable investments in technology and infrastructure will accelerate the structural transformations of key systems. This in turn will reduce political, economic and social concerns across countries by building trust to achieve climate and trade objectives.

1. Accelerating the energy transition through Country Platforms

Country platforms (CPs) have a significant role to play in achieving the SDGs and climate goals. The concept of CPs was first introduced in 2018 by the G20 Eminent Persons Group on Global Financial Governance, which aimed to provide a forum for connecting development partners with

country priorities. Unlike traditional coordination mechanisms for development finance, CPs can ensure national governments take the leading role and develop country-specific solutions for their development challenges, which are then supported by the development partners. The *G20 Reference Framework for effective Country Platforms* was endorsed by the G20 countries as a tool to advance the sustainable development agenda, with MDBs taking the leading implementation role (G20, 2021). *The Country Platforms Action Plan* was launched at COP26 by Mark Carney, the UN Special Envoy on Climate Action and Finance, introducing the enhanced model of CPs as a single focal point through which to channel all sources of finance and technical assistance to close climate financing gaps in EMDEs (Carney, 2021). Currently, Uzbekistan, Indonesia and South Africa have joined the CPs (IsDB, 2020; G20, 2022; COP26, 2021). However, the platforms have not emerged in a systematic manner, with several challenges such as a lack of incentives for national governments to take the lead, ineffective stakeholder coordination and limited institutional and technical capacities (Stern et al., 2022).

In the view of Stern et al. (ibid.), the G7 Climate Club can repurpose CPs as a vehicle to accelerate the delivery of investments and to finance and mobilise private sector capital for the net zero transition in EMDEs. As discussed in Chapter 4, it is widely recognised that major investment barriers in developing countries include the lack of an enabling environment, economically viable projects and concessional financing, all of which undermine investor confidence. Some national governments may need international support to design policy and regulatory frameworks that will attract long-term investors in climate action. The partnerships pillar highlights the important initiatives of the Energy Transition Mechanism (ETM) in Indonesia and the Just Energy Transition Partnership (JETP) in South Africa to align donors and investors in supporting the energy transition in Asia and Africa. The G7 has identified Indonesia, Vietnam and Senegal as potential priority countries for scaling up climate financing relating to nature, health and education (G7, 2022). Additionally, the G20 Compact with Africa initiative, supported by the AfDB, IMF and the World Bank, can attract private sector investment in Africa through macroeconomic, business and financing reforms (G20 Compact with Africa, n.d.).

By participating in the Climate Club, China would become a major development partner and strengthen development cooperation with the ETM and JETP, addressing coal-related stranded assets and renewable investment challenges faced by BRI investors. BRI investors could further benefit from a stable and predictable investment climate supported by International Financial Institutions (IFIs) and MDBs. For example, the IMF Resilience and Sustainability Trust (RST) can mitigate macroeconomic risks in BRI countries by speeding up the development of a conducive environment for investment through policy reforms. Additionally, the availability of finance for green development from a wide range of development partners and private financers will improve the affordability of the net zero transition in BRI countries. This reaffirms the importance of blended finance: blending public and private finance is vital to unlocking climate investments by mobilising private sector participation, with first-loss capital provided by MDBs. With technical support from multilateral institutions, more developed capital markets will enable Chinese investors to scale up sustainable finance through green bond issuances in the overseas markets.

2. Accelerating delivery of international climate financing in climate-vulnerable countries

As the largest developing country, China could represent the Global South in urging G7 countries to increase their financial contributions to climate-vulnerable countries. The goal of providing US$100 billion in international climate finance by 2020 remains unmet by developed countries. Beyond the US$100 billion goal, developed countries must double climate adaptation finance by 2025 (Bhattacharya and Stern, 2021). To date, climate adaptation finance has only received a share of 7% of total climate finance between 2019 and 2020, mostly funded by the public sector (Buchner et al., 2021) and less than 0.5% of multilateral climate finance has been allocated to health adaptation projects (WHO, 2021).

By having a driving seat in the Club, China could urge G7 donors to accelerate the delivery of international concessional finance with a focus on climate adaptation and resilience alongside the creation of a Loss and Damage (L&D) Finance Facility. The L&D agenda, to be discussed at

COP27, is key to a just transition. An increase in climate-related trade aid from the current level of 33% is also important under the WTO Aid-for-Trade initiative, which supports LDCs to address trade bottlenecks in preparing for, responding to and preventing the catastrophic impacts of climate-related disasters (WTO, 2021c). China could also raise the issue of the distributional impacts of carbon pricing revenues, which need to be incorporated as an important source of international climate finance for the least developed countries (LDCs).

The proposed Climate Club will function as the home or secretariat for public climate finance under the UN framework, in partnership with existing initiatives such as the Coalition of Finance Ministers for Climate Action and the central banks and financial supervisors' Network for Greening the Financial System (NGFS) (Stern et al., 2022). Since 2011, MDBs have played a leading role in delivering international public climate finance to member countries, which reached a total of US$300 billion (UK COP26, 2021d). The *MDB Joint Climate Statement* was endorsed at COP26 with the objective of raising collective climate ambition in support provided to countries by aligning MDB financial flows with the Paris Agreement. This requires MDBs to triple their level of financing by 2025 from 2018 levels (Bhattacharya and Stern, 2021).

The main challenge faced by MDBs is the low mobilisation ratio. Greater use of guarantees and blended concessional finance is needed to scale up climate and nature investments (Lankes, 2021). Debt instruments are mainly used by MDBs for climate financing, of which concessional financing only accounted for 12% of MDB climate finance in 2020, followed by 11.5% for policy-based financing, 9% for grants and 4% for guarantees (Prasad et al., 2022). By addressing bankability risks, a grant element is the most important financial instrument that determines the level of concessionality needed in project financing, which is particularly important for climate adaptation and mitigation investments.

3. Implementing COP26 commitments on MDB climate finance for green development across the Belt and Road Initiative

Multilateral institutions initiated by China could accelerate the implementation of the MDB Joint Climate Agreement endorsed at COP26 through the use of blended finance to unlock climate investments in BRI countries. Following the launch of the BRI, China announced its intention to establish the Asian Infrastructure Investment Bank (AIIB) and the New Development Bank (NDB) in 2014. As endorsed by 10 MDBs[7] at COP26, they will increase the level of private sector mobilisation particularly by using blended finance instruments in support of climate mitigation and adaptation investments (UK COP26, 2021d). The AIIB is committed to fully aligning with the goals of the Paris Agreement by 2023 and increasing its cumulative climate finance approvals to US$50 billion by 2030 (AIIB, 2021). The NDB has committed to 40% of project approvals contributing to climate change mitigation and adaptation between 2022 and 2026, up from 26% (NDB, 2022). For example, AIIB could extend its COVID-19 response to integrate climate considerations into its blended financing facility, namely the Special Fund Window for Less Developed Members (SFW), which aims to improve the affordability of infrastructure loans (AIIB, 2022). Similarly, as the AIIB is already a member, NDB may consider joining the DFI Blended Concessional Finance Working group. All these reinforced actions would be vital not only to support COP26 climate commitments, but also to support the implementation of China's international action in the *G20 Principles to Scale-Up Blended Finance in Development Countries, Including Least Developed Countries (LDCs), and Small Island Developing States (SIDS)*, which is to be endorsed at the G20 Summit under Indonesia's Presidency (G20, 2022).

Building on its strengthened partnerships with African and Asia-Pacific countries, China could continue to take a leading role in the replenishment of multilateral funds, which are crucial for de-risking BRI climate projects, especially in LDCs. Multilateral concessional funds from MDBs are key

[7] The 10 MDBs include: African Development Bank, Asian Development Bank, Asian Infrastructure Investment Bank, Council of Europe Development Bank, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank Group, Islamic Development Bank, New Development Bank and the World Bank Group.

to mobilising the private sector due to the MDBs' crucial role in providing grant financing for de-risking climate action in lower-income countries (Bhattacharya and Stern, 2021). In the case of China–Africa cooperation, China has been a longstanding development partner of the AfDB, particularly by providing concessional funding to the African Development Fund (ADF) – it was the 13th largest contributor to the 14th replenishment of the ADF [ADF-14] in 2016 (AfDB n.d.). This significant contribution was made following President Xi's pledge of a US$60 billion package to support the implementation of the 10-point cooperation with Africa during the 2015 Forum on China-Africa Cooperation (FOCAC) Summit (Reuters, 2015). The 2021 FOCAC Summit was the first time that China had placed the low-carbon transition at the centre of bilateral cooperation with the African region, emphasising financing partnerships with the AfDB. China could keep this momentum to increase climate-related donor contributions to the AfDB and other MDBs, including the Asian Infrastructure Investment Bank (AIIB) and New Development Bank (NDB), resulting in improved risk-adjusted return profiles for BRI investors.

The AIIB and NDB could support China's policy banks to scale up international climate financing through capacity building. For example, the NDB could play a bigger role in providing the instrument of guarantees to South Africa that will primarily be used to mitigate project risks, leveraging BRI investments in renewable energy. With MDB support, The China Development Bank (CDB) could expand its international presence as the green bond issuer, as it was instrumental in the development of the domestic bond market and in policy design for renewable energy development (Griffith-Jones et al., 2020). The Export-Import Bank of China (CHEXIM) could continue to increase concessional loans to support Chinese companies to expand third-party market cooperation in BRI countries on low-carbon trade and investment opportunities (CXEXIM, 2016). In addition, the creation of the Multilateral Cooperation Centre for Development Finance (MCDF) announced at the second Belt and Road Forum in 2017 and administered by the AIIB in 2020 could play an advisory role in supporting policy banks to scale up climate-related infrastructure investments in BRI countries (Belt and Road Forum, 2017).

By joining the Coalition of Finance Ministers for Climate Action, the Chinese Ministry of Finance (MOF) could play an enabling role in supporting Chinese investors to deliver on BRI climate commitments. For the first time this century, policy banks CDB and CHEXIM did not commit to providing overseas energy finance in 2021, in part because of the limited ability to raise capital in developing countries affected by the COVID-19 pandemic and in part due to renewable energy being a relatively new priority area in the context of the rapid global trend of decarbonisation (Ma et al., 2022). The research finds that BRI financiers had previously relied on the traditional development financing approach of 'engineering, procurement and construction contractors + financing' (EPC+F), with sovereign guarantees provided by governments in the host countries (Baxter, 2022). By comparison, renewable energy projects, which are capital-intensive, carry higher risks and have a longer investment payback period than traditional fossil fuel projects, are met with reluctance from lenders. Other possible reasons include the lack of an overarching policy framework to guide policy banks in providing climate-related development finance. In other words, climate action is still a missing piece in China's international approach to development financing, as reflected in MOF policy documents (e.g. *Guiding Principles on Financing the Development of the Belt and Road* and the *Debt Sustainability Framework for Participating Countries of the BRI)* (MOF, 2017; MOF, 2019). China's participation in the Climate Club would enable the MOF to sign up to the Helsinki Principles under the Coalition of Finance Ministers, exposing it to a wide range of discussion topics, including mainstreaming climate in macroeconomic policies (Coalition of Finance Ministers for Climate Action [COFM], 2019). Therefore, institutional strengthening of the MOF will in turn guide and encourage policy banks to strategically use innovative financial instruments to accelerate climate change mitigation and adaptation investments in BRI countries.

4. Technology cooperation through interdisciplinary research and knowledge sharing

The key feature of the technology partnership is to facilitate analytical cooperation in terms of finance and capacity building, with the launch of a research funding programme among the Club

members to support key sector transformations (Stern et al., 2022). In this context, leveraging the role of the higher education sector to promote interdisciplinary research and knowledge-sharing is critical. The Climate Club could build on existing initiatives like the Global Alliance of Universities on Climate (GAUC), of which China is the co-founder and which comprises 15 university members across the globe. GAUC was highlighted in China's updated NDC to showcase Chinese youth leadership and promote climate-related research and cooperation across universities, industry, non-profit organisations and governments (Kyriakopoulou et al., 2022).

As Tsinghua University is the chair of the GAUC, China could elevate the Alliance's role in the Climate Club by leveraging the comparative advantage of GAUC members to advance scientific research cooperation on low-carbon technologies. For example, the Institute of Carbon Neutrality at Tsinghua University (ICON) was established in 2021 as a platform to accelerate innovation in low-carbon and zero-carbon technologies while partnering with the private sector and governments (Tsinghua University, 2021). ICON could play an enabling role in accelerating the decarbonisation of steel, aluminium and cement and other industrial sectors through international collaboration with other GAUC members (which are all in G20 countries), to create leading markets for innovative technologies and to create small and medium-sized enterprise (SME) clusters to support the development of regional production and distribution hubs. Collective efforts like this in scientific research will enable policymakers to prioritise the industrial decarbonisation agenda in support of a just transition. This will encourage countries to prioritise the reform and redirect fossil fuel subsidies into low-carbon technologies while introducing more ambitious policies to internalise the social benefits of climate investments. Furthermore, ICON was also one of the leading research institutes in China on a report (*A synergistic roadmap for carbon neutrality and clean air in China*) that highlighted the importance of co-benefits of integrated climate and clean air policy actions on health (EFC, 2021). ICON has identified the research gaps in climate and health (e.g. impacts of climate change on zoonotic diseases and on healthy ageing), which need to be filled by robust scientific evidence in support of climate policymaking in China.

Also hosted by Tsinghua University, the Lancet Countdown on Health and Climate Change Regional Centre for Asia (Lancet Countdown Asia) could take a leading role in supporting Club members to undertake research on climate, environment and health, in collaboration with the LSE as the co-chair of the GAUC. The *2021 China report of the Lancet Countdown* has informed policymakers in China on how climate mitigation and adaptation actions can protect public health, following President Xi's advocation that countries must work together to formulate a collective response to tackling the challenges of climate change and the COVID-19 pandemic (Cai et al., 2021). The Lancet Countdown Asia could mobilise technical experts within its global research networks (headquartered in London with regional centres in Europe, Australia and South America) to jointly conduct the quantification of health co-benefits of climate mitigation policies for China and climate-vulnerable, less-developed countries (Lancet Countdown n.d.). In a leading example, China is putting health at the forefront of tackling air pollution in the cement sector to support the implementation of the Minamata Convention on Mercury (cement production being a source of mercury pollution) (UNEP, 2021). Decarbonising the iron and steel industry will prevent the high risks of lung cancer among workers using the blast furnace in steelmaking (Cappelletti et al., 2016). As discussed in previous chapters, the proven health impacts of asbestos-related diseases provide WTO-supported scientific evidence that allow member countries to impose restrictive trade measures based on risks to health. A joint report by the IMF, OECD, World Bank and WTO highlighted that more analysis is urgently needed to inform the design of subsidies to address the climate crisis, in which health and the environmental impacts of fossil fuel subsidies are a priority area for cooperation (IMF et al., 2022).

Due to the high upfront costs of early-stage low-carbon technologies, risk-sharing and blended finance instruments can be effective for enabling the large-scale capital mobilisation that will improve affordability and maturity (Stern et al., 2022). For example, energy storage has become a significant emerging policy priority during the 14th Five-Year Plan period. Concessional financing is important for reducing the costs of capital for new energy storage investments. In turn, this

would significantly lower the Levelized Cost of Energy (LCOE), which will improve cost competitiveness and technology maturity (Bloomberg NEF, 2019).

Pillar 2: Managing policy diversity

1. Agreeing on the role of green subsidies to improve low-carbon manufacturing growth

Through policy coordination and capacity-building, the Climate Club would provide an opportunity for members to set harmonised rules to jointly address the risk of carbon leakage (Stern et al., 2022). For example, the Club could offer a platform for members to discuss the improvement in design and implementation of carbon border adjustment mechanisms (CBAMs) by resolving the longstanding dispute about green subsidies in the multilateral trading system (ibid.). To deliver on climate goals, green subsidies such as renewable energy subsidies must play a role in incentivising companies to shift their production towards low-carbon practices. The WTO Agreement on Subsidies and Countervailing Measures (SCM) strictly prohibits the use of export subsidies to improve a country's export performance. Therefore, these rules need to be revisited to allow subsidies supporting green industries, even for industries producing green export products. This would mean China is supported to scale up global value chains in BRI countries while also accelerating the domestic energy transition.

The United Nations Environment Programme (UNEP) highlights that public financing is essential for the transition to a green economy, and that it is more than justified by the co-benefits that would be generated (UNEP, 2011), especially for health (Charnovitz, 2014). With the technical support of the Lancet Countdown, Club members could agree that the health benefits of climate action should be factored into their decision-making on renewable energy subsidies, particularly given that climate change is linked to human health through multiple and complex pathways.

2. Advancing the development of international carbon markets

International cooperation on carbon pricing by linking prices to an ETS could be another area of discussion (Stern et al., 2022). So far, the only successful cap-and-trade system is the US Acid Rain Programme with regulations under the Clean Air Act, which resulted in more than US$50 billion per year of the estimated health benefits, outweighing the US$0.5 billion in administration costs for implementing the programme (Green, 2017). China can benefit from technical support from Club members to improve policies and measures to better implement domestic ETS reform, driving up carbon prices and therefore gain the substantial co-benefits. China could also share its experience from its national ETS with developing country members like Indonesia, which will introduce an ETS as a key part of solutions under the ETM.

The high-quality design of a new sustainable development mechanism (SDM) under Article 6.4 of the Paris Agreement could incentivise private sector participation in support of the growth of voluntary carbon markets. The EU ETS demonstrates that importing project carbon offset credits from the Clean Development Mechanism under the Kyoto Protocol was less effective in reducing emissions due to low carbon offset prices. Therefore, joint discussion on how to limit the supply of carbon credits successfully could result in high prices, which could provide an important source of carbon finance for climate adaptation and resilience investments. For example, 5% of proceeds will be allocated to the Adaptation Fund as climate adaptation finance, as specified in the Paris Rulebook (Adaptation Fund, 2021). If the amount of adaptation finance received from the SDM is high enough, it could be used as the first-loss capital to encourage BRI investors to scale up climate adaptation and resilience projects, primarily in Africa. Other issues like the common standards, taxonomies and quality criteria for carbon credits could be discussed in the Club in order to increase market liquidity and mitigate risks for private investor participation (Rosales et al., 2021).

Pillar 3: Fostering sectoral alignment

1. Decarbonising the industrial system through multilateral agreements

Pillar 3 emphasises the important role of sectoral alignment in facilitating member countries to strengthen plurilateral coordination in hard-to-abate sectors, including steel, cement, ammonia and shipping (Stern et al., 2022). Within the UNFCCC framework, no agreements or goals have been reached on sectoral mitigation commitments. The Climate Club could fill this gap by supporting China to develop and implement a coordinated approach to accelerating the decarbonisation of key systems while reducing friction around the risk of carbon leakage.

As a signatory to the Glasgow Breakthrough Agenda, China could step up engagement in the sectoral mitigation commitments and actions of the Agenda (COP26, 2021e). The objective of the Breakthrough Agenda, launched at COP26 in 2021, is to accelerate the global development and deployment of clean energy technologies in an affordable and accessible manner for each emitting sector before 2030, which will create new markets, jobs and sustainable economic growth. China has already joined the hydrogen breakthrough, which aims to develop affordable renewable and low-carbon hydrogen globally by 2030. To maximise the synergies with existing regional and international cooperation mechanisms, some international initiatives have joined the power sector breakthrough, such as India's Green Grids initiative. The BRI could also consider participating in the sectoral breakthrough goals, creating markets in the power, transport, steel and agricultural sectors.

As the world's largest producer of steel and aluminium, industrial sectors accounted for almost 40% of GDP in China in 2021 (World Development Indicator, n.d.). Following the power sector, steel is the second largest carbon emitter in China: about 90% of steel outputs are produced by blast furnaces, which consume 30% of total coal use. The only technology that can significantly reduce emissions from the steel sector is the electric arc furnace (EAF), yet these were used in only 10.4% of steel production in China in 2020, which is well below the global average of 30% (CNII, 2021). Industrial decarbonisation has been the emerging policy priority for the Ministry of Ecology and Environment (MEE), which since 2019 has been focusing on ultra-low emissions standards to reduce air pollution with climate co-benefits, but this may not be sufficient to stimulate technological innovation in green steel and aluminium production. With the launch of the *Industrial Carbon Peaking Action Plan by China,* China identifies the possible expansion of sectoral coverage of the national ETS to industrial sectors as one of priorities to support China's enhanced green steel targets – it aims to increase the share of EAF in steelmaking to at least 15% by 2025 (MIIT, 2022).

By joining the Industrial Deep Decarbonisation Initiative (IDDI), China could further leverage the role of green procurement to gain international competitiveness in hard-to-abate sectors. Green public procurement is identified as an important strategy for market creation (Vangenechten and Lehne, 2022). The IDDI is a public procurement alliance established under the Clean Energy Ministerial, of which China is a member. Since 2019, the MEE has been implementing a green procurement policy that offers incentives to stimulate green innovation for industrial companies to reduce volatile organic compounds (VOCs) in the sectors of petrochemicals, industrial coating and industrial park clusters. This could be extended to the CBAM-covered sectors to stimulate R&D in low-carbon steel and aluminium development. China's participation in the IDDI could focus on reaching common standards and setting decarbonisation targets with the initiative's existing members (UK, India, UAE, Canada and Germany) and Climate Club members, which would help them identify a broad range of low-carbon export markets to cover.

A trade agreement on the *Global Arrangement on Sustainable Steel and Aluminium* would allow China to tackle its longstanding domestic industrial overcapacity issue, while addressing trade barriers (EU, 2021). The US and EU endorsed a *Joint Statement on Trade in Steel and Aluminium* at COP26, meaning that the US will remove import tariffs on steel and aluminium products from the EU (Hay, 2021). The UK and Japan also signed this global arrangement with the US in 2022. The main objective is to build an international partnership with other countries such as China and

jointly lower carbon intensity and tackle industrial overcapacity issues in support of a just transition. In this regard, an R&D investment fund could be established among members of the Climate Club, while leveraging the role of technology partnerships to enhance international cooperation to jointly accelerate the decarbonisation agenda.

6. Conclusion and policy recommendations

With power comes responsibility, and China's intensifying climate action at home and abroad is testament to its status as a rising responsible great power. This report has highlighted the challenges and opportunities for China to further integrate trade and climate into its international engagements. It contributes to dispelling any doubts that trade and climate can be reconciled, integrated and enhanced to serve humanity.

Already weakened from the COVID-19 pandemic and the Russian invasion of Ukraine, the economic growth outlook could be further hampered by inadequate and uncoordinated efforts to address the urgency of the energy and climate crises. It is imperative that international cooperation and solidarity are key to a green, inclusive and resilient recovery in the pursuit of limiting global warming temperature goals to 1.5 °C. Revitalising multilateralism in climate cooperation is crucial, too, to connect the Global North with the Global South under the United Nations and G20 policy frameworks. Actions taken to implement the Paris Agreement and Glasgow Climate Pact will not reach the most vulnerable in society in countries most impacted by climate change unless there is greater cooperation within the G20. President Xi has reiterated that "community with a shared future for mankind" is at the heart of China's international vision and foreign policy, and tackling shared challenges, especially climate change, with collective action is key to this vision.

At the time of the 20th National Congress of the Chinese Communist Party and ahead of COP27 in Egypt and the G20 Summit in Indonesia, China could demonstrate its leadership potential together with the G7 and G20 through diplomacy, policy, innovation and finance to deliver on climate and trade objectives for shared prosperity. We make the following policy recommendations for China to highlight and develop the country's international climate commitments and actions across climate–trade diplomacy, carbon pricing, the Belt and Road Initiative (BRI) and a Climate Club.

Policy recommendations for China

1. China could strengthen climate–trade diplomatic engagements at the multilateral, plurilateral and bilateral levels, including taking a leadership role in reinvigorating the negotiations of the Environmental Goods Agreement under the WTO and accelerating diplomacy with the EU to ratify and implement the EU-China Comprehensive Agreement on Investment.
2. China could strengthen policy coordination with the WTO and G20 to discuss trade implications for the Carbon Border Adjustment Mechanism (CBAM) proposed by the EU, while moving forward with international cooperation on carbon pricing, primarily through a carbon price floor.
3. China's new international development cooperation mechanism, the third-party market cooperation, could support BRI investors to accelerate the early retirement of coal plants by factoring in climate-related risks and scaling up investments in renewable energy and adaptation and resilience by delivering on green BRI commitments, primarily in Indonesia and South Africa.
4. To foster G20–G7 cooperation, China and Germany could take up the role of joint co-chairs in the Climate Club proposed by the G7, to encourage the financing of a just energy transition in BRI countries through Country Platforms, leveraging the role of the higher education sector to enhance joint research on low-carbon technologies, and accelerating the domestic industrial decarbonisation agenda.
5. An increased focus on the health co-benefits of climate action is a key argument to persuade Climate Club members to prioritise the development of carbon pricing and phase out fossil fuel subsidies, while also justifying the trade friction that may occur over CBAMs and the adoption of green subsidies to support low-carbon trade competitiveness.

References

Adaptation Fund (2021) *Adaptation Fund: key achievements of 2021 and entering 2022 with promise*. https://www.adaptation-fund.org/wp-content/uploads/2022/01/Newsletter-for-2021.pdf

Adrian T, Bolton P and Kleinnijenhuis (2022) How replacing coal with renewable energy could pay for itself. *International Monetary Fund*, 8 June. https://www.imf.org/en/Blogs/Articles/2022/06/08/how-replacing-coal-with-renewable-energy-could-pay-for-itself

African Development Bank [AfDB] (2022) *African economic outlook 2022*. https://www.afdb.org/en/documents/african-economic-outlook-2022

African Development Bank [AfDB] (n.d.) China: Partnership overview. https://www.afdb.org/en/countries/non-regional-member-countries/china

Albrizio S, Kozluk T and Zipperer V (2017) *Environmental policies and productivity growth: Evidence across industries and firms*. Journal of Environmental Economics and Management. http://www.sciencedirect.com/science/article/pii/S0095069616300602

Asian Infrastructure Investment Bank [AIIB] (2021) AIIB to fully align with Paris Agreement goals by mid-2023. *AIIB news release*, 26 October. https://www.aiib.org/en/news-events/news/2021/AIIB-to-Fully-Align-with-Paris-Agreement-Goals-by-Mid-2023.html

AIIB (2022) Special Fund Window for Less Developed Members (SFW). https://www.aiib.org/en/what-we-do/special-funds/_download/AIIB-Special-Fund-Window-SFW-FactSheet_20220421.pdf

Asian Development Bank [ADB] (2020) *Decoding Article 6 of the Paris Agreement*. https://www.adb.org/sites/default/files/publication/664051/article6-paris-agreement-v2.pdf

ADB (2021) *Energy Transition Mechanism explainer: How ETM will support climate action in Southeast Asia*. https://www.adb.org/news/features/energy-transition-mechanism-explainer-support-climate-action-southeast-asia

Assous A et al. (2021) *A storm in a teacup: Impacts and geopolitical risks of the European carbon border adjustment mechanism*. Sandbag and E3G. https://9tj4025ol53byww26jdkao0x-wpengine.netdna-ssl.com/wp-content/uploads/E3G-Sandbag-CBAM-Paper-Eng.pdf

Avi-Yonah R and Uhlmann D (2009) *Combating global climate change: Why a carbon tax is a better response to global warming than cap and trade*. University of Michigan Law School. https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1051&context=articles

Bank for International Settlements [BIS] (2021) *Climate-related risk drivers and their transmission channels*. https://www.bis.org/bcbs/publ/d517.pdf

Bank of China (2021) Bank of China plans to announce its first transition bonds transaction in offshore market. *News release*, 6 January. https://www.boc.cn/en/investor/ir10/202101/t20210106_18866798.html

Baltensperger M and Dadush U (2019) *The Belt and Road turns five*. Bruegel. https://www.bruegel.org/sites/default/files/wp_attachments/PC-01_2019_.pdf

Baxter T (2022) "Steeping up" Chinese solar and wind investment in Africa: An interview with Dr Shen Wei. *Panda Paw Dragon Claw*, 17 January. https://pandapawdragonclaw.blog/2022/01/17/stepping-up-chinese-solar-and-wind-investment-in-africa-an-interview-with-dr-shen-wei/

Belt Road Initiative International Development Green Development Institute [BRIGC] (2022) *Opinions on jointly promoting green development of the Belt and Road*. http://en.brigc.net/Media_Center/Updates/Green_Belt_and_Road/202204/t20220408_130595.html

Bazilian M, Handler B and Auth K (2021) *How public funders can help take coal offline ahead of schedule: Three financial options*. Energy for Growth Hubs. https://www.energyforgrowth.org/memo/how-public-funders-can-help-take-coal-offline-ahead-of-schedule-three-financial-options/

Bhattacharya A and Stern N (2021) *Beyond the $100 billion: Financing a sustainable and resilient future*. Grantham Research Institute on Climate Change and the Environment at the London School of Economics. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/11/Beyond-the-100-billion.pdf

Birol F and Malpass D (2021) It's critical to tackle coal emissions. *World Bank*, 8 October. https://blogs.worldbank.org/voices/its-critical-tackle-coal-emissions

Bloomberg New Energy Finance [Bloomberg NEF] (2019) *The Clean Technology Fund and concessional finance*. https://data.bloomberglp.com/professional/sites/24/BNEF_The-Clean-Technology-Fund-and-Concessional-Finance-2019-Report.pdf

Bloomberg (2022) *China hurt most by Indonesia's move to keep nickel at home*. Bloomberg news release, 13 January. https://www.bloomberg.com/news/articles/2022-01-13/china-hurt-most-by-indonesia-s-move-to-keep-nickel-at-home?leadSource=uverify%20wall

Böhringer C et al. (2022) *Potential impacts and challenges of border carbon adjustments*. Nature Climate Change. https://doi.org/10.1038/s41558-021-01250-z

Böhringer C, Balistreri E and Rutherford T (2012) *The role of border carbon adjustment in unilateral climate policy*. Belfer Center at the Harvard Kennedy School. https://www.belfercenter.org/sites/default/files/legacy/files/bohringer_dp54_v3-final.pdf

Boston University Global Development Policy Center (n.d.) *China's overseas development finance: Geospatial data for analysis of biodiversity and indigenous lands*. https://www.bu.edu/gdp/chinas-overseas-development-finance/

Brenton P and Chemutai V (2020) *The trade and climate change nexus*. World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/36294/9781464817700.pdf?sequence=5&isAllowed=y

Buchner B et al. (2021) *Global landscape of climate finance 2021*. Climate Policy Initiative. https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021/

Cabinet Secretariat of the Republic of Indonesia (2021) *Remarks of President of the Republic of Indonesia at the 7th Anniversary of Indonesian Solidarity Party (PSI)*. Press release, 22 December. https://setkab.go.id/en/remarks-of-president-of-the-republic-of-indonesia-at-the-7th-anniversary-of-indonesian-solidarity-party-psi-ballroom-of-djakarta-theater-building-central-jakarta-22-december-2021/

CAEP and EFC (2022) ***建立中国****环境* ***的****费用效益分析机制项目（第三期）—"****十四五****"****大气****污染治理与碳减排措施的费效分析* [The development of China's Phase III for environmental cost-benefit analysis (CBA)– CBA for 14th Five Year Plan Air pollution prevention and control and carbon reduction mitigation measures]. https://www.efchina.org/Attachments/Report/report-cemp-20220305

Cai W et al. (2021) *The 2021 China report of the Lancet Countdown on health and climate change: Seizing the window of opportunity*. The Lancet Public Health. https://doi.org/10.1016/S2468-2667(21)00209-7

Cappelletti R et al. (2016) *Health status of male steel workers at an electric arc furnace (EAF) in Trentino, Italy*. Journal of Occupational Medicine and Toxicology. https://occup-med.biomedcentral.com/articles/10.1186/s12995-016-0095-8

Carbon Credits (2022) *Congress introduces US CBAM: The 'Clean Competition Act.'* https://carboncredits.com/congress-introduces-us-cbam-clean-competition-act/

Carney M (2021) *Country Platforms Action Plan*. https://assets.bbhub.io/company/sites/63/2021/11/Country-Platforms-Action-Plan.pdf

CF40 (2021) NAFMII's active role in the high-quality development of China's green finance. *CF40 News release*, 17 July. http://www.cf40.com/en/news_detail/11977.html

Charnovitz S (2014) *Green subsidies and the WTO*. The George Washington University Law School. https://scholarship.law.gwu.edu/cgi/viewcontent.cgi?article=2341&context=faculty_publications

China Council for International Cooperation on Environment and Development [CCICED] (2021) *Special Policy Study on global green value chains: China's opportunities, challenges and paths in the current economic context*. https://cciced.eco/wp-content/uploads/2021/09/4-2-Global-Green-Value-Chains.pdf

Chestney N, Abnett K and Twidale S (2022) Europe's carbon price near the 100 euro milestone. *Reuters*, 6 February. https://www.reuters.com/business/energy/europes-carbon-price-nears-100-euro-milestone-2022-02-04/

China Daily (2021) AfCFTA to gain from Chinese expertise. *News release*, 26 October. https://www.chinadaily.com.cn/a/202110/26/WS61780d3ba310cdd39bc716c6.html

China Daily (2022) Nation's BRI gains spark calls for even greater cooperation. News release, 23 April. https://www.chinadaily.com.cn/a/202204/23/WS6263691fa310fd2b29e58d2e.html

China Development Bank [CDB] (2021) CDB signs MoC with Green Climate Fund. CDB News, 18 October. http://www.cdb.com.cn/English/xwzx_715/khdt/202112/t20211203_9390.html

Chiyemura F, Shen W and Chen Y (2022) *Scaling China's green energy investment in Sub-Saharan Africa: Challenges and prospects*. The African Climate Foundation, Institute of Development Studies and the Open University. https://africanclimatefoundation.org/wp-content/uploads/2021/11/800539-ACF-NRDC-Report.pdf

Chugh A and Taibi E (2021) *What is green hydrogen and why do we need it? An expert explains*. World Economic Forum, 21 December. https://www.weforum.org/agenda/2021/12/what-is-green-hydrogen-expert-explains-benefits/

Citi (2021) Global carbon markets: Solving the emissions crisis before time runs out. Citi GPS: Global Perspectives & Solutions. https://ir.citi.com/gps/AwnTN0KdVpKG7EpmpyzivMp7eoB5SWnKGNaB106BFaUUvXzRdFQlEI8rIyB7LheVAF3LRXH3YXU%3D

CNII (2021) 低碳发展加速提升电炉钢比例. [Accelerating the development of electric-arc furnace for low-carbon growth]. *中国工信产业网* [China's National Industry and Information website], 16 November. https://www.cnii.com.cn/gxxww/cyjj/202111/t20211116_323090.html

Coalition of Finance Ministers for Climate Action (2019) *Explanatory notes on the coalition principles*. https://www.financeministersforclimate.org/sites/cape/files/inline-files/Explanatory%20Note%20-final.pdf

Cui J, Zhang J and Zheng Y (2018) *Carbon pricing indues innovation: Evidence from China's regional carbon market pilots*. AEA Papers and Proceedings. https://pubs.aeaweb.org/doi/pdfplus/10.1257/pandp.20181027

Cui J, Wang C, Zhang J and Zheng Y (2021) *The effectiveness of China's regional carbon market pilots in reducing firm emissions*. PNAS. http://eprints.lse.ac.uk/113492/1/e2109912118.full.pdf

Cui Y, Zhao A, Dahl C and Hultman N (2022) *Financing Indonesia's coal phase-out: A just and accelerated retirement pathway to net-zero*. Center for Global Sustainability at the University of Maryland. https://cgs.umd.edu/research-impact/publications/financing-indonesias-coal-phase-out-just-and-accelerated-retirement

Cui J et al. (2022) *Carbon leakage within firm ownership networks: Evidence from China's regional carbon market pilots*. https://www.zhenxuanwang.org/publication/china-leakage/china-leakage.pdf

Dechezlepretre et al. (2018) The joint impact of the European Emissions trading system on carbon emissions and economic performance. OECD Working Paper. https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP(2018)63&docLanguage=En

Dekker T et al. (2012) Inciting protocols. Journal of Environmental Economics and Management. https://doi.org/10.1016/j.jeem.2011.11.005

Energy Foundation China [EFC] (2022) 聚焦稳增长 专家畅谈绿色投资支撑绿色复苏 [Focusing on growth, experts discussed the role of green investments in support of green recovery]. News release, 25 April. https://www.efchina.org/News-zh/Program-Updates-zh/programupdate-comms-20220527-zh

Environmental Justice Atlas [EJAtlas] (2022) I*ndonesia Morowali industrial park (IMIP), Central Sulawesi, Indonesia*. https://ejatlas.org/conflict/indonesia-morowali-industrial-park-imip1

Eskander S and Fankhauser S (2021) The impact of climate legislation on trade-related carbon emissions, 1997-2017. Grantham Research Institute on Climate Change and the Environment at the London School of Economics. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/07/working-paper-367-Eskander-and-Fankhauser-1.pdf

Espitia A, Rocha N and Ruta M (2022) *How export restrictions are impacting global food prices*. World Bank. https://blogs.worldbank.org/psd/how-export-restrictions-are-impacting-global-food-prices

European Roundtable on Climate Change and Sustainable Transition [ERCST] (2022) Border carbon adjustment in the EU. https://ercst.org/wp-content/uploads/2022/03/20220318-Exports-Report-CBAM.pdf

European Commission (2022a) EU-China agreement in principle. https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/china/eu-china-agreement/eu-china-agreement-principle_en

European Commission (2022b) The EU teams up with Ecuador, Kenya, New Zealand to forge cooperation on trade and climate. News release, 13 June. https://policy.trade.ec.europa.eu/news/eu-teams-ecuador-kenya-new-zealand-forge-cooperation-trade-and-climate-2022-06-13_en#:~:text=The%20trade%20ministers%20of%20the,the%20forefront%20of%20trade%20policy

European Commission (2021a) Proposal for a Regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0564&rid=9

European Commission (2021b) Joint EU-US Statement on a Global Arrangement on Sustainable Steel and Aluminium. https://ec.europa.eu/commission/presscorner/detail/en/IP_21_5724

Evans S (2021) Analysis: Which countries are historically responsible for climate change? Carbon Brief, 10 May. https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/

Falkner, R, Nasiritousi, N and Reischl, G (2022) Climate clubs: politically feasible and desirable? *Climate Policy* 22(4):480-487. https://doi.org/10.1080/14693062.2021.1967717

Federal Ministry of Finance of Germany (2021) *The German government wants to establish an international climate club*. https://www.bundesfinanzministerium.de/Content/EN/Pressemitteilungen/2021/20210825-german-government-wants-to-establish-an-international-climate-club.html

Fitriyanti V and Putriastuti P (2022) Indonesia should speed up its coal retirement program to support energy transition. *The Conversation*, 8 February. https://theconversation.com/indonesia-should-speed-up-its-coal-retirement-program-to-support-energy-transition-176042

Foreign, Commonwealth and Development Office (2022) *G7 foreign ministers' meeting in Germany, 2022: communiqué*. London: UK Government. https://www.gov.uk/government/publications/g7-foreign-ministers-meeting-in-germany-2022-communique/g7-foreign-ministers-meeting-in-germany-2022-communique

Forum on China-Africa Cooperation [FOCAC] (2021) Forum on China-Africa Cooperation Dakar Action Plan (2022-2024). Ministry of Foreign Affairs. http://www.focac.org/eng/zywx_1/zywj/202201/t20220124_10632444.htm

Fu Y (2021) The quiet China-Africa revolution: Chinese investment. *The Diplomat*, 22 November. https://thediplomat.com/2021/11/the-quiet-china-africa-revolution-chinese-investment/

Glaser A and Caspar O (2021) Less confrontation, more cooperation. Germanwatch. https://germanwatch.org/sites/default/files/GERMANWATCH_Increasing%20the%20acceptability%20of%20the%20EU%20CBAM_2021-06-17_0.pdf

Global Tailings Review (2020) *Global industry standard on tailings management*. International Council on Mining & Metals, UN Environment Programme, and Principles for Responsible Investment. https://globaltailingsreview.org/wp-content/uploads/2020/08/global-industry-standard-on-tailings-management.pdf

Goulder L, Long X, Lu J and Morgenstern R (2019) China's unconventional nationwide CO2 emissions trading system: The wide-ranging impacts of an implicit output subsidy. *National Bureau of Economic Research Working Paper No. 26537*. https://www.nber.org/system/files/working_papers/w26537/w26537.pdf

Government of Canada (2021) Exploring Border carbon adjustments for Canada. https://www.canada.ca/en/department-finance/programs/consultations/2021/border-carbon-adjustments/exploring-border-carbon-adjustments-canada.html

Gracia-Herrero A and Tagliapietra (2021) Asia-Pacific must phase out foss-fuel subsidies. MarshMcLennan, 7 June. https://www.brinknews.com/asia-pacific-must-phase-out-fossil-fuel-subsidies/#:~:text=The%20International%20Energy%20Agency%20(IEA,%2419%20billion%20(Table%201).

Green J (2017) Don't link carbon markets. Nature. https://www.nature.com/articles/543484a

Griffin, C, Diana H F, Ailia H, Kamala D, Adam G, and Gareth O (2019) *Climate Change and Trade Agreements Friends or Foes?* London: The Economist Intelligence Unit Limited. https://pages.eiu.com/rs/753-RIQ-438/images/TradeandClimateChange2019.pdf

Griffith-Jones S, Attridge S and Gouett M (2020) *Securing climate finance through national development banks*. Overseas Development Institute. https://cdn.odi.org/media/documents/200124_ndbs_web.pdf

G7 (2022a) Statement on Climate Club. Press release, 28 June. https://www.consilium.europa.eu/en/press/press-releases/2022/06/28/g7-leaders-communique/

G7 (2022b) The outcomes at a glance. https://www.g7germany.de/g7-en/current-information/g7-summit-outcomes-2058314

G20 (2022a) *Communiqué on G20 Finance Ministers and Central Bank Governors Meeting*. https://g20.org/wp-content/uploads/2022/02/G20-FMCBG-Communique-Jakarta-17-18-February-2022.pdf

G20 (2022b) Decade of actions: Bali Energy Transitions Roadmap. https://g20.org/wp-content/uploads/2022/09/Bali-Energy-Transitions-Roadmap_FINAL_Cover.pdf

G20 (2022c) Indonesia launched Energy Transition Mechanism Country Platform. https://www.g20.org/indonesia-launched-energy-transition-mechanism-country-platform/

G20 Compact with Africa (n.d.) *About the Compact with Africa*. https://www.compactwithafrica.org/content/compactwithafrica/home.html

Haines A et al. (2009) Public health benefits of strategies to reduce greenhouse-gas emissions: Overview and implications for policy makers. The Lancet. https://doi.org/10.1016/s0140-6736(09)61759-1

Hay G (2021) *EU-U.S. green steel deal shows way for COP26*. Reuters news release, 2 November. https://www.reuters.com/breakingviews/eu-us-green-steel-deal-shows-way-cop26-2021-11-02/

He X, Zhai F and Ma J (2022) The global impact of a carbon border adjustment mechanism: A quantitate assessment. Boston University Global Development Policy Center. https://www.bu.edu/gdp/files/2022/03/TF-WP-001-FIN.pdf

International Carbon Action Partnership [ICAP] (2022) Emissions trading worldwide. https://icapcarbonaction.com/system/files/document/220331_icap_report_practitioner-insights.pdf

International Energy Agency [IEA] (2021) The role of China's ETS in power sector decarbonisation. https://www.iea.org/reports/the-role-of-chinas-ets-in-power-sector-decarbonisation

International Monetary Fund/OECD (2021) *Tax policy and climate change*. https://www.oecd.org/tax/tax-policy/tax-policy-and-climate-change-imf-oecd-g20-report-september-2021.pdf
Intergovernmental Panel on Climate Change [IPCC] (2021) *IPCC Sixth assessment report*. https://www.ipcc.ch/assessment-report/ar6/
Islamic Development Bank [IsDB] and ADB (2019) *The evolution of Indonesia's participation in global value chains*. https://www.adb.org/sites/default/files/publication/534851/evolution-indonesia-participation-global-value-chains.pdf
IPCC (2007) *IPCC Fourth Assessment Report: Climate change 2007*. https://archive.ipcc.ch/publications_and_data/ar4/wg3/en/ch11s11-7-2.html
IsDB (2020) Uzbekistan Country Platform: Progress report, G20- International Financial Architecture Working Group (IFA-WG). https://www.isdb.org/publications/uzbekistan-country-platform-progress-report-g20-international-financial-architecture-working-group-ifa-wg
Jafino BA, Walsh B, Rozenberg J and Hallegatte S (2020) *Revised estimates of the impact of climate change on extreme poverty by 2030*. World Bank. https://openknowledge.worldbank.org/handle/10986/34555
Jakob, Michael et. *al*. (2022) How trade policy can support the climate agenda: Ensure open markets for clean technologies and products. *Science* 376(6600): 1401-1403.
Ji S (2022) *Explainer: China-Indonesia trade: How important is it, and what are the main exports?* South China Morning Post, 26 July. https://www.scmp.com/economy/china-economy/article/3186660/china-indonesia-trade-how-important-it-and-what-are-main
Kaplan S (2022) Denmark becomes first U.N. member to pay for 'loss and damage' from climate change. The Washington Post, 20 September. https://www.washingtonpost.com/climate-environment/2022/09/20/denmark-climate-change-un-general-assembly/
Kyriakopoulou D, Xia L and Xie C (2022) *Internationalism in climate action and China's role*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/01/Internationalism-in-climate-action-and-Chinas-role.pdf
Lancet Countdown on Health and Climate Change [Lancet Countdown] (n.d.) https://www.lancetcountdown.org/data-platform/
Lankes HP (2021) *Blended finance for scaling up climate and nature investments*. Report of the One Planet Lab. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/11/Blended-Finance-for-Scaling-Up-Climate-and-Nature-Investments-1.pdf
Laurens, N, Brandi, Cand Morin, J F (2022) Climate and trade policies: from silos to integration. *Climate Policy* 22(2). https://doi.org/10.1080/14693062.2021.2009433
Leva C and Vaughan S (2021) The Paris Agreement's new Article 6 rules. *International Institute for Sustainable Development [IISD]*, 13 December. https://www.iisd.org/articles/paris-agreement-article-6-rules
Liu J, Hou J, Fan Q and Chen H (2022) China's national ETS: Global and local lessons. Journal of Energy Reports. https://www.sciencedirect.com/science/article/pii/S2352484722006564
Low P, Marceau G and Reinaud J (2011) The interface between the trade and climate change regimes: Scoping the issues. *WTO Working Paper ERSD-2011-1*. https://www.wto.org/english/res_e/reser_e/ersd201101_e.pdf
Macquarie R (2022) *Searching for trust in the voluntary carbon markets*. Grantham Research Institute on Climate Change and the Environment at the London School of Economics. https://www.lse.ac.uk/granthaminstitute/news/searching-for-trust-in-the-voluntary-carbon-markets/
Ma X, Springer C and Shao H (2022) Outlier or new normal? Trends in China's global finance. Boston University Global Development Policy Center. https://www.bu.edu/gdp/files/2022/03/GCI_PB_011_FIN.pdf
Maulia E (2018) *China becomes Indonesia's No.2 investor with infrastructure drive*. Nikkei Asia, 1 February. https://asia.nikkei.com/Politics/International-relations/China-becomes-Indonesia-s-No.-2-investor-with-infrastructure-drive
Maulia E (2022) Indonesia's newest province chases $132bn industrial dream. Nikkei Asia, 7 March. https://asia.nikkei.com/Economy/Indonesia-s-newest-province-chases-132bn-industrial-dream#:~:text=But%20construction%20has%20recently%20begun,forum%20in%20Jakarta%20on%20Feb.
Medina A (2021) *Indonesia to construct world's largest green industrial park*. ASEAN Briefing, 24 December. https://www.aseanbriefing.com/news/indonesia-to-construct-worlds-largest-green-industrial-park/
Mehling M, Asselt H, Das K and Droege S (2019) Designing border carbon adjustments for enhanced climate action. Cambridge University Press. https://www.cambridge.org/core/journals/american-journal-of-

international-law/article/designing-border-carbon-adjustments-for-enhanced-climate-action/BF4266550F09E5E4A7479E09C047B984
Ministry of Economy and Finance of Italy (2021) First G20 Finance Track meeting discusses development finance. https://www.dt.mef.gov.it/en/news/2020/g20_03122020.html
Ministry of Ecology and Environment [MEE] (2022a) 生态环境部：减污降碳协同增效工作取得积极成效 [MEE tasks on reducing pollution and carbon emissions achieved productive outcomes]. https://www.ndrc.gov.cn/xwdt/ztzl/2022qgjnxcz/bmjncx/202206/t20220612_1327157.html
MEE (2022b) 生态环境部公开中碳能投等机构碳排放报告数据弄虚作假等典型问题案例(2022 年第一批突出环境问题) [MEE publicised several cases in carbon data misreporting from some companies under China's national ETS]. https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202203/t20220314_971398.shtml
MEE (2022c). Joint Statement issued at the BRICS High-level Meeting on Climate Change. https://www.mee.gov.cn/ywdt/hjywnews/202205/t20220515_982106.shtml
MEE (2021a) 全国碳市场第一个履约周期顺利结束 [The first compliance period of China's national emission trading scheme was successfully ended]. *MEE news release*, 31 December. *MEE news release*, 12 June. https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202112/t20211231_965906.shtml
MEE (2019) *关于推进实施钢铁行业超低排放的意见 [Policy Opinion on moving forward with ultra-low emissions for iron and steel industry]*. https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/201904/t20190429_701463.html
Ministry of Ecology and Environment [MEE] and Ministry of Commerce [MOFCOM] (2022) *关于印发《对外投资合作建设项目生态环境保护指南》的通知.*
https://www.mee.gov.cn/xxgk2018/xxgk/xxgk05/202201/t20220110_966571.html
Ministry of Commerce [MOFCOM] (2020) *商务部等 8 部门关于进一步做好供应链创新与应用试点工作的通知* [Policy Guideline on Ecological and Environmental Protection for Development Projects on Foreign Investment and Cooperation]. http://www.mofcom.gov.cn/article/zcfb/zcgnmy/202004/20200402954596.shtml
Ministry of Finance [MOF] (2022) 关于印发《财政支持做好碳达峰碳中和工作的意见》[Policy document on the Fiscal support for the development of dual carbon goals]. http://www.gov.cn/zhengce/zhengceku/2022-05/31/content_5693162.htm
MOF (2019) Debt sustainability framework for participating countries of the Belt and Road Initiative. http://m.mof.gov.cn/czxw/201904/P020190425513990982189.pdf
MOF (2017) Guiding principles on financing the development of the Belt and Road. http://m.mof.gov.cn/czxw/201705/P020170515761133537061.pdf
Ministry of Foreign Affairs of the People's Republic of China [MFA] (2022a) Jointly advancing the Global Development Initiative and writing a new chapter for common development. https://www.fmprc.gov.cn/eng/zxxx_662805/202209/t20220922_10769721.html
MFA (2022b) *Xi Jinping speaks with Indonesian President Joko Widodo on the phone*. Press release, 11 January. https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/202201/t20220112_10481287.html
MFA (2022c) Joint press statement on the bilateral meeting between President of the People's Republic of China and President of the Republic of Indonesia. Press release, 26 July. https://www.fmprc.gov.cn/eng/zxxx_662805/202207/t20220726_10728227.html
MFA (2021a) *Initiative for Belt and Road partnership on green development*. https://www.fmprc.gov.cn/mfa_eng/wjdt_665385/2649_665393/202106/t20210624_9170569.html
MFA (2021b) *Declaration on China-Africa cooperation on combating climate change*. https://www.fmprc.gov.cn/mfa_eng/wjdt_665385/2649_665393/202112/t20211203_10461772.html
MFA (2021c) 王毅卢胡特共同主持中国印尼高级版对话合作机制首次会议 [Chinese Foreign Minster Wang Yi and Indonesian Minister for Maritime and Investment Affairs Luhut to jointly host the first meeting of the China-Indonesia high-level bilateral dialogue cooperation mechanism]. News release, 6 June. https://www.fmprc.gov.cn/nanhai/chn/wjbxw/202106/t20210606_9071562.htm
MFA (2015) *The Forum on China-Africa Cooperation Johannesburg Action Plan (2016-2018)* https://www.fmprc.gov.cn/mfa_eng/wjdt_665385/2649_665393/201512/t20151210_679430.html
Ministry of Industry and Information Technology [MIIT] (2022) *工业领域碳达峰实施方案 [Implementation Plan for Carbon-Peaking in the Industrial sectors]*. http://www.gov.cn/zhengce/zhengceku/2022-08/01/5703910/files/f7edf770241a404c9bc608c051f13b45.pdf
Miniane J (2004) *Productivity shocks, learning and open economy dynamics*. International Monetary Fund Working Paper. https://www.imf.org/external/pubs/ft/wp/2004/wp0488.pdf

Monkelbaan, J (2017) Using Trade for Achieving the SDGs: the example of the Environmental Goods Agreement. *Journal of World Trade* 51(4): 575-604
Mulyanto R (2022) *Omnibus Law could slow rather than drive Chinese investment in Indonesian energy*. China Dialogue, 1 June. https://chinadialogue.net/en/business/omnibus-law-could-slow-rather-than-drive-chinese-investment-in-indonesian-energy/
Mureithi C (2022) Trade between Africa and China reached an all-time high in 2021. *Quartz*, 8 February. https://qz.com/africa/2123474/china-africa-trade-reached-an-all-time-high-in-2021/
Naegele H and Zaklan A (2019) *Does the EU ETS cause carbon leakage in European manufacturing?* Journal of Environmental Economics and Management. https://doi.org/10.1016/j.jeem.2018.11.004
National Development and Reform Commission [NDRC] NDRC (2019) *Third-Party market cooperation guidelines and cases*. https://www.ndrc.gov.cn/xxgk/zcfb/tz/201909/W020190905514523737249.pdf
NDRC (2021) Resolve to green the Belt and Road. News release, 10 August. https://en.ndrc.gov.cn/news/mediarusources/202108/t20210810_1293453.html
Nedopil C (2022a) *China's Belt and Road Initiative (BRI) investment report 2021*. Green Finance & Development Center and FISF Fudan University. https://greenfdc.org/brief-china-belt-and-road-initiative-bri-investment-report-2021/
Nedopil C (2022b) *Countries of the Belt and Road Initiative*. Green Finance & Development Center and FISF Fudan University. https://greenfdc.org/countries-of-the-belt-and-road-initiative-bri/
Nedopil C (2022c) *Belt and Road Initiative (BRI) investment report H1 2022*. Green Finance & Development Center and FISF Fudan University. https://greenfdc.org/china-belt-and-road-initiative-bri-investment-report-h1-2022/
Nedopil C, Springer C, Volz U and Yue M (2022) *The potential for early coal plant retirement*. Boston University Global Development Policy Center, FISF Fudan University and Centre for Sustainable Finance at SOAS University of London. https://www.bu.edu/gdp/files/2022/06/GCI_PB_014_FIN.pdf
Nedopil C, Yue M and Volz U (2022) *Global practices for financing of early coal retirement for accelerating green energy transition*. FISF Fudan University and Centre for Sustainable Finance at SOAS University of London. https://greenfdc.org/wp-content/uploads/2022/03/D3_Early_Coal_Retirement_Best_Practices.pdf
Nedopil C (2021) *Coal phase-out in the Belt and Road Initiative (BRI): An analysis of Chinese-backed coal power from 2014-2020*. Green BRI Center, International Institute of Green Finance (IIGF). https://green-bri.org/wp-content/uploads/2021/06/Christoph_NEDOPIL_Wang_2021_Coal-phase-out-in-the-Belt-and-Road-Initiative-BRI_Fin.pdf
New Development Bank [NDB] (2022) New Development Bank General Strategy for 2022-2026: Scaling up development finance for a sustainable future. https://www.ndb.int/wp-content/uploads/2022/07/NDB_StrategyDocument_Eversion-1.pdf
Nordhaus, W (2021) Dynamic climate clubs: On the effectiveness of incentives in global climate agreements. *PNAS*
Nordhaus, W (2015) Climate Clubs: Overcoming Free-Riding in International Climate Policy. *American Economic Review* 105(4): 1339-70. https://www.aeaweb.org/articles?id=10.1257/aer.15000001
OECD (2022) OECD *Secretary-General tax report to G20 Finance Ministers and Central Bank Governors*. https://www.oecd.org/g20/topics/international-taxation/oecd-secretary-general-tax-report-g20-finance-ministers-indonesia-february-2022.pdf
Parry I (2021) Five things to know about carbon pricing. *International Monetary Fund*, September. https://www.imf.org/en/Publications/fandd/issues/2021/09/five-things-to-know-about-carbon-pricing-parry
Parry I, Black S and Roaf J (2021) Proposal for an International Carbon Price Floor among large emitters. International Monetary Fund. https://www.imf.org/en/Publications/staff-climate-notes/Issues/2021/06/15/Proposal-for-an-International-Carbon-Price-Floor-Among-Large-Emitters-460468
Parry et al. (2021) Carbon pricing: What role for border carbon adjustments? International Monetary Fund. https://www.imf.org/en/Publications/staff-climate-notes/Issues/2021/09/24/Carbon-Pricing-What-Role-for-Border-Carbon-Adjustments-464805
Parry I, Black S and Zhunussova K (2022) Carbon taxes or emissions trading systems?: Instrument choice and design. International Monetary Fund. https://www.imf.org/en/Publications/staff-climate-notes/Issues/2022/07/14/Carbon-Taxes-or-Emissions-Trading-Systems-Instrument-Choice-and-Design-519101
Parija P and Srivastava S (2022) India mulls wheat export curbs in latest food supply squeeze. *Bloomberg*, 4 May. https://www.bloomberg.com/news/articles/2022-05-04/india-considers-restricting-wheat-exports-as-heat-destroys-crops#xj4y7vzkg

PBOC (2022) *Transcript of Governor Yi Gang's interview by CGTN*. Press release, 27 June. http://www.pbc.gov.cn/en/3688110/3688172/4437084/4587509/index.html

People's Bank of China [PBOC] (2021) *银行金融机构绿色金融评价方案* [Green Finance Assessment Plan for China's banks and financial institutions]. http://www.gov.cn/zhengce/zhengceku/2021-06/11/5616962/files/ad23a21fbf414d2facb1dfdb623f560d.pdf

Prasad A, Loukoianova E, Feng A and Oman W (2022) Mobilising private climate financing in emerging market and developing economies. International Monetary Fund. https://www.imf.org/en/Publications/staff-climate-notes/Issues/2022/07/26/Mobilizing-Private-Climate-Financing-in-Emerging-Market-and-Developing-Economies-520585

Reinsch WA and Benson E (2022) It's not always sunny in D.C. Center for Strategic & International Studies. https://www.csis.org/analysis/its-not-always-sunny-dc

Reuters (2022) Biden waives solar panel tariffs for four countries, invokes defense law. News release, 6 June. https://www.reuters.com/world/us/biden-waives-solar-panel-tariffs-invokes-defense-law-white-house-confirms-2022-06-06/

Reuters (2015) China's Xi pledges $60 bln for development in Africa. News release, 4 December. https://www.reuters.com/article/china-africa-idINL8N13T11020151204

Ritchie H, Roser M and Rosado P (2020) *Indonesia: Energy country profile*. Our World in Data. https://ourworldindata.org/energy/country/indonesia

Rosales et al. (2021) Voluntary carbon markets in ASEAN: Challenges and opportunities for scaling up. Imperial College London. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026880/Green_Finance_COP26_Universities_Network_Policy_Report.pdf

Romanello M, ..., Robinson EJZ, ... and Hamilton I (2021) The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. *The Lancet* 398(10311):1619-1662. https://www.thelancet.com/article/S0140-6736(21)01787-6/fulltext

Ruta M (2022) *The impact of the war in Ukraine and global trade and investment*. World Bank. https://openknowledge.worldbank.org/handle/10986/37359

Salinatri (2022) Indonesia successfully holds G20 TIMM, Trade Minister Zulkifli Hasan: Support achievement of 6 priority issues to overcome global economic challenges. G20 news release, 23 September. https://www.g20.org/indonesia-successfully-holds-g20-tiimm-trade-minister-zulkifli-hasan-support-achievement-of-6-priority-issues-to-overcome-global-economic-challenges/

Sanderson H (2022) *Nickel drama highlights Tsingshan's role in energy transition*. China Dialogue, 13 May. https://chinadialogue.net/en/business/nickel-drama-highlights-tsingshans-role-in-energy-transition/

Sanderson H (2020) *Tesla's nickel quest highlights metal's environmental burden*. Financial Times, 1 September. https://www.ft.com/content/5d6fc188-2b9c-4df7-848e-a6c1795dc691

Sato M et al. (2013) *Sectors under scrutiny – Evaluation of indicators to assess the risk of carbon leakage in the UK and Germany*. London: Grantham Research Institute on Climate Change and the Environment at the London School of Economics. https://www.cccep.ac.uk/wp-content/uploads/2015/10/Working-Paper-113-Sato-et-al.-2013_v2.pdf

Sato M and Burke J (2021) What is carbon leakage? Clarifying misconceptions for a better mitigation effort. Grantham Research Institute on Climate Change and the Environment at the London School of Economics. https://www.lse.ac.uk/granthaminstitute/news/what-is-carbon-leakage-clarifying-misconceptions-for-a-better-mitigation-effort/

Shah S (2022) *Pakistan's flood losses deal crushing blow to ailing economy*. The Wall Street Journal, 15 September. https://www.wsj.com/articles/pakistans-flood-losses-deal-crushing-blow-to-ailing-economy-11663250402

Shayegh S and Dasgupta S (2022) Climate change, labour availability and the future of gender inequality in South Africa. Journal of Climate and Development. https://doi.org/10.1080/17565529.2022.2074349

Smith A (2000) *Wealth of nations*. Hoboken, New Jersey: BiblioBytes.

South African Government (2021) Joint Statement issued at the conclusion of the 30th BASIC Ministerial Meeting on Climate Change hosted by India on 8th April 2021. https://www.gov.za/speeches/joint-statement-issued-conclusion-30th-basic-ministerial-meeting-climate-change-hosted

STA (2021) **税**务总局：环保税年收入稳定在 200 亿左右 **企**业超标排放率持续 [STA: environmental protection tax's annual revenues are steadily at CNY 20 billion; companies continue to emit more environmental pollutions over the limit]. STA news release, 26 August. http://www.chinatax.gov.cn/chinatax/n810219/n810780/c5168405/content.html

State Taxation Administration [STA] (2020) 环境保护税政策解读 [Interpretation of China's environmental protection tax policy]. STA news release, 30 September. http://www.chinatax.gov.cn/chinatax/n810351/n810906/c5157152/content.html

Stern N and Lankes H P et al. (2022) *Collaborating and Delivering on Climate Action through a Climate Club: An independent report to the G7*. London: London School of Economics and Political Science. https://www.lse.ac.uk/granthaminstitute/publication/collaborating-and-delivering-on-climate-action-through-a-climate-club-an-independent-report-to-the-g7/

Stern N (2021) *A time for action on climate change and a time for change in economics*. Grantham Research Institute on Climate Change and the Environment at the London School of Economics. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/10/working-paper-370-Stern.pdf

Stiglitz J.E. et al. (2017) *Report of the High-Level Commission on Carbon Prices*. Carbon Pricing Leadership Coalition. https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/59b7f2409f8dce5316811916/1505227332748/CarbonPricing_FullReport.pdf

Stiglitz, J (2007) *Making Globalization Work*. London: Penguin. Print.

Stoerk T, Dudek D and Yang J (2018) China's national carbon emissions trading scheme: Lessons from the pilot emission trading schemes, academic literature, and known policy details. *Journal of Climate Policy* 19(4):472-486. https://doi.org/10.1080/14693062.2019.1568959

Sylvia T (2020) Jinko Solar the world's biggest module provider again in 2019. PV Magazine, 12 February. https://www.pv-magazine.com/2020/02/12/jinko-solar-the-worlds-biggest-module-provider-again-in-2019/

The Lancet (2009) A Commission on climate change. 373 (9676):1659 https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60922-3/fulltext

The Export-Import Bank of China [CHEXIM] (2016) White Paper on green finance. http://english.eximbank.gov.cn/News/WhitePOGF/201807/P020180718416279996548.pdf

The State Council of the People's Republic of China (2019) 14 countries, China agree to third-party market cooperation. News release, 5 September. http://english.scio.gov.cn/beltandroad/2019-09/05/content_75174814.htm

The State Council (2021) *Full text: China's international development cooperation in the new era*. http://english.www.gov.cn/archive/whitepaper/202101/10/content_WS5ffa6bbbc6d0f72576943922.html

The State Council (2022) China accounts for 30% of global manufacturing output: Official. News release, 14 June. http://english.scio.gov.cn/pressroom/2022-06/14/content_78269516.htm

The National People's Congress of the People's Republic of China (2018) 中华人民共和国环境保护税法 [Environmental Protection Tax Law of the People's Republic of China]. http://www.npc.gov.cn/zgrdw/npc/xinwen/2018-11/05/content_2065629.htm

Tsinghua University (2021) Tsinghua University inaugurates institute to promote carbon neutrality. https://www.tsinghua.edu.cn/en/info/1244/10636.htm

Tvinnereim E and Mehling M (2018) Carbon pricing and deep decarbonisation. Journal of Energy Policy. https://doi.org/10.1016/j.enpol.2018.06.020

UN Climate Change Conference UK 2021 [UK COP26] (2022) *Six-month update on progress in advancing the just energy transition partnership (JETP)*. https://ukcop26.org/six-month-update-on-progress-in-advancing-the-just-energy-transition-partnership-jetp/

UK COP26 (2021a) *Agricultural commodity companies corporate statement of purpose*. https://ukcop26.org/agricultural-commodity-companies-corporate-statement-of-purpose/

UK COP26 (2021b) *Global coal to clean power transition statement*. https://ukcop26.org/global-coal-to-clean-power-transition-statement/

UK COP26 (2021c) Political Declaration on the Just Energy Transition in South Africa. https://ukcop26.org/political-declaration-on-the-just-energy-transition-in-south-africa/

UK COP26 (2021d) MDB Joint Climate Statement. https://ukcop26.org/mdb-joint-climate-statement/

UK COP26 (2021e) COP26 World Leaders Summit – Statement on the Breakthrough Agenda. https://ukcop26.org/cop26-world-leaders-summit-statement-on-the-breakthrough-agenda/

United Nations Conference on Trade and Development (2021) *Trade and Environment Review 2021: Trade-climate readiness for developing countries*. https://unctad.org/webflyer/trade-and-environment-review-2021

United Nations (2021) *Consultations on Climate and SDG Synergies for a Better and Stronger Recovery from the Covid-19 Pandemic*. *https://sdgs.un.org/publications/consultations-climate-and-sdg-synergies-better-and-stronger-recovery-covid-19-pandemic*

UK Parliament (2022) Ministers to consult on implementing CBAM following EAC recommendation. News release, 21 June. https://committees.parliament.uk/committee/62/environmental-audit-committee/news/171544/ministers-to-consult-on-implementing-cbam-following-eac-recommendation/

UN Environment Programme [UNEP] (2011) Towards a green economy: Pathways to sustainable development and poverty eradication. https://sustainabledevelopment.un.org/content/documents/126GER_synthesis_en.pdf
UN Environment Programme [UNEP] (2021) Minamata Convention on Mercury: China country profile. https://www.mercuryconvention.org/en/parties/chn
UN Partnership for Action on Green Economy [UN PAGE] (2019) Green transformation of industrial parks in China's Jiangsu Province: A synthesis report. https://www.un-page.org/news/sharing-good-practices-on-green-industrial-transition-in-china/
UN Climate Change Conference [UNFCCC] (2021) *Indonesia: Long-term strategy for low carbon and climate resilience 2050*. https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf
UN Climate Change Conference [UNFCCC] (n.d.) COP26 outcomes: Finance for climate adaptation. https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact/cop26-outcomes-finance-for-climate-adaptation
United Nations Conference on Trade and Development [UNCTAD] (2020) 'Omnibus Law' on job creation has been enacted. Investment Policy Hub. https://investmentpolicy.unctad.org/investment-policy-monitor/measures/3567/indonesia-omnibus-law-on-job-creation-has-been-enacted
United Nations Conference on Trade and Development [UNCTAD] (2021a) Evolution of the world's 25 top trading nations. https://unctad.org/topic/trade-analysis/chart-10-may-2021
United Nations Conference on Trade and Development [UNCTAD] (2021b) A European Union carbon border adjustment mechanism: Implications for developing countries. https://unctad.org/system/files/official-document/osginf2021d2_en.pdf
United Nations Economic and Social Commission for Asia and the Pacific [UNESCAP] (2022) Mainstreaming sustainable development in regional trade agreements: comparative analysis and way forward for RCEP. https://www.unescap.org/kp/2022/mainstreaming-sustainable-development-regional-trade-agreements-comparative-analysis-and
Vangenechten D and Lehne J (2022) Can a climate club accelerate industrial decarbonisation? E3G. https://www.e3g.org/publications/can-climate-clubs-accelerate-industrial-decarbonisation/
Venmans F, Ellis J and Nachtigall D (2020) Carbon pricing and competitiveness: Are they at odds? *Journal of Climate Policy* 20(9):1070-1091. https://doi.org/10.1080/14693062.2020.1805291
Verde S (2020) The impact of the EU emissions trading system on competitiveness and carbon leakage: The econometric evidence. *Journal of Economic Surveys* 34(2):320-343. https://doi.org/10.1111/joes.12356
Wang Y and Yu L (2021) Can the current environmental tax rate promote green technology innovation? – Evidence from China's resource-based industries. *Journal of Cleaner Production* 278(123443). https://doi.org/10.1016/j.jclepro.2020.123443
Weitzel M, Hubler M and Peterson S (2012) Fair, optimal or detrimental? Environmental vs. strategic use of border carbon adjustment. *Journal of Energy Economics* 34(2): S198-S207. http://www.sciencedirect.com/science/article/pii/S0140988312001934
Whitmee S et al. (2015) Safeguarding human health in the Anthropocene epoch: Repot of The Rockefeller Foundation-Lancet Commission on planetary health. *The Lancet* 386(10007):1973-2028. World Bank (2022a) Commodity markets outlook: The impact of the war in Ukraine on commodity markets. https://openknowledge.worldbank.org/bitstream/handle/10986/37223/CMO-April-2022.pdf
World Bank (2022b) *State and trends of carbon pricing 2022*. https://openknowledge.worldbank.org/handle/10986/37455
World Bank (2021) *What you need to know about concessional finance for climate action*. https://www.worldbank.org/en/news/feature/2021/09/16/what-you-need-to-know-about-concessional-finance-for-climate-action
World Bank (2020) *Green hydrogen in developing countries*. https://openknowledge.worldbank.org/bitstream/handle/10986/34398/Green-Hydrogen-in-Developing-Countries.pdf?sequence=1&isAllowed=y
World Bank (2019) State and trends of carbon pricing 2019. *https://openknowledge.worldbank.org/handle/10986/31755*
World Bank (2017) Guidance note on shadow price of carbon in economic analysis. https://thedocs.worldbank.org/en/doc/911381516303509498-0020022018/original/2017ShadowPriceofCarbonGuidanceNoteFINALCLEARED.pdf
World Bank (2012) Thai flood 2011: Rapid assessment for resilient recovery and reconstruction planning. https://documents1.worldbank.org/curated/en/677841468335414861/pdf/698220WP0v10P106011020120Box370022B.pdf
World Bank (2009) *Trade and Climate Change: WTO-UNEP Report*. Geneva: WTO. https://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf

World Bank (n.d.) Carbon pricing dashboard. https://carbonpricingdashboard.worldbank.org/what-carbon-pricing
World Development Indicators [WDI] (n.d.) *Trade (% of GDP)* https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS
World Development Indicators [WDI] (n.d.) *Industry (including construction), value added (% of GDP) – China*. https://data.worldbank.org/indicator/NV.IND.TOTL.ZS?locations=CN
World Economic Forum [WEF] (2022) Advancing the green development of the Belt and Road Initiative: Harnessing finance and technology to scale up low-carbon infrastructure. https://www3.weforum.org/docs/WEF_Advancing_the_Green_Development_of_the_Belt_and_Road_Initiative_2022.pdf
World Health Organisation [WHO] (2021) *COP26 special report on climate change and health: The health argument for climate action*. https://www.who.int/publications/i/item/9789240036727
WHO (1994) Marrakesh Agreement Establishing the World Trade Organisation. https://www.wto.org/english/docs_e/legal_e/04-wto_e.htm
World Trade Organisation [WTO] (2022a) First meeting on fossil fuel subsidy reform held at WTO in follow-up to MC12. News release, 3 October. https://www.wto.org/english/news_e/news22_e/ffsr_03oct22_e.htm
WTO (2022b) *Subsidies, trade, and international cooperation*. https://www.wto.org/english/news_e/news22_e/igo_22apr22_e.pdf
WTO (2021a) Trade and Environmental Sustainability Structured Discussions (TESSD), Ministerial Statement on Trade and Environmental Sustainability. https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/MIN21/6R2.pdf&Open=True
WTO (2021b) DDG Paugam: WTO rules no barrier to ambitious environmental policies. *WTO news release*, 16 September. https://www.wto.org/english/news_e/news21_e/ddgjp_16sep21_e.htm
WTO (2021c) Virtual trade dialogues with businesses – 'Trade 4 Climate'. *WTO news release*, 26 October. https://www.wto.org/english/news_e/spno_e/spno18_e.htm
WTO (2020) Short answers to big questions on the WTO and the Environment. https://www.wto.org/english/res_e/booksp_e/envirqapublication_e.pdf
WTO (2019) United States – Measures concerning the importation, marketing and sale of Tuna and Tuna Products. https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds381_e.htm
WTO (2009) *Trade and Climate Change: WTO-UNEP Report*. https://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf
WTO (2001) European Communities – Measures affecting asbestos and asbestos-containing products. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=1236&CurrentCatalogueIdIndex=0&FullTextHash=
WTO (1994) Marrakesh Agreement Establishing the World Trade Organisation. https://www.wto.org/english/docs_e/legal_e/04-wto_e.htm
WTO (n.d.) WTO rules and environmental policies: GATT exceptions. https://www.wto.org/english/tratop_e/envir_e/envt_rules_exceptions_e.htm
Wuttke, J (2022) The EU-China CAI—perspectives from the European business community in China. *Asia Europe Journal* 20(1): 21-24. https://link.springer.com/article/10.1007/s10308-021-00631-5
Xinhua (2022) Xinhua headlines: China's foreign trade rebounds amid stronger economic recovery momentum. News release, 9 June. https://english.news.cn/20220609/e70cea41120348c3af95c332e8c3a888/c.html
Xinhua (2021) Indonesia aims to become export hub of electric vehicles in Southeast Asia. News release, 26 October. http://www.news.cn/english/2021-10/26/c_1310270908.htm
Xinhua Finance (2022) 国家发改委：去年中资企业境外发债近 2000 亿美元 绿色债券大幅增长 [NDRC: Chinese companies issued bonds in the international market almost reached US$ 200 billion in 2021; with a significant rise in green bonds]. News release, 18 January. https://www.cnfin.com/zs-lb/detail/20220118/3517732_1.html
Xue T et al. (222) New WHO global air quality guidelines help prevent premature deaths in China. National Science Review. https://doi.org/10.1093/nsr/nwac055
Xue Y (2022) China's solar exports rose 60 per cent to US$28 billion last year, made light of Covid-19 pandemic and US tariffs. *South China Morning Post*, 17 February. https://www.scmp.com/business/article/3167293/chinas-solar-exports-rose-60-cent-us28-billion-last-year-made-light-covid
Yin P et al. (2020) The effect of air pollution on deaths, disease burden, and life expectancy across China and its provinces, 1990-2017: An analysis for the Global Burden of Disease Study 2017. *The Lancet Planetary Health* 4(9): e386-e398. https://doi.org/10.1016/S2542-5196(20)30161-3

Yang D and Goulder L (2021) China's new carbon market aims to substantially reduce its emissions. Here's how. *World Economic Forum*, 9 November. **https://www.weforum.org/agenda/2021/11/new-carbon-market-slash-chinas-emissions/**

Zeng X, Li W and Guo X (2021) *The Guangdong carbon emissions trading scheme: Progress, challenges and trends*. Belfer Center at the Harvard Kennedy School. **https://www.belfercenter.org/publication/guangdong-carbon-emissions-trading-scheme-progress-challenges-and-trends**

Zhou L et al. (2018) *Moving the green Belt and Road Initiative: From words to actions*. World Resources Institute and Boston University Global Development Policy Center. **https://www.bu.edu/gdp/files/2018/11/GDP-and-WRI-BRI-MovingtheGreenbelt.pdf**