CLIMATE CHANGE
09/2022

Interim report

Carbon Pricing Potential in East and South Asia

Jurisdiction factsheets and clusters

by:

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Abstract: Carbon Pricing Potential in East and South Asia: Jurisdiction factsheets and clusters

The effectiveness of carbon pricing as a market-based policy tool with economy-wide transformation potential has increasingly rendered it the instrument of choice among policy makers responding to challenges posed by climate change. However, the potential for jurisdictions to introduce carbon pricing instruments varies considerably owing to differences in political, legal, economic, technical, and multilateral contexts. Previous work under this project developed an analytical framework to assess carbon pricing potential and readiness, along these five dimensions. This report applies the framework to 15 selected jurisdictions in East and South Asia to identify opportunities for carbon pricing in a region crucial for climate change mitigation efforts. The analysis reveals pathways for carbon pricing, and points to emerging opportunities in jurisdictions where the challenges to it seem greatest. Overall, climate ambition in the region is on the rise. Multiple jurisdictions have made considerable headway in advancing their long-term climate strategies in which carbon pricing is expected to drive a major part of mitigation outcomes. Yet, obstacles to introducing carbon pricing are multiple and may be more difficult to overcome in the presence of a heavy reliance on fossil fuels for government and export revenues; subsidized and historically low energy prices; and a heavily regulated and fossil-fuel-reliant power sector, amongst others. The findings of the report underscore the relevance of framework conditions for carbon pricing to be feasible and effective at delivering emission reductions. Based on the findings, three jurisdictions (Indonesia, Pakistan, and Vietnam) are selected for in-depth analysis in future work under this project.

Kurzbeschreibung: Potenzial der CO2-Bepreisung in Ost- und Südasien: Factsheets und Cluster zu den einzelnen Ländern

CO_2-Bepreisung ist ein wirksames marktbasiertes politisches Instrument mit gesamtwirtschaftlichem Transformationspotenzial. Deshalb wird sie von politischen Entscheidungsträgern zunehmend als bevorzugtes Instrument benutzt, um auf die Herausforderungen des Klimawandels zu reagieren. Das Einsatzpotenzial von Instrumenten zur CO_2-Bepreisung ist jedoch aufgrund unterschiedlicher politischer, rechtlicher, wirtschaftlicher, technischer und multilateraler Gegebenheiten sehr unterschiedlich. In einem früheren Bericht wurde ein analytischer Rahmen entwickelt, um das Potenzial und die Bereitschaft zur CO_2-Bepreisung entlang dieser fünf Dimensionen zu bewerten. Der vorliegende Bericht wendet diesen Rahmen auf 15 ausgewählte Länder in Ost- und Südasien an, um Möglichkeiten für die CO_2-Bepreisung in einer Region zu ermitteln, die für die Bemühungen zur Eindämmung des Klimawandels von entscheidender Bedeutung ist. Die Analyse zeigt Wege für die CO_2-Bepreisung auf und weist auf neue Möglichkeiten in Ländern hin, in denen die Herausforderungen am größten zu sein scheinen. Insgesamt nimmt das Engagement für den Klimaschutz in der Region zu. Mehrere Länder haben beträchtliche Fortschritte bei der Entwicklung ihrer langfristigen Klimastrategien gemacht, bei denen die CO_2-Bepreisung einen großen Anteil an den Emissionsminderungen haben soll. Die Hindernisse für die Einführung von CO_2-Preisen sind jedoch vielfältig und können schwieriger zu überwinden sein, wenn beispielsweise eine starke Abhängigkeit von fossilen Brennstoffen für Staats- und Exporteinnahmen, subventionierte und historisch niedrige Energiepreise und ein stark regulierter und von fossilen Brennstoffen abhängiger Stromsektor vorhanden sind. Die Ergebnisse des Berichts unterstreichen die Bedeutung der Rahmenbedingungen, die gegeben sein müssen, damit die CO_2-Bepreisung durchführbar ist und wirksam zu Emissionsminderungen führt. Auf der Grundlage der Ergebnisse werden drei Länder (Indonesien, Pakistan und Vietnam) für eine vertiefte Analyse in einem nächsten Schritt des Projekts ausgewählt.

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List of abbreviations

AFOLU	Agriculture, Forestry and Other Land Use
ADB	Asian Development Bank
ACCEPT	ASEAN Climate Change and Energy Project
AFOLU	Agriculture, Forestry and Other Land Use
ASEAN	Association of Southeast Asian Nations
BAU	Business-as-usual
BCA	Border carbon adjustment
BMU	Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (General Federal Ministry of the Environment, Nature Conservation and Nuclear Safety)
BP	British Petroleum Plc
BUR	Biennial Update Report
CAT	Climate Action Tracker
CBA(M)	Carbon border adjustment (mechanism)
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH_4	Methane
CiACA	Collaborative Instruments for Ambitious Climate Action (UN)
CLIM	Climate Laws, Institutions and Measures
CO_2	Carbon dioxide
COP	Conference 8of the Parties
COVID-19	Coronavirus disease
CPI	Carbon pricing instrument
CPLC	Carbon Pricing Leadership Coalition
EBRD	European Bank for Reconstruction and Development
ECO	Economic Cooperation Organsation
EE	Energy efficiency
EIU	Economist Intelligence Unit
EPA	Environmental Protection Agency
ETS	Emissions Trading Scheme
EU	European Union
FDI	Foreign direct investment
FiT	Feed-in-tariff
FTA	Free trade agreement
GDP	Gross domestic product
GEF	Global Environmental Facility
GGGI	Global Green Growth Institute

GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German development agency)
GW	Gigawatt
ICAP	International Carbon Action Partnership
ICT	Information and communications technology
IEA	International Energy Agency
IIA	International investment agreement
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent power producer
IRENA	International Renewable Energy Agency
JCM	Joint Crediting Mechanism
JI	Joint Implementation
kWh	kiloWatt hour
LNG	Liquified natural gas
LULUCF	Land use, land-use change, and forestry
MBM	Market-based mechanism
MRV	Monitoring, reporting and verification
MW	Megawatt
NAMA	Nationally Appropriate Mitigation Action
NC	National Communication
NGO	Non-governmental organisation
O&G	Oil and gas
OECD	Organisation for Economic Co-operation and Development
NDC	Nationally Determined Contribution (in Paris-Agreement)
N_2O	Nitrous oxide (laughing gas)
NO_x	Nitrous oxide
PMR	Partnership for Market Readiness
PPA	Power purchasing agreement
PPP	Purchasing power parity
PV	Photovoltaics
RCEP	Regional Comprehensive Economic Partnership
RE	Renewable energy
REDD+	Reducing emissions from deforestation and forest degradation
SAFTA	South Asian Free Trade Agreement
SAR	Special Administrative Region

SMO	System and market operator
SO_2	Sulphur dioxide
T&D	Transmission and distribution
TI	Transparency International
TPES	Total primary energy supply
UBA	Umweltbundesamt (German Environment Agency)
UK	United Kingdom
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USD	United States Dollar
VAT	Value-added tax
VRE	Variable renewable energy
V20	Vulnerable Twenty
WB	World Bank
WEF	World Economic Forum
WDI	World Development Indicators
WTO	World Trade Organisation
WWF	World Wildlife Fund

Summary

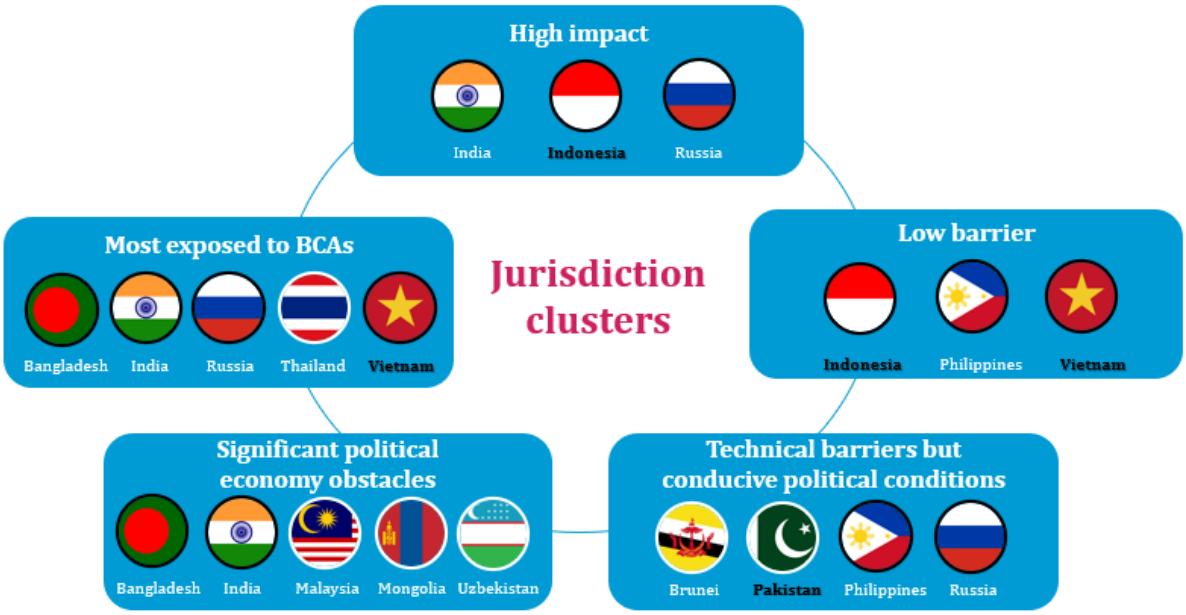
Carbon pricing is set to play a key role for many jurisdictions[1] on the path to climate-neutral economies by mid-century. Making a success of carbon pricing in individual jurisdictions requires a detailed and methodical understanding of their circumstances. Previous work under this project developed an analytical framework to assess carbon pricing potential and readiness, along political, legal, economic, technical, and multilateral dimensions. The framework identifies variables and indicators relevant to a jurisdiction's carbon pricing potential and has now been applied to 15 selected jurisdictions in East and South Asia to disentangle the drivers for and obstacles to carbon pricing in each. The desk-based research and analysis of these 15 jurisdictions are compiled in detailed and structured factsheets available in the Appendix. The chosen jurisdictions for this report are Bangladesh, Brunei, Hong Kong, India, Indonesia, Malaysia, Mongolia, Pakistan, Philippines, Russia, Sri Lanka, Taiwan, Thailand, Uzbekistan, and Vietnam.

The contribution of this report is two-fold. First, it provides an initial assessment of carbon pricing readiness and potential in 15 Asian jurisdictions critical to climate change mitigation efforts in the coming decades. The factsheets themselves are an important resource for anyone who is interested in carbon pricing as well as the broader climate policy landscape in the jurisdictions covered. Second, the information in these factsheets is used to sort jurisdictions into clusters to help identify three jurisdictions for in-depth review during the subsequent phase of the project. These jurisdictions are Vietnam, Pakistan, and Indonesia. The in-depth case studies will expand the analysis in the factsheets, complement them with stakeholder mapping and interviews, and plot potential pathways to facilitate the deployment of carbon pricing instruments in the three jurisdictions and their regional partners.

This report groups the jurisdictions into clusters that reflects expert assessment of the team and the project's aims. The assignment to the identified clusters, however, did not necessarily aim at an allocation of all 15 selected jurisdictions. The **high impact cluster** includes India, Indonesia, and Russia. These are jurisdictions where the successful introduction of carbon pricing would generate the greatest impact in terms of emissions reduction, due to the large share of their emissions on a global scale. The **low barrier cluster** is made up of Indonesia, the Philippines and Vietnam, and is where jurisdictions face relatively favourable political, legal, economic, technical, or multilateral conditions, or have taken steps to overcome the barriers to carbon pricing they face. The **cluster with technical barriers and conducive political conditions** comprises Brunei, Pakistan, the Philippines, and Russia. These jurisdictions face some potentially high technical barriers to the introduction of carbon pricing; however, their governments have shown interest in carbon pricing, and they therefore have the beginnings of a political foundation in place to push forward with the instrument. The **cluster with significant political economy obstacles** includes Bangladesh, India, Malaysia, Mongolia, and Uzbekistan, and faces political and economic challenges that can arise from a powerful brown lobby, lack of trust in government, significant poverty, and a reliance on fossil fuels. It will be important in these jurisdictions to underline the co-benefits of emissions reduction and how carbon pricing can facilitate this. Policy design and strategic communications will also be key. Finally, the **cluster with the most exposure to border carbon adjustments** (BCAs) comprises Bangladesh, India, Russia, Thailand, and Vietnam. These jurisdictions export substantially to destinations where a BCA may be adopted in future and so may face disruptions to their exports

[1] In the following, the term "jurisdiction" includes states, provinces, territorial authorities and regions. It does not reflect the position of the Federal Republic of Germany with regard to the status of a country or region.

and export-oriented development strategies. These issues may be pre-empted by adopting a domestic carbon pricing instrument.



Note: Flags with a black ring appear in multiple clusters. Jurisdiction names in black are case study jurisdictions.

Source: Own illustration, adelphi

Several high-level findings arise across the 15 selected jurisdictions in the region along the five dimensions. **Politically**, a heavy reliance on oil, gas, and coal alongside the dominance of fossil fuel earnings in government revenues and GDP provide the economic rationale and political interests that seek to avoid high carbon prices. Targeted and transparent communication about the policy instrument and the counterweight of green groups and civil society can help successfully mitigate this, as has been observed in areas of environmental policy in many jurisdictions. From a **legal** perspective, though many jurisdictions examined here have a flagship climate law in place, the existence of a comprehensive and robust regulatory and policy framework is also necessary for the success of carbon pricing. **Economically**, the structure and state of liberalisation of electricity markets are important for dispatch and investment decisions consistent with decarbonization and for effective carbon cost pass-through. The interplay between current (and future) market regulation and carbon pricing in the electricity sector, as well as existing energy subsidies, can create an aversion to higher electricity prices, which must be carefully reflected in the design of the carbon pricing instrument. Furthermore, while most jurisdictions already have some experience with market-based mechanisms such as through Clean Development Mechanism, (CDM), Joint Implementation (JI) or Joint Crediting Mechanism (JCM) projects, and established MRV infrastructures, many still lack the detailed **technical** and administrative capacity necessary to implement and operate a carbon pricing instrument with a broader scope. **Multilateral** climate cooperation can be particularly helpful for successful carbon pricing. Strong standing and economic integration under the ASEAN framework are relevant for many of the analysed jurisdictions. These connections can be leveraged to transfer lessons on carbon pricing and forge cross-border cooperation once the instrument is up and running. This multilateral dimension is also set to become increasingly important as jurisdictions ramp up their domestic carbon pricing efforts and talks of border carbon

adjustments progress. Assistance from multilateral carbon pricing support initiatives can continue to raise the potential in this respect.

Zusammenfassung

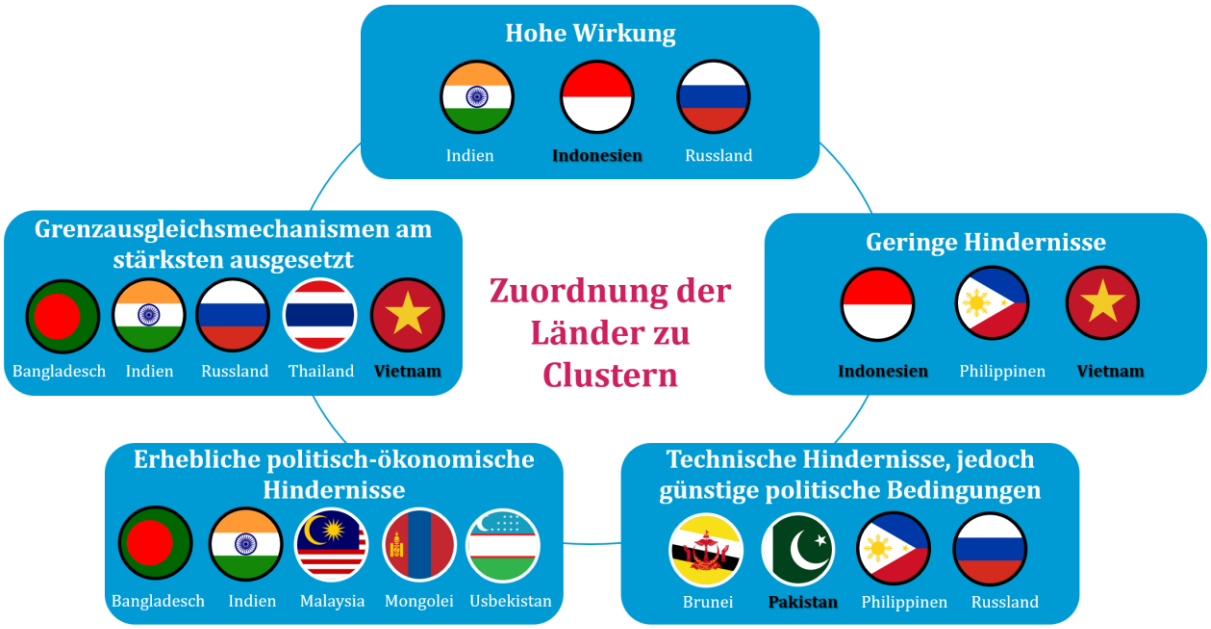
CO_2-Bepreisung wird für viele Länder[2] auf dem Weg zur Klimaneutralität bis Mitte des Jahrhunderts eine Schlüsselrolle spielen. Um die CO_2-Bepreisung in den einzelnen Ländern zum Erfolg zu führen, ist ein detailliertes und methodisches Verständnis der jeweiligen Umstände erforderlich. In einem früheren Bericht wurde ein analytischer Rahmen entwickelt, um das Potenzial und die Bereitschaft zur CO_2-Bepreisung entlang politischer, rechtlicher, wirtschaftlicher, technischer und multilateraler Dimensionen zu bewerten. Der Rahmen identifiziert Variablen und Indikatoren, die für das Potenzial eines Landes zur CO_2-Bepreisung relevant sind, und wurde nun auf 15 ausgewählte Länder in Ost- und Südasien angewandt, um die Triebkräfte und Hindernisse für die CO_2-Bepreisung in jedem Land zu ermitteln. Die Sekundärforschung und die Analyse dieser 15 Länder sind in detaillierten und strukturierten Factsheets zusammengestellt, die im Anhang zu finden sind. Die für diesen Bericht ausgewählten Länder sind Bangladesch, Brunei, Hongkong, Indien, Indonesien, Malaysia, die Mongolei, Pakistan, die Philippinen, Russland, Sri Lanka, Taiwan, Thailand, Usbekistan und Vietnam.

Dieser Bericht liefert eine erste Einschätzung der Bereitschaft und des Potenzials der CO_2-Bepreisung in 15 asiatischen Ländern, die für die Bemühungen zur Eindämmung des Klimawandels in den kommenden Jahrzehnten entscheidend sind. Die Factsheets sind eine wichtige Ressource für alle, die sich für CO_2-Preise und die breitere klimapolitische Landschaft in den erfassten Ländern interessieren. Die Informationen in diesen Factsheets werden daraufhin verwendet, um die Länder in Cluster einzuteilen und drei Länder zu identifizieren, die in der nächsten Phase des Projekts vertieft untersucht werden sollen (Vietnam, Pakistan und Indonesien). Die drei Fallstudien werden die Analyse in den Factsheets erweitern, sie durch Stakeholder-Mapping und Interviews ergänzen und potenzielle Wege aufzeigen, um die Einführung von Instrumenten zur CO_2-Bepreisung in den drei Ländern und ihren regionalen Partnern zu erleichtern.

In diesem Bericht werden die Länder in Cluster eingeteilt, basierend auf der Experteneinschätzung des Teams und den Zielen des Projekts. Die Zuordnung zu den identifizierten Clustern zielte jedoch nicht zwangsläufig auf eine Aufteilung aller 15 ausgewählten Länder ab. Das **Cluster mit großer Wirkung** umfasst Indien, Indonesien und Russland. Dies sind Länder, in denen die erfolgreiche Einführung von CO_2-Preisen aufgrund des großen Anteils ihrer Emissionen an den weltweiten Emissionen die größte Wirkung in Bezug auf die Emissionsminderungen hätte. Das **Cluster mit geringen Hindernissen** besteht aus Indonesien, den Philippinen und Vietnam. Diese Länder verfügen über relativ günstige politische, rechtliche, wirtschaftliche, technische oder multilaterale Bedingungen, oder haben Schritte unternommen, um die Hindernisse zu überwinden, die einer CO_2-Bepreisung im Wege stehen. Das **Cluster mit technischen Hindernissen und günstigen politischen Bedingungen** umfasst Brunei, Pakistan, die Philippinen und Russland. Diese Länder sehen sich mit einigen potenziell hohen technischen Hindernissen für die Einführung der CO_2-Bepreisung konfrontiert; ihre Regierungen haben jedoch Interesse an der CO_2-Bepreisung gezeigt und verfügen daher über die Anfänge einer politischen Grundlage, um die Einführung des Instruments voranzutreiben. Das **Cluster mit erheblichen politischen Hindernissen** besteht aus Bangladesch, Indien, Malaysia, die Mongolei und Usbekistan. Diese Länder stehen vor politischen und wirtschaftlichen Herausforderungen, die sich aus einer mächtigen fossilen Lobby, mangelndem Vertrauen in die Regierung, großer Armut und der Abhängigkeit von

[2] Die Bezeichnung „Länder" umfasst im Folgenden Staaten, Provinzen, Gebietskörperschaften und Territorien. Sie spiegelt nicht die Position der Bundesrepublik Deutschland hinsichtlich der Staatsqualität eines Landes oder einer Region wider.

fossilen Brennstoffen ergeben können. In diesen Ländern wird es wichtig sein, die Co-Benefits der Emissionsminderungen hervorzuheben und zu zeigen, wie die CO_2-Bepreisung diese erleichtern können. Die Politikgestaltung und strategische Kommunikation werden ebenfalls von entscheidender Bedeutung sein. Schließlich gehören Bangladesch, Indien, Russland, Thailand und Vietnam zum **Cluster der am stärksten von Grenzausgleichsmechanismen betroffen ist**. Diese Länder exportieren in erheblichem Umfang in Länder, in denen in Zukunft Grenzausgleichsmechanismen eingeführt werden könnten, und müssen daher möglicherweise mit Störungen ihrer Exporte und exportorientierten Entwicklungsstrategien rechnen. Diese Probleme können durch die Einführung inländischer CO_2-Bepreisung vermieden werden.



Hinweis: Länder, deren Flaggen schwarz umringt sind, gehören zu mehreren Clustern. Die schwarz gedruckten Länder(namen) wurden in den Fallstudien vertieft untersucht.

Quelle: eigene Darstellung, adelphi

Die 15 ausgewählten Länder der Region liefern in Bezug auf die fünf Dimensionen mehrere übergeordnete Erkenntnisse. Aus **politischer** Sicht bedeutet eine starke Abhängigkeit von Öl, Gas und Kohle sowie die Dominanz der Einnahmen aus fossilen Brennstoffen bei den Staatseinnahmen und dem Bruttoinlandsprodukt, dass wirtschaftliche und politische Interessen gegen hohe CO_2-Preise sprechen. Eine gezielte und transparente Kommunikation über das politische Instrument und das Gegengewicht grüner Gruppen und der Zivilgesellschaft können dazu beitragen, diese Tendenz erfolgreich abzumildern, wie es in weiteren Bereichen der Umweltpolitik in vielen Ländern bereits zu beobachten war. Aus **rechtlicher** Sicht, obwohl viele der hier untersuchten Länder über ein vorbildliches Klimagesetz verfügen, ist ein umfassender und robuster regulatorischer und politischer Rahmen für den Erfolg der CO_2-Bepreisung erforderlich. Aus **wirtschaftlicher** Sicht sind die Struktur und der Stand der Liberalisierung der Elektrizitätsmärkte wichtig für Dispatch- und Investitionsentscheidungen, um Emissionsminderungen zu erreichen und CO_2-Kosten effektiv zu übertragen. Das Zusammenspiel zwischen aktueller (und zukünftiger) Marktregulierung und CO_2-Bepreisung im Elektrizitätssektor sowie bestehende Energiesubventionen können zu einer Abneigung gegen höhere Strompreise führen, was bei der Gestaltung des Instruments zur CO_2-Bepreisung

sorgfältig berücksichtigt werden muss. Darüber hinaus verfügen die meisten Länder zwar bereits über eine gewisse Erfahrung mit marktbasierten Mechanismen, wie z. B. Clean Development Mechanism (CDM), Joint Implementation (JI) oder Joint Crediting Mechanism (JCM), und über eine etablierte MRV-Infrastruktur, doch fehlt es vielen noch an den **technischen** und administrativen Kapazitäten, die für die Umsetzung und den Betrieb eines Instruments zur CO_2-Bepreisung mit einem breiteren Anwendungsbereich erforderlich sind. **Multilaterale** Zusammenarbeit im Klimabereich kann für eine erfolgreiche CO_2-Bepreisung besonders hilfreich sein. Die starke Stellung und die wirtschaftliche Integration im ASEAN-Rahmen sind für viele der untersuchten Länder von Bedeutung. Diese Verbindungen können genutzt werden, um Erfahrungen mit der CO_2-Bepreisung weiterzugeben und eine grenzüberschreitende Zusammenarbeit aufzubauen, sobald das Instrument eingeführt ist. Diese multilaterale Dimension wird in dem Maße an Bedeutung gewinnen, in dem die Länder ihre Bemühungen zur CO_2-Bepreisung im eigenen Land verstärken und die Gespräche über Grenzausgleichsmechanismen voranschreiten. Die Unterstützung durch multilaterale Initiativen zur Förderung der CO_2-Bepreisung kann das Potenzial in dieser Hinsicht weiter erhöhen.

1 Introduction and overview

Carbon pricing has an important role to play on the path to climate neutrality by the middle of this century. Many jurisdictions recognise this role and have already adopted emissions trading systems (ETSs) and carbon taxes to impose a price on carbon (or indeed GHG) emissions. These jurisdictions vary enormously in their political and legal context, levels of development, the complexity of their climate and energy policy portfolios, as well as in the depth of their engagement with various aspects of globalisation. Accordingly, the design of their carbon pricing instruments have tended to reflect their individual characteristics. Other jurisdictions have shown interest in carbon pricing; some have even mentioned these instruments in their Nationally Determined Contributions (NDCs) but have not yet deployed them.

Successful preparations for and implementation of carbon pricing instruments in individual jurisdictions requires a detailed and methodical understanding of their circumstances. In recognition of this requirement, earlier work under this project developed an analytical framework to assess carbon pricing potential and readiness.[3] Specifically, the framework focuses on the political, legal, economic, technical, and multilateral dimensions of potential and readiness based on a detailed review of the academic and grey literature on the topic. For each of these dimensions, the report identifies aspects and variables/indicators to empirically operationalise the framework in a real-world setting.

The current report applies this analytical framework to 15 selected jurisdictions from East and South Asia.[4] To that end, a factsheet for each jurisdiction is developed and provided as an appendix at the end of this report.[5] All factsheets follow the same structure. Each one starts with a standardised table providing an overview of the state-of-play in each jurisdiction. This is complemented by a jurisdiction-specific assessment of carbon pricing potential and readiness for each of the political, legal, economic, technical, and multilateral dimensions. The factsheets conclude with an overview assessment for the jurisdiction. Section 2 below provides additional details regarding the method and content of the factsheets.

Based on the findings in the factsheets, it is possible to group jurisdictions in different clusters, which is the topic of Section 3. Five clusters are identified and are relevant for choosing case study jurisdictions for further analysis. These are:

i) **High impact cluster:** jurisdictions where carbon pricing would have the greatest emissions impact.

ii) **Low barrier cluster:** jurisdictions where carbon pricing faces relatively low barriers to implementation.

iii) **Cluster with technical barriers and conducive political conditions:** jurisdictions where carbon pricing faces potentially high implementation barriers from a technical perspective but simultaneously relatively favourable political conditions.

[3] UBA (2021): Carbon Pricing Potential in East and South Asia: Interim report. Available at: https://www.umweltbundesamt.de/en/publikationen/carbon-pricing-potential-in-east-south-asia

[4] This report applies the analytical framework to the following jurisdictions: Bangladesh, Brunei, Hong Kong, India, Indonesia, Malaysia, Mongolia, Pakistan, Philippines, Russia, Sri Lanka, Taiwan, Thailand, Uzbekistan, and Vietnam.

[5] This is due to the factsheets' length, the specificity of their bibliography, and to facilitate access to jurisdiction-specific information. The jurisdictions are ordered alphabetically.

iv) **Cluster with significant political and economic obstacles:** jurisdictions where carbon pricing faces the highest barriers to implementation from a political and economic perspective.

v) **Cluster with the most exposure to border carbon adjustments (BCAs):** jurisdictions that are most exposed to the introduction of BCAs in their export markets.

These clusters are five among many alternative ways to group jurisdictions. Indeed, in preparing this report, the authors also considered other cluster themes which may be operationally relevant for UBA. These include an emphasis on jurisdictions tending towards specific carbon pricing instruments (i.e., ETSs versus carbon taxes); various geographical groupings; Germany's strategic cooperation goals; and jurisdictions that are relatively under-researched.

This report is the second output under the UBA project titled "Potentials of introducing carbon pricing, especially CO_2 taxes and emission trading schemes in Asia". The overarching project goal is to examine the framework conditions with a view to assessing the actual potential for the successful introduction of carbon pricing instruments in selected Asian jurisdictions. The project also aims to identify possible pathways to regional or multilateral carbon pricing. Finally, the set of outputs produced under the project will build a scientific information base for governments, civil and private sector stakeholders as well as international multilateral and bilateral donors who are interested in advancing carbon pricing in the region.

Viewing the results of the clustering analysis in light of the project goals, three jurisdictions (among the 15 for which factsheets were prepared) have been selected for in-depth research. These jurisdictions are Indonesia, Pakistan, and Vietnam. Planned work under the project includes the preparation of case studies for each of these jurisdictions.

The rest of the report is organised as follows. Section 2 describes the factsheets in greater detail. Section 3 clusters jurisdictions into various groups and describes how each cluster can contribute to the project's goals. Section 4 discusses the rationale behind the selection of the three case study jurisdictions. It also provides interim conclusions from this report. The appendix contains the factsheets, where the jurisdictions are ordered alphabetically.

2 Jurisdiction factsheet overview

The set of jurisdictions studied in this report were preselected and consists of Bangladesh, Brunei, Hong Kong, India, Indonesia, Malaysia, Mongolia, Pakistan, Philippines, Russia, Sri Lanka, Taiwan, Thailand, Uzbekistan, and Vietnam. A factsheet per jurisdiction is provided in the appendix.

Each factsheet follows the same outline reflecting the analytical framework developed in UBA (2021). Specifically, individual sections apply the political, legal, economic, technical, and multilateral components of the framework to the jurisdiction in question based on desk research reflecting information that is current as of April 2021. A final sixth section provides an overview of carbon pricing readiness and options.

To allow quick access to key information and to provide a degree of comparability the first page of each factsheet contains a standardised table. Most elements of the table are self-explanatory and are based on the research conducted in developing the factsheet. For specific, quantitative variables, Table 1 provides the units, sources, and relevant link.

Table 1: Description of the quantitative variables in jurisdiction factsheets

Variable	Units	Source	Note:
GDP	PPP (current international $)	World Bank	Link to variable's WDI page
GDP per capita	PPP (current international $)	World Bank	Link to variable's WDI page
Population	Millions	World Bank	Link to variable's WDI page
Electricity from fossil fuels	% of total generation	IEA	Link to relevant IEA page
Perceived corruption	n/a	TI	Link to TI document
Income group	n/a	World Bank	Link to variable's WB page
Gini index	n/a	World Bank	Link to variable's WDI page
Industry value-added	% of GDP	World Bank	Link to variable's WDI page
Industry employment	% of total employment	World Bank	Link to variable's WDI page
Industry emissions[6]	% of total CO_2 emissions	IEA	Link to relevant IEA page
Fossil subsidies	% of GDP	IMF	Link to relevant IMF page
Openness	% of GDP	World Bank	Link to variable's WDI page
NDC Assessment	n/a	CAT	Link to CAT page

Note: PPP= Purchasing power parity; WDI = World Development Indicators; IEA = International Energy Agency; TI = Transparency International; CAT = Climate Action Tracker.

[6] Important to note is that the World Bank definition of "industry" for value-added and employment figures includes mining, manufacturing, construction, electricity, water, and gas. To make the figures broadly comparable for the purposes of this report, the "industry" emissions from the IEA combines emissions from electricity and heat producers, industry, and other energy industries.

3 Jurisdiction clusters

The jurisdictions within the scope of this report can be grouped in clusters to support the overall aim of the project, namely the provision of a comprehensive analysis and evaluation of the introduction of carbon pricing in the region. The clusters constitute an intermediate step in this respect. They connect the desk-based research and analysis in the factsheets (already complete; see appendix) with detailed case studies (yet to be developed; expected in 2022). They do so by underlining the common and emergent themes and operationally meaningful aspects of the factsheets for carbon pricing readiness. This contributes to an informed selection of jurisdictions for case study, which will combine further analysis of local institutions, structures, and information sources, complemented by interviews with relevant actors and stakeholders in the jurisdiction. In turn, the results of the analysis will not only offer a higher-resolution picture of the jurisdiction that is the subject of the case study but may also yield insights that may be relevant in other jurisdictions that share a cluster with it.

There are many different themes and operationally meaningful aspects around which jurisdiction clusters can be formed. Moreover, the number of clusters and the number of jurisdictions in each cluster can vary to serve different purposes. Indeed, there is no intrinsically correct way of forming individual clusters, nor the right number of clusters or cluster members. Moreover, the assignment to the identified clusters did not necessarily aim at an allocation of all 15 selected jurisdictions. This report uses five clusters with three to five members each to group the information in individual factsheets in light of the project's aims.[7] The organizing theme, membership and number of clusters presented below reflect the expert assessment of the project team and helps inform the selection of case study jurisdictions described in Section 4.

3.1 High impact cluster: India, Indonesia, Russia

The high impact cluster includes jurisdictions where the successful introduction of carbon pricing would generate the greatest impact in terms of emissions reduction. By construction, the high impact cluster includes jurisdictions that have large emissions footprints and could make a difference on the global scale in the fight against climate change. Note that a large emissions footprint correlates with the magnitude of the GDP and population. That is, the members of this cluster feature the top three aggregate GHG emissions among the 15 jurisdictions studied as well as the top three aggregate GDP numbers. In terms of population, India and Indonesia are the most populous countries in the study sample, and Russia comes fifth (Pakistan and Bangladesh rank third and fourth in terms of population size). The co-occurrence of high emissions, GDP, and population has the implication that benefits from the implementation of a cost-effective instrument would potentially be substantial and touch the lives of many people.

3.2 Low barrier cluster: Indonesia, Philippines, Vietnam

The members of the low barrier cluster either face relatively favourable political, legal, economic, technical, and multilateral conditions or have taken steps to overcome the barriers they face. Note that low barriers do not necessarily translate into imminent and successful implementation of carbon pricing but only that among the group of jurisdictions considered in this report, the efforts to introduce carbon pricing are more likely to yield positive results. Vietnam provides a good example in this respect. Despite being a one-party socialist republic, it has embraced market mechanisms and explicitly mentions market-based instruments in its NDC. The jurisdiction has a legal mandate and the institutional infrastructure largely in place to

[7] Members of the clusters are ordered alphabetically.

establish an ETS, has implemented important power sector reforms, and is currently developing its MRV capacity with support from the PMR. At the same time, it has relied heavily on coal to meet its soaring energy demand and to ensure energy security. The jurisdiction has a relatively young coal-fired power fleet with foreign participation in the sector as well as significant domestic fossil fuel production. Taken together, the influence of the brown lobby finding support within the political establishment could well derail progress towards the introduction of carbon pricing.

3.3 Cluster with technical barriers and conducive political conditions: Brunei, Pakistan, Philippines, Russia

This cluster includes jurisdictions with some, potentially high, technical barriers to the introduction of carbon pricing. At the same time, the governments of jurisdictions in this cluster have shown some interest in introducing carbon pricing despite these and other barriers, or at least they do not appear to face insurmountable political obstacles to its introduction. The technical barriers may be caused by the absence of a legal climate policy framework and low institutional and technical capacity to implement carbon pricing instruments. Moreover, the jurisdictions may have very limited MRV capacity, although they have some project-level exposure to MRV from JI, CDM and JCM projects. With exception of the Philippines these jurisdictions do not participate in capacity-building initiatives such as the PMR. The absence of MRV infrastructure is a critical limiting factor in these jurisdictions as this is required for both carbon taxes and emissions trading. At the same time, provided there is political will, it is possible to build such capacity with support from the international community.

3.4 Cluster with significant political economy obstacles: Bangladesh, India, Malaysia, Mongolia, Uzbekistan

The political economy of carbon pricing is complicated in *any* jurisdiction, and significant effort is required to overcome obstacles on this front. Accordingly, this cluster highlights those jurisdictions in the sample that face a particularly difficult situation without playing down the challenges elsewhere. These political and economic obstacles can arise from the presence of a large and powerful brown lobby; low trust in government; significant poverty; heavy reliance on fossil fuels for government and export revenues; subsidized and historically low energy prices; and a heavily regulated power sector reliant on fossil fuels, particularly coal. Each of these obstacles could severely inhibit the potential of carbon pricing in a jurisdiction. More importantly, these obstacles take time to overcome, as political consensus-building to start reforming the existing economic, energy and regulatory infrastructure is a slow-moving process. Nonetheless, potential enablers of carbon pricing operating in parallel can provide a way out of the equilibrium.[8] Underlining the co-benefits of emissions reduction due to carbon pricing, supporting the emergence of a green lobby, and the diligent use of generated revenues to ensure buy-in from the most adversely impacted citizen and business groups can further be important strategies for jurisdictions in this cluster to consider. Leveraging enablers, underlining co-benefits, and careful policy design can hence go a long way in ratcheting up ambition in jurisdictions where the challenges may seem greatest.

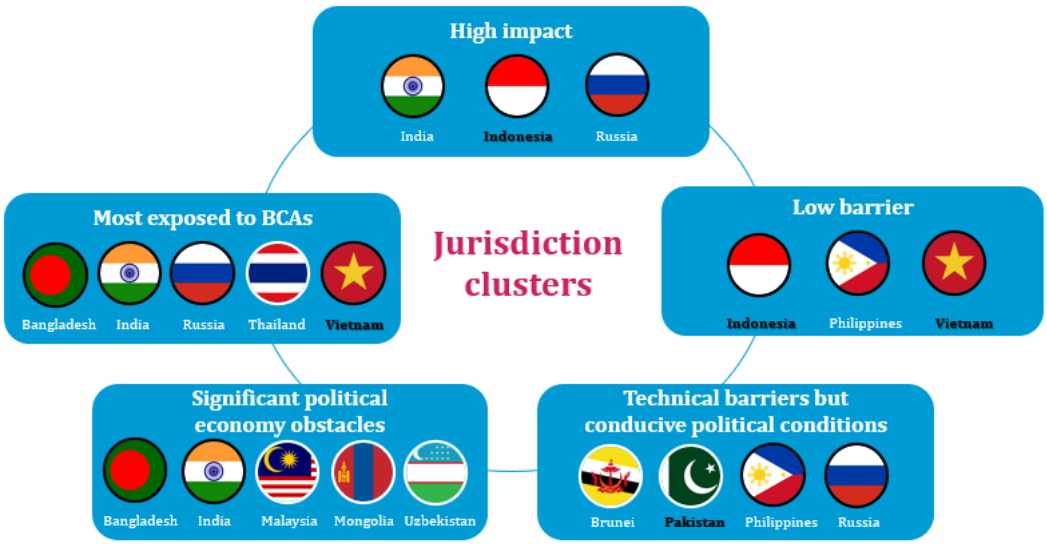
[8] Brunei, which is not a member of this cluster, provides an example. Its economy is heavily reliant on export revenues from hydrocarbons, features a tightly regulated power sector and a history of subsidised carbon-intensive goods. Yet, high government efficacy and economic resilience of to-be-affected consumer groups, as well as a strategic need for economic diversification and the political will to deploy market-based instruments to futureproof the economy provide a strong impetus for the introduction of a CPI.

3.5 Cluster with the most exposure to BCAs: Bangladesh, India, Russia, Thailand, Vietnam

This cluster includes jurisdictions with substantial exports to destinations where a border carbon adjustment may be adopted in the future. The most important markets where these jurisdictions export to—notably the EU, China, the UK, and the US—are adopting increasingly stringent climate policy targets and using carbon pricing to achieve them. There is also increasing talk of adopting some form of border carbon adjustment to level the playing field for their producers. This may disrupt the exports and export-oriented development strategies of jurisdictions in this cluster, which may be pre-empted by adopting a domestic carbon pricing instrument.

These five clusters and their membership is summarised in Figure 1. The jurisdictions that are members of multiple clusters are indicated by a black outline in their flags. For example, India appears in the clusters titled "high impact," "most exposed to BCAs," and "significant political economy obstacles." The figure also highlights the three jurisdictions which have been selected for further research and analysis, namely Indonesia, Pakistan, and Vietnam, by using black font in jurisdiction names. Section 4 explains in more detail the rationale behind this selection.

Figure 1: Jurisdiction clusters



Note: Flags with a black ring appear in multiple clusters. Jurisdiction names in black are case study jurisdictions.

Source: own illustration, adelphi

4 Considerations in the selection case study jurisdictions and interim conclusions

The goal of the clustering analysis in the previous section is to inform the selection of a set of case studies. In this respect, the selection, which includes Indonesia, Pakistan, and Vietnam, offers a well-balanced group aligned with the goals of the project. Several points are worth highlighting in this respect.

First, there is at least one case study jurisdiction in four of the five clusters described above. Therefore, studying these jurisdictions in detail will provide information not only for the case study jurisdiction but it will also shed light on other jurisdictions in the same cluster. For example, findings from the Vietnam case study regarding exposure to potential BCAs in trading partners may generate insights as well as clues for understanding and resolving related challenges in Thailand since both are members of the relevant cluster.

Second, the cluster with significant political economy obstacles does not include a case study jurisdiction. This is the cluster where the obstacles to the introduction of carbon pricing are perhaps the hardest to overcome because they tend to be related to deep-rooted, structural issues which are typically jurisdiction specific and have inertia. Consequently, cross jurisdiction spill overs in terms of learning are likely to be small, and domestic and international efforts to advance carbon pricing can only pay off in the medium to long term.

Third, in line with the project's aims there is an emphasis on identifying high carbon pricing potential in the region. Making this information available to domestic, international and multilateral stakeholders can be crucial for realising this potential rapidly. For example, the case study analyses in Indonesia and Vietnam, two of the three jurisdictions in the low-barrier cluster where ETSs are already under development, can speed up these jurisdictions' progress along the path to successful deployment of carbon pricing and support the cost-effective achievement of their climate goals. In the case of Indonesia, this can have implications on the global scale since the jurisdiction, a member also of the high impact cluster, is one of the top ten emitters globally.

A fourth point relates to the fact that technical barriers can be overcome given domestic political will and with international capacity building support. Indeed, the cluster with technical barriers and conducive political conditions focuses precisely on this issue. Pakistan is in this cluster and also considering an ETS. Both the jurisdiction and its international and multilateral partners will benefit from the in-depth analysis that the case study will provide in identifying the most pressing technical bottlenecks and options to bypass them.

In conclusion, the contribution of this report is two-fold. First, it provides an initial assessment of carbon pricing readiness and potential in 15 Asian jurisdictions using an analytical framework developed earlier in the project. The factsheets themselves are an important resource for anyone who is interested in carbon pricing as well as the broader climate policy landscape in the jurisdictions covered. Next, the information in these factsheets is used to sort jurisdictions into clusters considering the project's overarching aims. This provides an important bridge to the next stage of the project by assisting in the identification of the three case study jurisdictions. The development of these case studies is the subject of future work which will expand the factsheets, complement them with stakeholder mapping and interviews, and plot potential pathways to facilitate the deployment of carbon pricing instruments in these jurisdictions and their regional partners.

A Appendix:

This appendix consists of 15 sections, one per jurisdiction covered in the study. Each section presents a jurisdiction factsheet which reports the findings from the application of the analytical framework developed in UBA (2021). The jurisdictions are ordered alphabetically, and jurisdiction specific bibliographies are provided at the end of each section for ease of access.

The factsheets have a similar structure. Each one consists of five sections analysing the viability of a carbon price as a climate change policy instrument in the jurisdiction's context from political, legal, economic, technical, and multilateral perspectives. A final sixth section provides an overall qualitative assessment of carbon pricing potential in the jurisdiction. A high-level overview of the key relevant variables is provided in a standardised table on the first page of each factsheet and allows comparison across the jurisdictions in this study's scope.

A.1 Bangladesh Factsheet

Bangladesh			
Overall		**Political**	
Capital	Dhaka	**Electricity from fossil fuels**	98.2% of total generation (2018)
Govt structure	Parliamentary representative democratic republic	**Brown lobby**	BPDB
GDP **GDP per capita**	USD 809.38 billion (2019) USD 4,964.1 (2019)	**Green lobby**	Citizens' Climate Lobby Bangladesh; Bangladesh Env. & Dev't Society; Grameen Shakti; BRAC; Bangladesh Solar Assoc.; Works for Green Bangladesh; Friends of the Earth/BELA; ESDO; Climate and Clean Air Coalition
Population	163.1 million (2019)	**Perceived corruption**	Score=26 (2020) Min=12; Mean=43; Max=88 Germany=80
Legal		**Economic**	
Key government departments	Dep. of Env.; Min. of Env., Forests & Climate Change; Min. of Power, Energy & Mineral Resources	**Income group**	Lower-middle income
Key legal instruments	Climate Change Trust Act; Clean Air Act 2020	**Gini index**	32.4 (2016) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	Bangladesh Climate Change Strategy and Action Plan; Renewable Energy Policy; National Solar Energy Roadmap 2021-2041; Mujib Climate Prosperity Plan; National REDD+ Strategy; NAP for Reducing Short-Lived Climate Pollutants; Energy Efficiency & Conservation Master Plan up to 2030	**Importance of industry**	Value-added: 29.6% of GDP (2019) Employment: 21% of total (2019) CO_2 emissions: 69.5% of total (2018)
FDI	0.6% of GDP (2019)	**Fossil subsidies**	3.1% of GDP (2017)
		Electricity market	Partially unbundled; single buyer model

Bangladesh			
Technical		**Multilateral**	
MRV status	National Forest Monitoring System; no MRV law	**Openness**	37% of GDP (2019)
UNFCCC reporting	AFOLU estimates submitted to UNFCCC; Updated First NDC 2020	**International agreements**	WTO (1995); APTA (1975); BIMSTEC (1997)
Experience with carbon markets	CDM; JCM	**NDC**	(Un)Conditional: (5%) 15% reduction in GHG emissions by 2030 compared to BAU
Participation in WB initiatives	Not a CPLC partner Not a PMR partner	**NDC assessment**	Ambition not assessed by CAT; Carbon trading via CDM mentioned

Carbon pricing readiness and options

- Continuously rising power prices and ineffective cost pass through in electricity markets has created an aversion to higher electricity prices.
- Weak financial and institutional infrastructure makes ETS implementation difficult.
- Bangladesh could be exposed to border carbon adjustments due to its heavy reliance on export-oriented textile industry to Europe as textile industry is on the EU's carbon leakage list and its products could eventually be included in CBAM.
- No flagship climate law but climate change mitigation and adaptation integral part of strategic vision up until at least 2025.
- Some exposure to carbon markets through participating in CDM projects, but no MRV law is in place or in development.

1. Political dimension

Vested interested of carbon-intensive industries can be obstacles on the path to carbon pricing. In 2018, 76.5% of Bangladesh's total primary energy supply and more than 98% of its electricity generation came from fossil fuels (IEA 2018). Bangladesh has a significant number of coal power plants currently being planned or built (among the top ten in the world) and has historically shown political commitment to coal (Global Energy Monitor 2021). More recently, however, overseas investors have been losing interest in financing coal projects. 11 planned coal plants are now set to be scrapped, although it is less "protests or environmental concerns" catalysing this but the cost of importing and storing coal, land acquisition and project delays (Siddique 2020). The government is instead moving towards LNG-based plants, rather than away from fossil fuel-based generation, with 13 planned coal plants to be converted to run on gas (ibid). These developments, alongside "concerted efforts" to push low-cost US gas onto Asian markets including Bangladesh, are also obstructing renewable energy investment, which is already low (Asian Times 2021). These vested interests may well continue to pose challenges for the introduction of a carbon price. Conversely, the financial sector can have an interest in the development of carbon markets (Paterson 2012), but the weakness of Bangladesh's financial institutions may result in little in this regard (Nordea Trade 2021).

The success of a carbon pricing policy also depends on the public's acceptance and attitude towards green issues. Underlying this is the population's trust in the government. Corruption in Bangladesh is a routine problem; with a score of 26, Bangladesh ranks 148th of 180 countries by Transparency International for perceived corruption (2020), with politicians, parliament, and the judiciary perceived to be the most malleable (McDevitt 2015). The lack of trusted public

institutions here presents challenges for carbon pricing. Some of the country's largest political scandals have also laid bare the government's susceptibility to influence from brown industries. One such example is Calgary-based oil and gas company Niko Resources, which in the late 2000s bribed top Bangladeshi officials, including two former prime ministers and the then-energy minister, to obtain a natural gas contract worth USD 750 million (Montero 2009). Although Niko's presence in Bangladesh today is small, these scandals have left a sour taste and may impede the public's acceptance of a top-down policy as carbon pricing. To add, power prices in Bangladesh have continued to "skyrocket" since centre/centre-left Awami League came to power in 2009, with a fifth hike at the retail level implemented in March 2020 despite consumer resistance (Nabi 2020). This resistance may translate into further consumer pressure against increased energy prices stemming from a passed-through carbon price. In fact, past attempts to introduce a carbon tax, as in 2017, were backtracked due both to politicians who feared increasing the cost of living and the strong energy and transport lobby (Siddique 2017).

Despite this, addressing climate change is not remiss from the government's outward messaging. In growing recognition of the country's extreme vulnerability to the impacts of climate change, with its low-lying geography and coastal infrastructure, in summer 2020 Prime Minister Sheikh Hasina urged countries to ramp up their climate ambition under the framework of the Paris Agreement (Gerretsen 2020). Adding their weight to counter the interests of carbon-intensive groups is the green lobby in Bangladesh. This is made up of numerous NGOs, youth citizens' groups, and various green advocacy associations composed of, for example, renewable energy proponents and environmental lawyers such as the Bangladesh Environmental Lawyers Association (BELA), who played a key role during the various Niko Resources scandals. NGOs and aid agencies have historically played a critical role in Bangladesh's general development (The Economist 2021). The Green Party of Bangladesh was set up in 2014, drawing on the objectives of the Australian Greens (Johansen 2018). However, it is still in its first stage and is not represented in the legislature.

Bangladesh is a parliamentary representative democratic republic with a multi-party system. The prime minister is head of the government, which holds executive power. The legislative arm is made up of both the government and parliament. The 2020 Economist Intelligence Unit's democracy score for Bangladesh of 5.88 (80th in global rankings) shows it to be a hybrid regime (EIU 2020). On top of its corruption problems, regulatory quality is ranked globally by the World Bank in the lowest quintile (score of 15.4 in 2019) and government effectiveness is in the lowest quartile (23.6 in 2019) (World Bank 2019b), resulting in an institutional environment that may not be conducive to the successful operation of a carbon pricing instrument (CPI). Despite significant economic growth and increasing geopolitical significance, some argue that persistent democratic backsliding and "acrimony" between the two major parties, Awami League and the Bangladesh Nationalist Party, obstruct the country's potential for sustainable growth (Riaz & Parvez 2021) and may therefore also pose challenges for carbon pricing.

2. Legal dimension

Under the Bangladeshi Constitution, environmental and fiscal legislative power rests with the parliament, or the "House of the Nation", although laws are proposed and processed by the cabinet (Constitution of the People's Republic of Bangladesh 1972). In 2011, the constitution was amended to specify that the government must "endeavour to protect and improve the environment" and preserve it for future generations (Nachmany et al. 2015). Primarily responsible for climate change issues in Bangladesh is the Ministry of Environment, Forest and Climate Change (MoEFCC) under which the Department of Environment (DoE) and the Bangladesh Climate Change Trust Fund also operate. Set up in 2010 via the Climate Change Trust Act, the fund is resourced and overseen by the government which collaborates with

ministries, NGOs, and the private sector. This country-driven approach to climate finance, as opposed to "previous models of piecemeal contributions by developed countries" arguably allows Bangladesh to better align its resources with its own national context and priorities (Khan et al. 2012).

The history of rulemaking in Bangladesh that specifically recognises climate change begins in earnest in 1992 with the Environment Policy of Bangladesh, a comprehensive plan to address the issue despite few elements making their way into law. Three years later, the 1995 Environment Conservation Act was introduced to set environmental standards and regulate pollution. It was given further weight in 2002 with an amendment endowing it with environment primacy, or the ability to override all other laws (Nachmany et al. 2015). In 2005, the MoEFCC (MoEF at the time) brought in the National Adaptation Programme of Action (NAPA), designed to address the country's extreme climate vulnerability. The NAPA was deemed insufficient, however, so was revised in 2009 with additions including explicitly mainstreaming climate change and enhancing capacity and knowledge. The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009-2018 was introduced in the same year, and climate mitigation entered the fray in addition to adaptation, joining low carbon development, capacity-building, and institutional strengthening as key areas of focus for the country. The country's current Five-Year Plan (2020-2025) has retained the chapter dedicated to climate change from the previous iteration (General Economics Division 2020). To comprehensively address air pollution issues, the DoE has spearheaded the Clean Air Act 2020, which has now been finalised and is awaiting approval.

Although no flagship climate law is in place *per se*, Bangladesh's constellation of policies and over 200 environmental laws (Islam 2019), several of which have been amended over time to reflect developments and stakeholder interests, could form the firm basis for the legal framework required for a successful carbon pricing policy. Perhaps less promising is the Supreme Court's susceptibility to influence by the ruling party. This is due to the essential part that judicial independence plays for the success of carbon pricing—particularly for an ETS—as it provides market players with confidence and protection (Bogojevic 2013; UBA 2021). The Supreme Court is the highest judicial power in Bangladesh, and although separate from the executive since 2007, a score of 3.33 in 2017 on the World Economic Forum's judicial independence index places it in the bottom 40% worldwide (WEF 2017).

Alongside institutional corruption, the fickleness of the courts could also partially explain the stagnation of foreign investment in the country (The Economist 2021). Foreign direct investment in Bangladesh makes up 0.6% of its GDP (World Bank 2019a), with the export-oriented garment industry receiving much of this inflow (Nordea Trade 2021). The government is actively seeking foreign investment, particularly in the energy sector (through e.g., a public-private partnerships since 2009) and for infrastructure. Bangladesh is part of 27 international investment agreements (IIAs)—mostly bilateral investment treaties—currently in force (UNCTAD 2021). Although the level of regulatory restrictiveness on FDI in Bangladesh is relatively low, foreign investment is discouraged in certain "high-growth" sectors, which may increase the risk of arbitration concerning carbon pricing (UNCTAD 2013).

Bangladesh's (interim) NDC commits to a 5% reduction in GHG emissions by 2030 compared to BAU (increased to 15% conditional on support from developed countries). Key regulations and government strategies that will play into the realisation of its NDC include the Renewable Energy Policy, which mandates that at least 10% of total power generation must be from RE sources; the Energy Efficiency and Conservation Master Plan; the National Action Plan for Reducing Short-Lived Climate Pollutants; the National Sustainable Development Strategy; and

the Bangladesh Green Development Programme focusing on demand-side energy management, distributional issues, and green job creation.[9]

3. Economic dimension

As a lower-middle income country, Bangladesh has grown substantially over the past decades with GDP per capita reaching USD 4,964 in purchasing power parity terms in 2019. Prior to the pandemic, economic growth exceeded 7% four years in a row, outpacing Pakistan and India as well as China (The Economist 2021). However, inequality has also risen. The richest Bangladeshi households grew richer by a quarter and the poorest saw a decline in their income by a third (The Economist 2021).

Much of the growth in Bangladesh has been driven by the export-oriented textile industry, which makes up over 86% of Bangladesh's export earnings (BTMA 2021), and is supported by Bangladesh's participation in trade agreements such as the Asia Pacific Trade Agreement (APTA). Increased labour costs in China have also benefited Bangladesh's textile industry, as local labour costs are much cheaper (McKinsey and Company 2011). Labour market productivity and flexibility have slowly increased, as the share of workers in the agricultural sector dropped and shifted to the service and industry sectors and more women entered the workforce; however, more than half of those employed are considered vulnerable (Danish Trade Union Development Agency 2020). Though Bangladesh has grown substantially, the country is still working to eradicate extreme poverty, as close to one of two (44%) in the population are inactive in the labour market (ibid).

Industrial activities (including mining, energy, and construction in addition to manufacturing as per the World Bank classification) contribute to approximately 29.6% of GDP (2019), making up 21% of total employment (2019), and contributing to 69.5% (2018) of the country's CO_2 emissions. As a growing lower-middle income country with aspirations of soon achieving middle-income status, Bangladesh has growing energy demands. Currently Bangladesh is an energy importer, though it is working to increase foreign direct investment in the power sector to support coal, LNG, renewables, and cross border energy projects (Bangladesh Planning Commission 2020). Diminishing natural gas discoveries in recent years has forced the government to look for other sources of energy generation, as indicated in Bangladesh's new Eighth Five-Year Plan, which highlights a further reliance on imported LNG and coal-fired generation (General Economics Division 2020). To meet growing demand for power in line with the country's economic growth and goal of full electrification by 2021, the government of Bangladesh undertook a series of key steps, including short-term contracts to import oil-fired generation from neighbouring countries, as well as encourage private sector power production and increase energy imports (Asrarul 2020).

Natural gas is the leading fuel for power generation and is supplemented by a significant number of short-term contracts for oil-fired capacity (Ichord 2020) as well as coal-fired generation, though recently the Bangladeshi government signalled its intention to replace 13 under-construction coal power projects with LNG (Menafn 2021). Bangladesh uses natural gas to meet most of its electricity needs (IEA 2018), increasingly relying on imported LNG to meet the needs of large, new gas combined cycle generation plants, reduce reliance on oil generation, and offset declines in domestic gas production (Ichord 2020). The country's current master plan envisions substantial coal-fired generation, and Chinese investors were primed to support new coal plants. However, imported LNG in conjunction with the increasing economic unviability of coal power, as well as substantial climate costs, have encouraged the government to convert 13 planned coal

[9] See the LSE Climate Change Laws of the World database at https://climate-laws.org/ and the International Energy Agency policies database at https://www.iea.org/policies for more details.

plants to combined cycle generation plants (Siddique 2020). Despite a 3.1 GW renewable energy target for 2021 (IEA 2016) and the establishment of the Sustainable and Renewable Energy Development Authority (SREDA) to promote and facilitate renewable energy and energy efficiency, renewable energy is only at a very nascent stage. The lack of cost recovery for retail electricity prices as well as limited access to land has increased investor risk, making it difficult to pursue large renewable energy projects for electricity grid-connection (Ichord 2020). Recent World Bank and Asian Development Bank projects in Bangladesh have focused on stimulating investment for grid-connected renewable energy (ibid).

These efforts are further supported by the Scaling Up Renewable Energy Bangladesh, focused on stimulating investments in the renewable energy sector (IEA 2018). The main has been that since 2020 Bangladesh has had an excess of capacity, with almost 44% of available power capacity remaining unused; however, load-shedding and power failures happen frequently due to the country's inadequate power transmission and distribution system (Asrarul 2020). Bangladesh also struggles with cost recovery in the power sector, as inadequate revenue generation by the distribution companies has made it difficult to maintain payments to private generators and to fulfil short-term contracts for oil-fired capacity (ibid). A new Power Sector Master Plan to address some of these challenges was originally expected in 2021. However, the pandemic has likely extended that timeline (Dhaka Tribune 2021).

The Bangladeshi electricity sector has undergone reforms since the mid-1990s, including unbundling the state-owned energy supplier the Bangladesh Power Development Board (BPDB) into separate companies responsible for power generation, transmission, and distribution. While there are some independent power producers (IPPs), currently the majority of the electricity generation fleet is owned by the BPDB which sells its own generation as well as the power it purchases from IPPs to urban distribution companies and the Bangladesh Rural Electrification Board cooperatives (Asararul 2020). The transmission system is also still linked to the BPDB, as it is owned and operated by the Power Grid Company (PGCB), a subsidiary of the BPDB (ibid).

Given the almost complete absence of low-carbon generation, and that Bangladesh is increasingly moving to combined cycle gas plants that are more efficient, a carbon pricing mechanism could raise the cost of natural gas-fired generation. What's more, it could contribute to discontinuing gas or coal for electricity generation to avoid even higher electricity costs (Ahmed and Khondker 2018). Given existing challenges with cost pass through, it is unlikely that a carbon price would be adopted.

4. Technical dimension

In its Third National Communication in 2018, Bangladesh communicated the country's last GHG inventory update to the UNFCC based on inventory years 2007-2012 (Bangladesh Ministry of Environment 2018). Bangladesh plans to use its 1st Biennial update report (BUR) to begin considering inventory years starting from 2013 (Bangladesh Ministry of Environment 2021). Bangladesh does have some experience with monitoring environmental assets, as the country launched the Bangladesh Forest Information System (BFIS) to monitor, assess and implement forest management and conservation activities. BFIS gathers forestry sector data that is disseminated to forestry sector stakeholders, as well as leveraged for international and national reporting (UN-REDD 2019). In its (interim) NDC update released at the end of 2020, Bangladesh highlights that a workable MRV system will be necessary for the country to maintain transparency and verification of emissions reductions but does not make an explicit commitment to establish an MRV system or law, stating instead that a fuller analysis of mitigation actions and more definitive targets may be provided to the UNFCCC in the coming months (Bangladesh Ministry of Environment 2020).

Though Bangladesh does not have a specific MRV law in place, it does have some experience with other carbon market programs, specifically the Clean Development Mechanism with 10 registered projects to date (UNFCCC 2021), and the Joint Crediting Mechanism with three registered projects (JCM 2021). The country also dabbled with economic instruments. For example, in 2014, the government of Bangladesh proposed a 1% 'green tax' as an environmental protection surcharge on factories that produced substantial amounts of air pollution (Bhuiyan et al. 2020); the proposal was never implemented. However, the government of Bangladesh will need to build substantial institutional capacity to implement a carbon pricing instrument (Alam 2019), especially given that the majority of Bangladeshi businesses report facing regulatory unpredictability and undue discretionary practices (Alam 2019), and that Bangladesh does not currently participate in any international forums dedicated to carbon pricing capacity building. Some institutional support is provided by the International Centre for Climate Change and Development, though the centre's focus is more on building capacity for adaption to climate change as opposed to mitigation policies (IIED 2018).

5. Multilateral dimension

Despite a mixed trend in terms of trade openness over the last decade, Bangladesh's trade-GDP ratio in 2019 stood at 37% (World Bank 2019). As member of the WTO since 1995, signatory of the APTA since 1975, and member to 12 more free trade agreements, Bangladesh is in good stead in terms of its cooperative capacities. In more recent context, however, the country is neither a signatory of, nor was invited to negotiations that led to the 2020 Regional Comprehensive Economic Partnership (RCEP), the world's largest trade bloc. Some have since argued that Bangladesh has much to lose from this—especially to competitors who *have* joined the RCEP like Vietnam—including exports, investment, and trade opportunities (Uddin & Nazrul 2021). Vietnam is a comparable country in this regard, competing in similar sectors and with low labour costs; however, Vietnam *is* actively considering an emissions trading system with recent focus on capacity-building (ICAP 2021) and so may suffer less from potential disruptions from the imposition of carbon border adjustments. Bangladesh's regional and broader economic integration now also falls behind other similar states such as Myanmar, Laos, and Cambodia, who have all signed the RCEP, but these do not currently have plans for carbon pricing. Despite this, Bangladesh has signed, ratified, or acceded to 16 multilateral environment agreements (InforMEA 2021). Bangladesh also has experience in hosting Clean Development Mechanism projects. But although the CDM is touched upon in its NDC, no further mention of the intention to use (international or domestic) market mechanisms to achieve its contributions is made (Bangladesh Ministry of Environment 2020).

Bangladesh has important trade and diplomatic relations with countries that already have or are actively considering implementing a carbon pricing instrument. Germany, the US, the UK, France, Italy, and Japan are among the top recipients of exports (primarily ready-made garments) from Bangladesh. In 2019, these countries received 50.8% of total exports (OEC 2019); all these countries have a CPI in place and are now currently discussing border carbon adjustments (CBAs). Carbon pricing specific initiatives such as the World Bank Partnership for Market Readiness (PMR) and the Carbon Pricing Leadership Coalition (CPLC) have not been active in Bangladesh, and the absence of current domestic carbon pricing plans exposes the country to CBAs. This is particularly pertinent considering the export of garments. Textiles are currently included in the EU's carbon leakage list, and although the industry is not being discussed as an initial sector to be included in the bloc's CBA Mechanism, or CBAM, (European Commission 2019), it is "entirely feasible" that it would be covered if the initial policy is a success (OECD 2020).

Bangladesh also plays a key role in several multilateral climate-related cooperation initiatives. Since June 2020, it has held the presidency of the Climate Vulnerable Forum (CVF), a partnership of 48 countries that are disproportionately affected by the impacts of climate change, as well as the Vulnerable Twenty (V20) Group of Finance Ministers. It is a member of the Bay of Bengal Initiatives for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), under which key themes include climate change, energy, environment and disaster management, and trade and investment. The BIMSTEC permanent secretariat is located in Dhaka. In April this year, the Bangladesh foreign minister met with US Special Presidential Envoy for Climate to discuss US-Bangladesh climate cooperation through technology transfer, capacity building and finance (Prothomalo 2021). The UK is another key climate partner, with the UK-Bangladesh Climate Partnership Forum serving as an important platform for the countries to discuss upcoming issues of interest, one of which is the UK's legislated and stringent MRV requirements. These could have significant implications for Bangladesh, which could be required to present its direct and indirect emissions reports to the UK. Without investment in this area for Bangladesh and continued cooperative dialogue, it may end up facing disruption from CBAs in the future instead – from both the UK and other countries (Maxwell and Huq 2021).

6. Carbon pricing readiness and options

Bangladesh is one of the most climate vulnerable countries in the world, making it crucial for the South Asian nation to implement both mitigation and adaptation plans and policies as quickly as possible. Carbon pricing could be a key policy tool in helping Bangladesh to mitigate emissions, though there are several obstacles that will need to be overcome. Any carbon pricing mechanism will face public acceptability and institutional capacity challenges, as the Bangladeshi citizens have little trust in governmental institutions that suffer from rampant corruption and have had a track record of catering to brown lobby instruments. Additional obstacles stem from continuously rising power prices due to ineffective cost recovery in the country's electricity market. Rising prices have created an aversion to even higher electricity prices and policies such as the carbon tax proposed in 2017, which was never implemented after lobbying efforts from the energy and transport sectors and political reluctance to increasing the cost of living.

However, despite these challenges, it is important Bangladesh considers a carbon pricing mechanism, to help mitigate domestic effects of climate change as well as potentially respond to developed markets becoming more environmentally conscious in their sourcing of imports (Davies, Fan and Hussain 2016). The country's heavy reliance on an export-oriented textile industry, which has greatly contributed to Bangladesh's strong economic development, could be subject to a European CBAM given that the textile industry is one of the listed industries on the EU's carbon leakage (European Commission 2019) or other BCAs (Maxwell and Huq 2021). However, should the South Asian country pursue a carbon pricing mechanism, a carbon tax would likely be the best mechanism as the country's underdeveloped technical, financial, and institutional infrastructure would make implementing an emissions trading system difficult. Though Bangladesh has some experience with international carbon pricing mechanisms, including the CDM and JCM and fulfils UNFCCC GHG reporting requirements, there is not yet solid GHG inventory data available past 2012, and no current discussion about any kind of MRV system. Moreover, Bangladesh does not have a framework climate law that could help to inform sectoral climate targets.

However, Bangladesh is actively advocating to tackle climate change through settings such as the Climate Vulnerable Forum and has identified climate change as an integral part of its strategic vision, via its 2020-2025 Five-Year Plan. A carbon tax would be a more suitable carbon pricing mechanism for Bangladesh given that it is much less complex administratively and could effectively price the climate externalities imposed by the country's heavy and growing reliance

on natural gas and LNG. For the successful implementation of carbon price, it is crucial for the government to take steps to build the required institutional and technical capacity. To make the carbon price effective, further electricity sector reforms and the design of the carbon pricing instrument should be jointly considered. These efforts would build public support and confidence and lay the foundation for an effective carbon price in Bangladesh.

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A.2 Brunei Darussalam Factsheet

Brunei Darussalam			
Overall		**Political**	
Capital	Bandar Seri Begawan	**Electricity from fossil fuels**	99.95% of total generation (2018)
Govt structure	Sultanate	**Brown lobby**	National oil and gas producers; public stakeholders (e.g., Petroleum Authority of Brunei Darussalam)
GDP **GDP per capita**	USD 28.1 billion (2019) USD 64,847.7 (2019)	**Green lobby**	Green Brunei
Population	163.1 million (2019)	**Perceived corruption**	Score=60 (2020) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Ministry of Energy, Manpower and Industry; Brunei Climate Change Secretariat (BCCS); Brunei National Council on Climate Change (BNCCC)	**Income group**	High-income
Key legal instruments	Brunei Darussalam National Climate Change Policy (BNCCP, 2020)	**Gini index**	n/a Perfect equality/inequality = 0/100; Germany=31.9 (2016)
Related policies	Wawasan Brunei 2035 (2007); Energy White Paper (2014)	**Importance of industry**	Value-added: 62.5% of GDP (2019) Employment: 21% of total (2019) CO2 emissions: 83% of total (2018)
FDI	2.8% of GDP (2019)	**Fossil subsidies**	12.1% of GDP (2017)
		Electricity market	Vertical monopoly

Brunei Darussalam			
Technical		**Multilateral**	
MRV status	Under development	**Openness**	109% of GDP (2019)
UNFCCC reporting	No BURs submitted; 2 National Communications submitted.	**International agreements**	ASEAN (1984); WTO (1995); RCEP (2020);
Experience with carbon markets	n/a	**NDC**	Reduction of 20% by 2030 relative to BAU levels.
Participation in WB initiatives	Not a PMR or CPLC partner	**NDC assessment**	Ambition of NDC not assessed by CAT; Cites Strategy 6 of BNCCP, laying out intention to implement carbon pricing by 2025

Carbon pricing readiness and options

- Heavy reliance on oil and gas in the energy mix and the dominant share of fossil fuel earnings in government revenues and GDP provide the economic rationale and political interests that seek to avoid high carbon prices.
- Economic diversification is a key national priority: Potential for considerable co-benefits if a carbon price is successfully coupled to the government's economic diversification program
- Strong standing in region, especially under the ASEAN framework; already involved in several multilateral climate and carbon pricing initiatives.
- High level of technical capacity but still missing a robust legal foundation for MRV and climate action; Brunei Darussalam National Climate Change Policy (BNCCP) is significant as a framework guideline.
- Public acceptance of a CPI could benefit from low level of perceived corruption, economic prosperity and lack of income taxes providing citizens with the economic resilience against the real income declines due to a carbon price.

1. Political dimension

Brunei is the country with the 9th highest GDP per capita in the world when measured in purchasing power parity units, thanks to its reserves of oil and natural gas (IMF 2021). In recent years, the country has aimed to diversify its economy and implement a strategy of sustainable growth under the framework of the Wawasan Brunei 2035, or Brunei Vision 2035, first introduced in 2007. The government has committed to reducing GHG emissions by 20% below BAU by 2030 and achieving a 30% share of renewables in the electricity mix by 2035 (BCCS 2020). Currently, electricity generation relies on fossil fuels for 99.95%, leaving significant potential for decarbonisation (IEA 2018). In 2020, the government published the Brunei Darussalam National Climate Change Policy (BNCCP), containing ten strategies to address climate change (BCCS 2020). One of these was the intention to introduce a carbon pricing mechanism in the industrial and power sectors by 2025, which taken together account for more than 80% of the nation's CO2 emissions.

These overall policy goals and intentions hold promise for the introduction of carbon pricing in the near future. That said, the strong reliance on the oil and gas (O&G) industry for both government revenue (76%, in part due to the lack of income taxes) and GDP (Khut 2020) could constrain ambition in the absence of a credible strategy for far-reaching economic diversification. The government has a large stake in O&G and operates through several joint ventures with international majors. These include the liquefied natural gas (LNG) company Brunei Liquified Natural Gas (BLNG), a joint venture with Shell Overseas Holdings Limited and Mitsubishi Corporation, and the largest private player in the country's oil industry Brunei Shell

Petroleum (BSP) (BLNG 2021; BSP 2015). The government's plan for diversification includes increased investment in downstream fossil fuel industries to bolster exports in higher value-added products. In 2019, Chinese company Hengyi opened a USD 3.45 billion petrochemical plant (Hengyi 2021). A USD 1.8 billion government-run fertiliser plant, one of the largest in Southeast Asia, is set to open in May 2021 (Biz Brunei 2020). There are hence strong vested interests in the fossil fuel industry in Brunei that could resist and derail the implementation of a CPI.

Although a strategic plan to achieve 10% share of renewables by 2035 is in place (IEA 2018), the presence of renewable energy players is minimal. One large solar plant was built by the government in 2010 in cooperation with Mitsubishi Corporation, one of the stakeholders in BLNG (DES 2016); another large solar plant, expected to be completed in 2021, is owned by BSP (BSP 2020). There are no independent renewable energy producers outside of the fossil fuel industry that could lobby the government towards adopting a carbon pricing mechanism. While the presence of an organised green lobby is limited, the government has expressed an interest in engaging with civil society groups on the issue of climate change. The Brunei Climate Change Secretariat (BCCS) was created in 2018 under the Ministry of Energy with the explicit mission to ensure a "whole-of-nation approach" to addressing climate change (BCCS 2018). Still, despite significant youth involvement in climate policy, it is largely organised by the government. One exception is NGO Green Brunei, a "youth-led platform for environmental sustainability" that organises educational activities for a clean environment and collaborated with the BCCS in developing the Brunei Carbon Calculator, an initiative to measure and reduce citizens' carbon footprint and plant trees (Green Brunei 2021; BCCS n.d.). Green Brunei is also represented in the government's Executive Committee on Climate Change, alongside other civil society organisations (BCCS 2020).

The success of a carbon price also rests on the level of the public's acceptance and trust in the regulator to operate such a system transparently and effectively (UBA 2021). Brunei is an absolute, hereditary sultanate and elections were last held in 1964, before the country gained its independence from the United Kingdom in 1984. Since then, the country has been in a state of emergency declared by the sultan, granting far-reaching power to the executive that largely rules by decree (Freedom House 2020). The country scores high on government effectiveness (87th percentile) and regulatory quality (73rd percentile) (World Bank 2019b), while the level of corruption is relatively low. Although over the past years there have been some corruption cases against lower-level officials, judges, and a former BSP officer (Freedom House 2020), the country ranks 35th out of 180 countries with 60 points in Transparency International's Corruption Perception Index, a relatively good score especially when compared to its neighbours such as Malaysia (score of 51) and Indonesia (score of 37) (Transparency International 2021). This is due to the government actively addressing the issue, for example by amending the Prevention of Corruption Act in 2015 to include new conflict of interest rules for public officials. The World Bank Control of Corruption Index put it in the 78th percentile in 2019 (World Bank 2019b). Such high level of government effectiveness will likely facilitate the implementation of a carbon pricing mechanism.

Brunei is co-leading an ASEAN Climate Finance Strategy Project, working alongside the ASEAN Secretariat and the UNFCCC-Regional Collaboration Center. With the aim to increase access to and mobilise resources for climate action, the project targets the improvement of coordination across government, banks, regulators, and the financial sector (Ministry of Finance and Economy 2020; weADAPT 2021). Especially as the financial sector can have an interest in the development of carbon markets (Paterson 2012), this strategic development of climate finance is an important step towards the successful introduction of carbon pricing.

2. Legal dimension

Brunei does not have any binding climate laws in force. The flagship Brunei Darussalam National Climate Change Policy of 2020 is a guiding framework rather than a piece of climate legislation but does signal that binding climate legislation may soon follow. As one of the strategies, it states the intention to introduce a directive for mandatory annual and monthly GHG emissions data reporting for all facilities (BCCS 2020), a critical step for both a carbon tax and emissions trading. Carbon pricing is also explicitly listed as a strategy to be in place by 2025 and is estimated to have the potential to result in a 45% reduction in GHGs as compared to BAU (BCCS 2020).

In 2014, the government published an Energy White Paper, aimed at strengthening and reforming the energy sector (EDPMO 2014). It set out three main goals: to strengthen the oil and gas industry, to ensure a "safe, secure, reliable and efficient supply and use" of energy, and to secure economic benefits from the energy sector for the population. It also introduced a renewable energy capacity target of 10% by 2035, since revised upwards to at least 30% through the BNCCP and 2020 NDC under the Paris Agreement. Brunei's NDC commits to a reduction in GHG emissions by 20% relative to BAU by 2030 (Government of Brunei 2020).

A regulatory framework and corresponding incentives for promoting RE technologies is being developed, an area where Brunei currently falls behind its regional counterparts (Vakulchuck et al. 2020). While the country plans to introduce a renewable portfolio standard, general lack of experience in this area limits opportunities for cross pollination if a carbon price were adopted. However, other relevant regulations and policies have been developed. Energy efficiency standards have been legislated for the construction of government buildings and for air conditioning units (Grantham Research Institute 2015; IEA 2020). A Land Transport White Paper (2014), commissioned by the ministries of transport and development, also formulated the goal to increase energy efficiency in passenger transport (CSPS 2014). Fuel efficiency standards have been under development, and the shift towards electric vehicles has recently received more attention; EVs are to reach 60% of car sales by 2035 (Borneo Bulletin 2019; Ministry of Energy 2021; BCCS 2020).

The threat of investment arbitration challenges may also inhibit carbon pricing developments in Brunei, with FDI making up 2.8% of GDP (World Bank 2019a). Most notably, Chinese company Hengyi made the largest ever FDI into Brunei with the construction of its petrochemical plant. The carbon intensity of this operation, as well as the inflow of foreign investment into other emission-intensive sectors such as construction and manufacturing (Khut 2020) increases vulnerability to the cost of a carbon price, and policymakers are increasingly aware of the high cost of exposure to investor-state dispute settlement mechanisms, including in environmental legislation (Ayub 2019). Although the constitution does not specifically provide for judicial independence, the government rarely interferes, and acknowledging the importance of protecting investor rights, a Commercial Court was established in 2016 (State Judiciary Department Gov. of Brunei 2019). Brunei is part of five international investment agreements (IIAs)—mostly bilateral investment treaties— that are currently in force (UNCTAD 2021). The level of regulatory restrictiveness on FDI in Brunei is relatively low, with the encouragement of foreign investment a priority for the government (United States Department of State 2020).

Climate policy in Brunei is developed under a framework of broad societal participation, as reformed in 2018. The BNCCP and accompanying strategies are developed by the Brunei Climate Change Secretariat on behalf of the Brunei National Council on Climate Change (BNCCC) (BCCS 2020). The Council consists of the Ministers of Energy, Development, Primary Resources and Tourism, and Transport, and the Deputy Minister of Energy (Brunei Darussalam 2020). The Secretariat is a government agency mandated to develop, implement, monitor, and evaluate

climate policy in strategic cooperation with different ministries and non-governmental actors. The Secretariat will review the BNCCP biannually and report to the Council (UNFCCC 2019), as well as to the Executive Committee on Climate Change, which is made up of representatives from business and civil society and chaired by the Ministry of Energy. The development of the strategies under the BNCCP is also monitored by different working groups consisting of representatives from the private and public sector, NGOs, and academia (BCCS 2020; Brunei Darussalam 2020). For the carbon pricing and MRV strategies, this is the Support Framework Working Group. The broad involvement of stakeholders may benefit the development of a carbon pricing instrument by leveraging expertise across sectors and ensuring buy-in. Furthermore, the clearly delineated responsibilities under the new climate governance framework would facilitate the implementation process.

Under the Bruneian constitution, executive and legislative power are vested in the Sultan. The Sultan can override the advice of the Council of Ministers and the (appointed) legislative council is not authorised to propose any bills that may affect the finances of Brunei (Brunei Darussalam 2011). The successful implementation of a CPI will therefore to large extent depend on the Sultan's support.

3. Economic dimension

Brunei is a high-income country heavily reliant on the O&G industry which has historically contributed the lion's share of the country's GDP. Featuring a population of just under half a million and high revenues from hydrocarbon exports, Brunei ranked among the top in terms of GDP per capita (PPP) in Asia and 12th worldwide in 2019 (World Bank 2021). Incomes took a hit starting 2012 only to gradually increase from 2016 onwards as oil prices steadily recovered. In 2019, GDP per capita levels were still 35% below their peak in 2012 (World Bank 2021), highlighting the major role of international oil market developments on the country's economy. GDP growth slowed in 2020 due to the pandemic but is expected to pick up pace again this year (ADB 2021). Given overall prosperity and moderate income inequality (WID 2021), the introduction of a carbon price may face less resistance from the population. Bruneian citizens enjoy a range of public provisions including free access to medical services and the absence of income tax and VAT, ensuring a high degree of economic resilience against potential price inflation should a carbon pricing instrument at effective price levels be introduced. However, the extensive use of subsidies (whose total costs amounted 12.1% of GDP in 2017) may limit the effectiveness of a carbon price and incentivise irrational consumption of carbon-intensive products (IMF 2019). Brunei has pursued energy pricing policy that sets prices below market rates (Pacudan & Hamdan 2019) with regular gasoline prices being capped at USD 0.27 as of 2021 (Ministry of Finance and Economy 2021).

Despite the country's wealth, the high dependency on O&G revenues has exposed Brunei to market volatility that the government aims to address through economic diversification. In its blueprint policy document "Towards a dynamic and sustainable economy", the government has targeted downstream O&G, food, tourism, ICT, and services as strategic priority sectors for economic expansion alongside diversification to new economic areas (Ministry of Finance and Economy 2020). Structural unemployment has also been a cause of concern. Recent declines in the unemployment rate from 9.3% in 2017 to 6.9% in 2019 are encouraging in this regard.

Brunei's economy is moderately emissions-intensive with a value of 0.324 kg CO_2 emissions per PPP $ of GDP in 2016, which is comparable to Malaysia, India, and Vietnam but below Russia and other Central Asian jurisdictions. Industry (including mining, energy and construction in the World Bank definition) contributed 63% of Brunei's GDP in 2019 and accounted for just 21% of employment, reflecting their capital-intensive nature. The remainder of value added comes from

the services sectors, with agriculture making up less than 1% of the country's GDP. Importantly, industry makes up approximately 83% of Brunei's CO_2 emissions profile signalling the potential for high emissions coverage under a carbon pricing instrument.[10]

International trade in manufactured goods accounts for a marginal share of 8% of total exports but 80% of imported goods. Exports predominantly consist of hydrocarbons and fuel commodities (i.e., 91% of merchandise) (WTO 2020) whose tax proceeds make up more than three-quarters of government revenue (IMF 2016). Correspondingly, Brunei has consistently run a trade surplus although the margin on the current account balance has been declining in recent years (IMF 2019). Given Brunei's economic openness and heavy reliance on revenues from trade-exposed sectors, the opportunities for full cost pass through under a CPI will likely be limited in economic activities where most revenue is generated. This must be navigated as the government advances plans for carbon pricing.

In line with its sizeable fossil fuel reserves, Brunei's total primary energy supply consists of 82% natural gas and 18% oil and features only negligible shares of renewable energy sources (IEA 2021). The O&G reserves are estimated at 1.1 billion barrels and 260 billion m^3 respectively (EIA 2017; Knoema 2021). The reserves are maturing and expected to be depleted within approximately the next two decades. This has driven recent government efforts to speed up economic diversification (Maelzer 2018). Brunei has a history of subsidising energy consumption, both gasoline fuels and electricity, which has led to high consumption levels and may impede the effectiveness of a CPI in the absence of accompanying reforms. The IMF has highlighted subsidy reform as a priority area for fiscal consolidation (IMF 2019). The government has taken steps in this regard, for instance by introducing progressive retail electricity rates in 2012, although regressive tariffs for large industrial consumers have remained in place (DES ND; Oxford Business Group 2016).[11]

Electricity in Brunei is generated entirely by natural gas except for a 1% share of oil-fired power and a negligible share of solar PV (IEA 2021). As a result, there is no latent potential for fuel switching should a carbon price be introduced, nor for the decommissioning of carbon-intensive assets, although investment in more efficient gas plants could be promoted under a CPI. Moreover, the instrument could support renewable energy investment and dispatch on the back higher operational costs for gas plants (and corresponding increased wholesale electricity prices) subject to carbon costs being reflected in the regulated electricity tariff schemes. The Brunei electricity system is run by two state-owned vertically integrated utilities, the Department of Electrical Services (DES) and Berakas Power Company (BPC), whose investments are based on the Ministry of Energy's policy plans (ERIA 2017). As these include the ambition to increase investment in renewable energy to attain a 30% share in the power mix, there is considerable potential for a carbon price to support this goal alongside the Renewable Portfolio Standard that the government intends to introduce (BCCS 2020). One further point for consideration for the electricity sector is the cross-border interconnection capacity of the electricity grid. Under the ASEAN Plan of Action for Energy Cooperation 2016-2025, several interconnection projects between Brunei and the Malaysian regions of Sabah and Sarawak have been envisaged and are underway (ASEAN Centre for Energy 2015), with Brunei upgrading its high-voltage network in anticipation of these power exchanges (Pacudan 2016). What may start as bidirectional power transaction (e.g., Sarawak-Brunei) may evolve into third-party access trading arrangements, where Brunei would wheel power through its existing network to regions

[10] Half of Brunei's CO_2 emissions are attributed to electricity production, one-third to the energy-intensive industries and one-sixth to transport (IEA 2021).

[11] Electricity prices increase with volumetric use under progressive tariffs (usually by means of a tier or block structure) with the objective to incentivise energy savings and account for income distribution. The reverse applies to regressive tariffs, which are often used to support energy-intensive industries.

in Malaysia (ibid). In the longer term, if these regions become highly interconnected, there would be a risk of leakage in case Malaysia did not adopt a similar CPI. However, this would also bring about opportunities for linking if both adopted such an instrument.

The small number of industry participants in O&G and electricity indicate that allowance trade would likely be limited under an ETS. However, a carbon tax or hybrid scheme (featuring price bounds and the option to trade) would be well suited to Brunei's market structure and could provide an efficient tool for realising its climate objectives at lower administrative cost.

4. Technical dimension

Brunei has not yet submitted Biennial Update Reports under the UNFCCC but has submitted two National Communications, in 2016 and 2017. The latest emissions data stem from 2014 based on Tier 1 IPCC methodology (i.e., the default option using standard emission factors) (RCC, IGES and NEA 2018), indicating room for improvement in the frequency of emissions updating and data quality in order to facilitate the implementation of a CPI. While no MRV legislation nor mandatory emissions reporting are yet in place, the government has made substantial progress in this area. It aims to launch an MRV system (carbon inventory) in 2021 consisting of annual and monthly mandatory reporting on six GHGs, eventually evolving into a real-time digital reporting system (BDNCCC 2020). Brunei has several opportunities that will enable it to develop a fully functioning reporting system including clearly delineated responsibilities under the new climate governance structure, highly skilled government staff, and industry on aggregate comprising few and large emitters (RCC, IGES and NEA 2018).

Brunei has no experience with carbon markets such as the CDM, nor is it involved with the World Bank's Partnership for Market Readiness or the Carbon Pricing Leadership Coalition. However, government knowledge and capacity are being strengthened through consultations with other international carbon pricing policy stakeholders, such as ASEAN's ACCEPT which is supporting Brunei in exploring options for a CPI. Synergies from experience with complementary policies (or international carbon markets) will initially be low given that the development of renewable energy and energy efficiency frameworks are still in the early stages. However, government effectiveness and regulatory quality are high (WGI 2021), and both the commitment and building blocks for an MRV and CPI have been laid.

In the private sector, existing knowledge, and capacity for understanding of carbon pricing is varied. In 2019, the WEF Global Competitiveness Index ranked Brunei 61st out of 141 countries for strength of ethics and accountability within corporate governance and 62nd for business sophistication (WEF 2019). Major O&G players such as joint ventures BSP and Brunei LNG, Brunei Coldgas, and Brunei Shell Tankers (where the government has partnered with Japan's Mitsubishi Corporation) have experience operating in jurisdictions with carbon pricing policies in place. Several also have mid-century net-zero targets and use an internal carbon price (e.g., Shell (Moorhead and Nixon 2015), partake in emissions disclosure and/or have official decarbonisation strategies in place (e.g., Mitsubishi Corporation 2021).

5. Multilateral dimension

Brunei has been a member of the WTO since 1995 and ASEAN since 1984. With its trade-GDP ratio at 109% in 2019, it is a highly open and trade-dependent economy. Brunei is in a promising position in terms of its multilateral cooperative capacities. It is also an active member at the ASEAN table, holding chairmanship throughout 2021; its secretary-general since 2018 is Lim Jock Hoi, a Bruneian national. The country coordinated negotiations for the ASEAN-Australia-New Zealand FTA, which came into force in 2010 (United States Department of State 2020). In November 2020, Brunei was a negotiating party to and signed the Regional Comprehensive Economic Partnership, in doing so becoming part of the world's biggest free trade bloc, giving it

greater platform to cooperate internationally. Brunei has also signed ten regional free trade agreements that are currently in force, most under the ASEAN framework, including the Brunei - Japan FTA (ADB 2021).

Brunei's main export product, making up 91% of total exports, is oil but the country also exports organic chemicals. Japan is the country's main export market and received 31% of Brunei's total exports in 2019. Other key export destinations include Singapore (14%), Australia (10%), Malaysia (9%), and India (9%) (UN Comtrade 2021). Brunei's strong ties with these regions are significant, as several already have a CPI instrument in place or are ramping up plans for carbon pricing. For instance, Japan has implemented a carbon tax since 2012, operates two subnational ETSs and has recently seen momentum injected into its national carbon pricing debate. Singapore has had a carbon tax effective since 2019; and Australia has had its ERF baseline -and- offset system in place since 2016 (World Bank 2020). Given growing global leakage concerns, without concerted effort to align its domestic CPI plans with those of its main trade partners, this may in the future expose Brunei to disruption from carbon border adjustment mechanisms.

Diligent diplomacy has been crucial for Brunei's relationship with powerful states. This can be observed, for example, in its long-standing neutrality in the South China Sea territorial dispute. This passiveness has recently evolved; claimant Brunei is now more strategically trying to maintain "robust economic relations" with China—a country that has been a source of much investment—by endorsing its proposal for bilateral cooperation (Espeña & Uy 2020). Although not currently part of a wider multilateral architecture such as the PMR or CPLC, Brunei's participation in the ASEAN ACCEPT program, alongside the 13 multilateral environment -related treaties currently in force (WEF 2019), including the ASEAN Agreement on Transboundary Haze (ASEAN Haze Action Online 2013), also demonstrate the country's long-running cooperation on the environment and climate and may prove essential as carbon pricing picks up pace internationally. These prepare the ground for mutually beneficial cooperation on carbon pricing in the future.

6. Carbon pricing readiness and options

Despite the economy's complete reliance on fossil fuels for energy, Brunei's carbon intensity is on equal footing with its regional neighbours, thanks in part to the absence of the carbon - intensive coal from its energy mix. The heavy dependence on O&G, both in terms of GDP and government revenue, presents challenges for the introduction of a CPI mainly as it provides ground for the economic rationale and political interests that seek to avoid high carbon prices.

However, the government can capitalise on several other factors to facilitate as much as possible the introduction of a carbon price, as already laid out in its policy documents and strategic forward trajectory. Existing O&G fields are finite and aging. Economic diversification is therefore essential and has become a key national priority. There is the potential for considerable co - benefits if a CPI is successfully coupled to the government's economic diversification program, which could allow for increasing stringency of the instrument over time as other sectors' contribution to the economy expands. Another opportunity for Brunei lies in the ability to level the playing field through a CPI, particularly for exports to countries already with carbon pricing in place or to those considering border carbon adjustment measures. Its existing cooperation with key partners (particularly ASEAN but also further afield) specifically in climate and environment lays the foundation for potential carbon pricing cooperation in the future. Technical capacity, such as the relatively high level of government effectiveness and regulatory quality could also be further strengthened through these international ties and multilateral initiatives. Many initiatives are ongoing in this respect.

In terms of the current structure of the energy sector, the gas-dominated electricity system limits the short- to mid-term abatement options under a carbon price, such as fuel switching and early decommissioning. However, a carbon tax or hybrid instrument could be an efficient tool to incentivise the adoption of higher efficiency gas plants and support renewable energy investment. Pass through to end user prices through additional regulations would enhance the effectiveness of the CPI given that electricity market liberalisation is so far not on the country's horizon.

The public acceptability of a CPI in Brunei requires careful assessment. On the one hand, economic prosperity, the absence of income taxes, and free access to a range of public services increases the economic resilience of citizens who would be affected by a carbon price, likely limiting public resistance. However, a CPI may go against the prevailing social contract underlying the Bruneian state where political participation is limited but lifelong economic provisions are guaranteed. Such political risk can be mitigated if a CPI is coupled to broader economic reforms in support of a low-carbon transition that would safeguard economic prosperity for future generations.

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A.3 Hong Kong SAR Factsheet

Hong Kong SAR			
Overall		**Political**	
Capital	n/a	**Electricity from fossil fuels**	99.74% of total generation (2018)
Govt structure	Autonomous Special Administrative Region of the People's Republic of China	**Brown lobby**	CLP; Hong Kong Electric
GDP **GDP per capita**	USD 366.03 billion (2019) USD 62375.10 (2019)	**Green lobby**	WWF; Greenpeace; Civic Exchange; Clean Air Network; Friends of the Earth
Population	7.5 million (2019)	**Perceived corruption**	Score=76 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Environment Bureau, Steering Committee on Climate Change	**Income group**	High-income
Key legal instruments	Air Pollution Control Ordinance; Environmental Impact Assessment Ordinance	**Gini index**	[No WB Gini] Perfect equality/inequality = 0/100 Germany=31.9 (2016)
Related policies	Hong Kong's Climate Action Plan 2030+; Energy Saving Plan; Clean Air Plan	**Importance of industry**	Value-added: 6 % of GDP (2018) Employment: 11 % of total (2019) CO2 emissions: 77% of total (2018)
FDI	18.5% of GDP (2019)	**Fossil subsidies**	n/a in IMF
		Electricity market	Monopoly

Hong Kong SAR			
Technical		**Multilateral**	
MRV status	n/a	**Openness**	353% of GDP (2019)
UNFCCC reporting		**International agreements**	WTO (1995); Free Trade Agreements with Mainland of China (2003), New Zealand (2010), the Member States of the European Free Trade Association (2011), Chile (2012), Macao (2017), ASEAN (2017), Georgia (2018) and Australia (2019).
Experience with carbon markets	CDM	**NDC**	NDC PRC (without reference to Hong Kong)
Participation in WB initiatives	Not a CPLC partner Not a PMR partner	**NDC assessment**	Ambition not assessed by CAT; No refence to carbon pricing

Carbon pricing readiness and options

- Strong economic integration within the Chinese mainland, and in particular the Greater Bay Area where ETS is in place, ongoing cooperation on environmental protection and emission reductions, and the objective of becoming a leading hub for sustainable finance provide the foundation for the introduction of a carbon price in Hong Kong.
- However, the monopoly organisation of the electricity system, reliance on fossil fuels, limited renewable energy potential, and the failure of the ETS for SO_2 are likely to be limiting factors.

1. Political dimension

Vested interests of carbon-intensive industries can present significant challenges for carbon pricing. In 2018, over 99% of Hong Kong's total primary energy supply and over 99% of electricity generation stems from fossil fuels (IEA 2018). Electricity generation is by far the most prominent source of GHG emissions in Hong Kong, amounting to 63% in 2019. The construction of new coal-fired power plants has not been allowed since 1997, but new gas-fired production capacity is being built to gradually replace coal. In the absence of indigenous gas, the two electricity utilities, Hong Kong Electric and CLP, are building an offshore Liquefied Natural Gas (LNG) terminal, in addition to the existing supply of natural gas through pipelines from the Chinese mainland. CLP and Hong Kong Electric thus have vested interests in the fossil energy infrastructure, although the promotion of gas is presented as part of the Government's climate change strategy of reducing carbon intensity by 65-70% by 2030 from the 2005 level (CAPCO 2020; Hong Kong Government 2019). Electricity utilities have an interest in recovering their fossil energy investments. At the same time, they do not oppose renewable energy investments (CLP 2010), as the realisation of the latter could increase their return under the long-term regulated contracts (Scheme of Control Agreement) that govern their activities.

The weight of carbon-intensive industries in resisting carbon pricing can be counteracted by green industries and NGOs. Hong Kong has undertaken modest steps to promote the development of renewable energy sources, including public investments in solar PV systems and the introduction of a feed-in-tariff scheme in cooperation with the electricity utilities (Hong Kong Government 2019). WWF played a determining role in the introduction of Hong Kong's feed-in tariff scheme and in the establishment of Hong Kong's Renewable Energy Certificate

scheme (e.g., with pilot projects and studies on Hong Kong's renewable energy potential and the economic cost of a feed-in tariff scheme) (WWF 2017; 2018). Although Hong Kong' renewable energy initiatives resulted in the development of business opportunities in the placement of solar panels, the scale remains too small to create a green lobby capable of influencing more ambitious decarbonisation measures. CLP explored the feasibility of developing a 200 MW offshore wind farm (CLP 2010), but this project has not yet been realised in the absence of government approval. As the Scheme of Control Agreement guarantees the return on investment of projects approved by the government, electricity utilities in Hong Kong would in principle have an interest in investing in renewable energy projects, as this would increase their investment base without affecting the returns for existing investments in thermal power generation.

The public acceptability of carbon pricing depends in part on trust in the government and the population's attitude to green issues. An important constraint to the realisation of investments in renewable energy, and more generally the transition to decarbonisation in the electricity sector, is the perceived impact on end user prices. This constraint is also likely to influence the possibility of carbon pricing in Hong Kong. Under the Scheme of Control Agreement concluded between the government and the electricity utilities, the government examines new investment proposals (e.g., renewable energy projects) based on their environmental benefits, but also their impact on electricity tariffs. The government's objective is "to promote wider use of renewable energy while protecting consumer interests" (Hong Kong Government 2010). As the latter concern translates into low electricity tariffs, ambitious low-carbon projects that increase the investment costs of the electricity utilities—and thus their tariff basis—face resistance.

Hong Kong is a Special Administrative Region of the People's Republic of China, and this status gives it a "high degree of autonomy" in its administration, with the exception of defence and foreign affairs (Joint Declaration 1984; Basic Law). The Basic Law guarantees autonomy for 50 years, based on the concept of "one country, two systems". The Legislative Council is the law-making body of Hong Kong and debates issues of public interest, including environmental protection and electricity market reform. In 2019, Hong Kong was ranked 16th among 198 countries and territories assessed by Transparency International for its perceived levels of public sector corruption. However, following recent political developments, "antipathy towards the government is widespread" (EIU 2021). Reduced trust in government could transfer into political reluctance to increase energy prices as the result of a carbon price.

2. Legal dimension

Hong Kong does not have a flagship climate law. However, legislative measures have been adopted to address local air pollution, including the Air Pollution Control Ordinance, the Air Pollution Control (Air Pollutant Emission) (Controlled Vehicles) Regulation, and the Air Pollution Control (Fuel for Vessels) Regulation (Environment Bureau 2017b). The Air Pollution Control Ordinance provides the statutory basis for Air Quality Objectives and the introduction of licensing control on major stationary emission sources. The construction of new coal-fired power plants is forbidden. Power plants are subject to emission caps, that require reductions of sulphur dioxide, nitrogen oxides and fine particulates by around 60-80% in 2022 as compared with 2010 levels. On this basis, Hong Kong Electric and CLP have implemented a number of emission reduction measures including installing flue gas desulphurisation and denitrification systems for coal-fired units, switching from coal to gas, and the modernisation of existing gas-fired power plants (Environment Bureau 2017b).

Replacing coal with natural gas is seen as "most effective to further reduce emissions from power plants" (Environmental Protection Department 2019; Environment Bureau 2017b). It is

expected that by 2023, the share of gas in the total fuel mix will amount to 57%. To improve end-use energy efficiency, Hong Kong adopted the Buildings Energy Efficiency Ordinance. The Energy Saving Plan for the Built Environment 2015-2025+ sets a target of reducing Hong Kong's energy intensity by 40% by 2025. The government also aims to increase the share of renewable energy, but regulatory action has remained limited, including a requirement for the electricity utilities to promote the use of renewable energy and a feed-in tariff scheme. Action on local air pollution indirectly contributes to reducing GHG emissions. The Hong Kong government recognises the interlinkages between air quality control, energy use and climate change mitigation (Environment Bureau 2017b). However, the adoption and implementation of low-carbon regulation must comply with the contractual guarantees set out in the Scheme of Control Agreement.

The Paris Agreement applies to Hong Kong, following China's ratification of the Agreement and the declaration by China of its application to Hong Kong (Mayer 2017; Environment Bureau 2017). Hong Kong thus has to contribute to China's achievement of its obligations under the Paris Agreement. As recognised by the Environment Bureau (2017), "Hong Kong plays a part to help fulfil the obligations that China has under the Paris Agreement. As such, Hong Kong will need to review [its] climate change efforts every five years and align them with the submission timelines under the Paris Agreement". However, Hong Kong is not mentioned in China's NDC.

Hong Kong's Climate Action Plan 2030+, published by the Environment Bureau in 2017 in collaboration with the Steering Committee on Climate Change,[12] set out the target of reducing Hong Kong's carbon intensity by between 65% and 70% by 2030, compared with the 2005 level (amounting, according to the Environment Bureau, to about 26% to 36% absolute emission reductions). In 2020, the Council for Sustainable Development, created under the Environment Bureau to advise the Government on sustainability issues including climate change, recommended to adopt a "roadmap with critical milestones supported by action plans to progressively advance to net zero carbon emissions by 2050".

Hong Kong has signed 20 bilateral investment treaties and more free trade agreements containing investment protection provisions, including the Agreement on Closer Economic Partnership Arrangement between the People's Republic of China and Hong Kong (UNCTAD 2020). In addition, domestic investors in the power sector are protected by the arbitration provision of the long-term Scheme of Control Agreements that the investors signed with the Hong Kong government (Environment Bureau 2019). Any dispute relating to the Agreements shall be settled by arbitration in accordance with the UNCITRAL Arbitration Rules (Environment Bureau 2019). The Agreements specifically protect the investors against market changes that would result into stranded costs.[13] Carbon pricing could thus be challenged before arbitration, if it resulted in stranded costs or prevented the companies from obtaining the return on investment specified in the agreement. As the Scheme of Control Agreements apply until 31 December 2033, the threat of arbitration has a potentially long-term chilling effect on carbon pricing and market reform.

[12] The Steering Committee on Climate Change was set up to co-ordinate actions of government policy bureaus and departments in combating climate change and formulate long term climate strategies. It includes the Chief Secretary for Administration's Office; Civil Service Bureau; Commerce and Economic Development Bureau; Constitutional and Mainland Affairs Bureau; Development Bureau; Education Bureau; Financial Services and the Treasury Bureau; Food and Health Bureau; Home Affairs Bureau; Innovation and Technology Bureau; Labour and Welfare Bureau; Security Bureau; Transport and Housing Bureau; Information Services Department; Financial Secretary's Office; Economic Analysis and Business Facilitation Unit; Hong Kong Observatory.

[13] If stranded costs are likely to arise from a market change, the government shall agree with the investors on a mechanism for the recovery from the market of the residual stranded costs.

3. Economic dimension

Hong Kong is a high-income economy. It is a regional as well as global financial and economic hub, following the economic principle of free trade and enterprise (Trade and Industry Department 2020). Services are at the heart of the Hong Kong economy, making Hong Kong "one of the most service-oriented economies in the world" (Trade and Industry Department 2020). In 2018, the services sector amounted to 88.7% of Hong Kong's (GDP) and 89% of total employment. Industry only accounts for 6.5% of value added in 2018 and 11% of total employment. Hong Kong heavily relies on imported goods (e.g., electrical machinery, apparatus and appliances), and thus on "greenhouse-gas-intensive activities taking place beyond its borders" (Mayer 2017). Hong Kong's CO_2 emissions amounted to 42.6 million tonnes in 2018 and have increased 27.93% since 1990. The distribution of emissions spans electricity and heat production (63.38%), transport (18.78%) and industry (14.08%), with residential, commercial and public services making up the rest.

The Hong Kong government has considered the liberalisation of its electricity market, but following a public consultation decided to continue to organise the sector on a monopoly basis (Environment Bureau 2015). Electricity supply is controlled by two monopolies that are in charge of different areas of Hong Kong. The Scheme of Control Agreement concluded with the government requires the companies to ensure the security and reliability of electricity supply (CLP Scheme of Control Agreement 2018; Hong Kong Electricity Scheme of Control Agreement 2018). In return, the government guarantees a return for each year in respect of the combined electricity operations of 8% of the total value of the average net fixed assets. Tariff adjustments take into account changes in the companies' operating costs and changes in the cost of fuels consumed by the company. The cost of carbon pricing, and emission reduction measures, is thus likely to be passed through to end consumers. The government can introduce changes to the electricity regulatory framework, but only after 31 December 2033. As the reliability of the Hong Kong electricity system is high and tariffs remain relatively low, pressure to reform the electricity market is limited (Chung and Xu 2020).

Both the government and companies recognise the objective of GHG emissions reduction and the promotion of renewable energy in the Scheme of Control Agreements (CLP Scheme of Control Agreement 2018; Hong Kong Electricity Scheme of Control Agreement 2018). However, Hong Kong has limited potential for renewable energy sources, given high population density and the reluctance of the population, expressed in a public consultation, to increase electricity imports from the Chinese mainland. To incentivise energy efficiency improvements and small-scale renewable energy development, the permitted return of the companies is adjusted in function of energy savings achieved by end users and renewable energy performance. The cost of feed-in tariffs is recovered in the fuel cost of the companies. Besides the promotion of end-use energy efficiency and new small-scale renewable energy connections, the companies would in principle have an interest in investing in low-carbon measures as this could increase the total value of their fixed assets and their return on investment. However, investments must be approved by the government that is concerned about the impact on end user prices.

4. Technical dimension

As an important international financial centre, Hong Kong is equipped with significant technical expertise that can be deployed to implement carbon pricing and would in particular favour an ETS. Hong Kong's Securities and Futures Commission aims to build Hong Kong as "a hub for green and sustainable finance in the Asia-Pacific region" (Hong Kong's Securities and Futures Commission 2018; 2020). One of the Strategic Framework for Green Finance aims is to enhance the disclosure of climate risks and facilitate the development of green investment products. To achieve the former goal, the Hong Kong's Securities and Futures Commission (2020b) issued a

consultation paper on amendments to the Fund Manager Code of Conduct that would require fund managers to make appropriate disclosures of climate risk information. A Green and Sustainable Finance Cross-Agency Steering Group (2020) was set up, with the objective of "strengthening Hong Kong's financial ecosystem to support a greener and more sustainable future, [which] can drive action in Hong Kong and beyond and contribute to the global agenda." The objective is to develop Hong Kong into a leading green and sustainable finance and risk management centre, by strengthening Hong Kong's sustainable finance capabilities, supporting capacity building, building up market knowledge and encouraging collaboration among relevant stakeholders.

In 2008, the Environmental Protection Department adopted the "Supplementary Notes on the Implementation of Projects under the Clean Development Mechanism by Hong Kong Enterprises in the Mainland". These Notes make it possible to implement CDM projects in Hong Kong, provided they are given approval by the National Development and Reform Commission of China and the Environmental Protection Department of Hong Kong. The Environmental Protection Department (2009) aimed to build capacity by organising seminars on CDM in cooperation with the Climate Change Department of the National Development and Reform Commission. The Hong Kong Quality Assurance Agency (2009) was accredited as Designated Operational Entity by the CDM Executive Board. In parallel, since 2007, the Hong Kong Exchanges and Clearing Market (2009) has been exploring possible long-term business opportunities in carbon emission trading in Hong Kong, including the introduction of CER futures as a potential product. However, experience in the field remained limited. In a public consultation, no positive feedback was received from major stakeholders, including CDM project developers, compliance buyers, and exchange participants (Hong Kong Exchanges and Clearing Market 2009). This limited interest was mainly explained by the minimal carbon pricing knowledge and experience of the Hong Kong investing community. However, the Hong Kong Exchanges and Clearing Market concluded in 2009 that "if any policy changes in carbon emission trading arise in future that seem favourable for Hong Kong, HKEx will revisit the product concept of CER futures".

5. Multilateral dimension

As a member of the WTO since 1995, and as a highly open economy, Hong Kong is in a promising position in terms of its multilateral cooperative capacities. Hong Kong and the Central Government of the People's Republic of China concluded the Closer Economic Partnership Arrangement in 2003, in order to deepen the liberalisation and facilitation of trade and investment (Trade and Industry Department 2020). Economic integration with the Chinese mainland, where a national ETS covering the power sector launched in 2021 in addition to the existing ETS pilots in subnational jurisdictions, can facilitate the adoption of carbon pricing in Hong Kong, in particular an ETS. The province of Guangdong and the city of Shenzhen both have an ETS and directly border Hong Kong. Increased cooperation in the Guangdong-Hong Kong-Macao Greater Bay Area in the fields of trade, investment and environmental protection could increase the possibility of carbon pricing in Hong Kong.

Hong Kong cooperates with the Chinese mainland, in particular the neighbouring Guangdong province, and the Macao Special Administrative Region of the People's Republic of China, in the field of air pollution control and prevention. In 2000, the Hong Kong and Guangdong authorities established the Hong Kong-Guangdong Joint Working Group on Sustainable Development and Environmental Protection to cooperate on environmental protection issues (Environment Bureau 2017b). In 2014, Guangdong, Hong Kong and Macao concluded the "Cooperation Agreement on Regional Air Pollution Control and Prevention" in order to jointly control and prevent air pollution (Environmental Protection Department 2019; Environment Bureau

2017b). The parties set emission reduction targets for sulphur dioxide and nitrogen oxide, as well as respirable suspended particulates and volatile organic compounds. The cooperation has proved to be relatively successful as emissions of SO_2, NO_2 and RSP were reduced by 81%, 28% and 36% respectively from 2006-2018 (Environmental Protection Department 2019). However, emissions of O_3 increased by 21% during the same period, and the photochemical smog in the region remains a serious problem. The Guangdong-Hong Kong-Macao PRD Regional Air Quality Monitoring Network aims to jointly monitor air quality information and share air quality data for the Pearl River Delta region to enable local authorities to improve the effectiveness of their air pollution control policy responses. In the field of climate change, joint workshops have been organized, such as the GHG Measurement, Reporting and Verification (MRV) Workshop in Hong Kong, to share information on MRV system development and implementation, methodologies of preparing GHG inventories and MRV workflow.

As part of regional environmental cooperation, Hong Kong and Guangdong province initiated a joint "Emissions Trading Pilot Scheme for Thermal Power Plants in the Pearl River Delta Region" in 2007. The Air Pollution Control (Amendment) Ordinance 2008 allows electricity companies in Hong Kong to participate, on a voluntary basis, in emissions trading with electricity companies in Guangdong and so benefit from a certain degree of flexibility in the reduction of their emissions of SO2, NOX and RSP/PM10 (Lin 2009). The Hong Kong and Guangdong governments would allocate emission rights to power plants corresponding to the regulatory emission limit set by the respective government. Eligible power plants could propose emission reduction measures (e.g., the use of renewable energy) that resulted in "project-based emission credits", if approved by the local government. Credits could be traded at a contractually agreed price between the buyer and seller, but every transfer of credits had to be approved by the local authority. The effectiveness of the scheme was affected by the small size of the market and the limited number of participants (Lin 2009). However, the ETS was not successful, and the scheme was aborted with no transactions undertaken (Wong, Xu and Chang, 2020; Mayer 2017).

The Hong Kong/Guangdong Joint Liaison Group on Combating Climate Change agreed in 2016 on a work plan for Hong Kong and Guangdong to combat climate change and acknowledged the "strengthening [of] the relevant exchanges of both sides in the light of the upcoming establishment of the National Carbon Market" (Hong Kong Government 2016). Academic studies emphasise the cost-saving benefits that an integrated carbon market between Hong Kong and the Chinese mainland would present for Hong Kong to achieve emission reductions (up to 78% lower costs compared to an independent market) (Wang et al. 2020). According to Wong, Xu and Chang (2020), the "One Country, Two Systems" model "brings benefits to the cross-boundary collaboration because it provides for the presence of the Chinese central government that greatly assists such collaboration". The Joint Liaison Group on Combating Climate Change and the Hong Kong-Guangdong Joint Working Group on Sustainable Development and Environmental Protection provides an institutional framework for the coordination of climate change policies, possibly including carbon pricing. At the same time, as illustrated by the failure of the Hong Kong and Guangdong Emissions Trading Scheme, there are significant formal and informal constraints to environmental cooperation, including "[low] trust and reciprocity between the two jurisdictions… because of their differences in political culture and the lack of a close personal relationship between the officers from the different governments" (Wong, Xu and Chang 2020).

Cooperation also takes place in the field of green finance, with the objective of encouraging Mainland entities to make use of Hong Kong's capital markets and financial services for green and sustainable investment, financing and certification, and promoting financial cooperation (Green and Sustainable Finance Cross-Agency Steering Group 2020). The Green and Sustainable

Finance Cross-Agency Steering Group (2020), co-chaired by the Hong Kong Monetary Authority and the Securities and Futures Commission, explicitly lists the objective of "explor[ing] the development of a carbon market in the Greater Bay Area" as part of the Strategic Plan to Strengthen Hong Kong's Financial Ecosystem to Support a Greener and More Sustainable Future.

6. Carbon pricing readiness and options

Strong economic integration with the Chinese mainland, an open economy and a growing interest in the development of Hong Kong as a leading hub for sustainable finance provide the foundation for the introduction of a carbon price in Hong Kong. However, the organisation of the electricity sector on the basis of long-term bilateral agreements, with guaranteed return on investment and recovery of operating costs, as well as very limited success with the promotion of renewable energy sources and energy efficiency improvements are likely to be limiting factors.

The contractual guarantees given to the electricity utilities on a long-term basis, with guaranteed return, limit the possibility for the government of Hong Kong to introduce carbon pricing in the electricity sector, the main emitter of GHG in Hong Kong. A previous experience of emissions trading, focusing on SO_2, NO_X and RSP/PM10, failed. With high reliability and relatively low electricity prices, as well as the compensation of stranded costs and arbitration, the adoption and implementation of liberalisation reforms seems unlikely. The government is likely to be reluctant to engage in complex market reform if it risks increasing electricity prices, and further alienating the population in the current political climate.

Hong Kong aims to take advantage of increasing opportunities in the field of green finance and, as part of these efforts, is exploring the possibility of carbon pricing within the Green and Sustainable Finance Cross-Agency Steering Group. Cooperation with the Chinese mainland, in particular within the Greater Bay Area, provides an opportunity to extend the Chinese ETS to Hong Kong. This will require building expertise in the field of MRV and, more generally, in low-carbon regulation, given limited experience and success with the development of clean energy.

When viewed through the lens of the analysis in UBA (2021), Hong Kong is more likely to adopt ETS than a carbon tax, given the use of the former in the neighbouring Guangdong province and Shenzhen, and since 2021 in the Chinese mainland more generally, and the importance of Hong Kong as an international financial centre.

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A.4 India Factsheet

India			
Overall		**Political**	
Capital	New Delhi	**Electricity from fossil fuels**	76.0% of total generation (2019)
Govt structure	Federal democratic republic	**Brown lobby**	Ministries and large companies related to fossil fuel industries e.g., coal, oil, and gas
GDP **GDP per capita**	USD 9,560.2 billion (2019) USD 6,996 (2019)	**Green lobby**	Ministries and companies related to RE; NGOs like Greenpeace India, Centre for Science and Environment, youth movement; nascent Green Party
Population	1,366.4 million (2019)	**Perceived corruption**	Score=41 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Min. of Environment, Forests and Climate Change; Prime Minister's Council on Climate Change	**Income group**	Lower-middle income
Key legal instruments	National Action Plan on Climate Change; National Solar Mission; National Mission for Enhanced Energy Efficiency; National Mission on Strategic Knowledge for Climate Change	**Gini index**	35.7 (2011) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	Perform, Achieve and Trade; Renewable Purchase Obligations; RE Certificate; coal tax	**Importance of industry**	Value-added: 24.8% of GDP (2019) Employment: 26% of total (2020) CO2 emissions: 78.6% of total (2018)
FDI	1.8% of GDP (2019)	**Fossil subsidies**	8.8% of GDP (2017)
		Electricity market	Limited liberalisation. Generation: public and private Transmission: mostly public

India			
Technical		**Multilateral**	
MRV status	Indian Network on Climate Change Assessment under MoEFCC as core MRV institution, MRV & inventory takes ad-hoc, decentralised and project-based approach	**Openness**	40% of GDP (2019)
UNFCCC reporting	Two national communications (NCs) and two Biannual Update Reports (BURs)	**International agreements**	WTO (1995); G20, MEF, BASIC, BRIC, and initiator of International Solar Alliance
Experience with carbon markets	CDM; voluntary offsets; REDD+	**NDC**	Unconditional: Reduce emissions intensity of GDP by 33-35% compared to 2005 levels by 2030; Conditional: non-fossil fuel share of cumulative power generation capacity 40% by 2030
Participation in WB initiatives	PMR implementing country; Climate Warehouse partner country; Indian Railways as CPLC partner	**NDC assessment**	2°C compatible but 1.5 °C incompatible (CAT); NDC refers to market mechanisms such as Perform Achieve and Trade

Carbon pricing readiness and options

- Motivations for carbon pricing include the huge potential for cost-saving given India's sheer and growing economic size and emissions, deep integration into the global economy, broader diplomatic interest, and the increasing threat posed by major trade partners' potential border carbon adjustment policies.
- Main obstacles for introducing carbon pricing are the overriding economic and social development agenda as the highest national priority and the significant vested interests of the fossil fuel sectors.
- The lack of regulatory and institutional capacity for MRV, weak enforcement at the subnational level and the greater capacity to raise revenue suggest a carbon tax as the preferred instrument.
- Existing market-based instruments (and the associated regulatory, technical, and institutional experience), extensive experience with project-based mechanisms, business sector's own initiatives, the advantage of an ETS in providing flexibility, and potential for regional or international trading may favour trading.
- An important challenge for a carbon pricing in India, regardless of its form, is the issue of policy interaction and institutional coordination across ministries and between the national and subnational levels.
- India's climate policies will continue to be designed to meet development and environmental goals. Carbon pricing would benefit from its co-benefits being underlined and how these can be realised.

1. Political dimension

Within the intertwined debate of energy and climate, no issue seems to be more contentious than the degree to which emerging economies should rely on non-fossil fuel resources and energy efficiency to meet their growing energy demand (Ebinger 2016). India is perhaps the greatest example of this debate, facing the dilemma of committing to a low-carbon economic transition while needing to feed its energy hunger and ensure its energy security. As the world's second most populous country home to nearly 1.4 billion people,[14] India's rapid economic and population growth have stimulated the demand for cheap, clean and secure sources of energy

[14] India's population is expected to overtake that of China in the coming five years, making it the world's most populous country (see: https://population.un.org/wpp/Download/Probabilistic/Population/).

(Devasthali 2020). India's energy mix and power system are dominated by fossil fuels, which accounted for around 76% of its total primary energy supply in 2018 with renewables plus nuclear accounting for the rest (IEA 2018). Electricity generation in 2019 stemmed predominantly from coal (71%). Other sources include oil (0.5%), natural gas (4.5%), nuclear (3%), and renewables (21.1%) (IEA 2019a). India is also dependent on fossil fuel imports: it imports 80% of its oil, and 80% of the imports are from less stable regions like West Asia and the Middle East (ibid). India relies on imports even for coal and natural gas (30% and 55% respectively) (Devasthali 2020).[15] In addition, India is home to vast reserves of coal, with 101.3 billion tonnes of proven coal reserves as of December 2018 (Ministry of Coal n.d.). The fossil fuel sectors are important for employment. For example, India's coal mining industry directly employs 485,000 people (Prayas Energy Group 2019). There are also other estimates that India's coal sector employs a total of 1.5 million people directly and indirectly (Ebinger 2016). While investment in renewables has exceeded that in coal since 2016, the country has not yet laid out a roadmap or concrete plan to transition away from coal (Climate Transparency 2020). These factors all point to strong vested interests of fossil fuel industries, whose resistance may impede the successful implementation of a carbon price in India.

More specifically, there are powerful public authorities and state-owned enterprises (known as "public-sector undertakings", or PSUs)[16] representing the interests of the fossil fuel industry in India, for example: the coal sector's Ministry of Coal (MoC) and Coal India Limited (CIL)[17], and the oil and gas sector's Ministry of Petroleum and Natural Gas (MoPNG) and Oil and Natural Gas Corporation (ONGC)[18], Indian Oil Corporation Limited (IOCL)[19], and GAIL India Limited. On the renewable energy side, there is also one dedicated ministry, the Ministry of New and Renewable Energy (MNRE), and a growing private sector including solar power producers Acme Solar, Adani, and Greenko and wind producers Renew Power, Greenko, and Sembcorp.

Although the country suffers from significant air pollution and other ecological decline, green politics is largely absent from the broader political agenda. India's main political parties have focussed instead on alleviating poverty, creating jobs, and reviving the economy in their election campaigns (Hindustan Times 2014; Nives Dolsak and Aseem Prakash 2019). The India Greens Party was founded only two years ago and has not yet shown any substantial political influence in national nor regional agendas (India Greens Party 2021). In contrast, civil society organisations are much more active in driving the environment and climate agenda (Jaffrelot and Thakker 2020). Two key examples are Greenpeace India and the Centre for Science and Environment. More recently, new NGOs have been set up by young environmentalists, such as Let India Breathe, Fridays For Future India, and There is No Earth B (ibid). However, the overall role of NGOs in India's climate policymaking is still limited (Friedrich Ebert Stiftung 2017).

Regarding public awareness of climate change, India presents a mixed picture. Studies show a growing awareness of the significance of the climate problem globally and India's climate vulnerability among the Indian population, but the narrative indicates a lack of motivation to take action, or a belief that richer countries need to take greater responsibility for combatting climate change (see Climate Scorecard 2017; Centre for Progressive Reform 2012; Soni 2020). In

[15] There are estimates that by 2025, India will be the second largest consumer of energy globally after China. By 2032, over 91% of the country's energy needs will need to be imported (Nandy 2016, p. 1-6).

[16] India's largest companies in which the Government of India holds more than 50% are referred to as PSUs. Central government owns PSUs across the energy sector, notably in mining and exploration (crude oil, coal and natural gas), petroleum refining and marketing, power generation, nuclear energy and power transmission (IEA 2020).

[17] CIL was responsible for 82% of the country's coal production in 2017 (IEA 2020).

[18] ONGC is India's largest oil and gas exploration and production company. It produces 62% of India's crude oil and condensate and 72% of its natural gas (IEA 2020).

[19] IOCL is the largest operator, owning nine refineries with 28% of India's total refining capacity (IEA 2020).

this context, garnering public support will be key if the government is to press ahead plans for carbon pricing.

2. Legal dimension

India is one of the world's largest democracies. Its political system is characterised by federalism, the division of powers between the national (the Union Government) and subnational governments (with 29 subnational states and seven union territories). Part XI of the Constitution of India specifies the distribution of legislative, administrative, and executive powers between the federal government and the states (Government of India, updated 2006). Specific responsibilities of each are determined by the constitution. Energy issues fall under concurrent legislation, hence involving both levels of government (Jörgensen et al. 2015). As for climate change, India lacks a clear-cut assignment of legislative responsibility (ibid). Legislative responsibilities for climate policy derive from different legal sources. Amongst the few issue areas relevant to climate policy over which the national legislator has exclusive powers are trade representation, the United Nations Organisation, agreements and conventions with foreign countries, atomic power, mineral and oil resources, and control of industries. The state governments have exclusive jurisdiction over public health and sanitation, agriculture, land improvement and water. Others like building and transportation are under the responsibility of both levels, similar to energy (ibid; UBA 2013). Carbon pricing in India will hence need to be established through both effective cross-ministerial coordination at the national and subnational levels, and by engaging with and building the support and capacities of the subnational authorities.

India's legislative system also has specific implications to how a carbon tax could be introduced. If introduced as a separate tax, an amendment to the Constitution would be required to empower the central government and the states to legislate it and would entail a lengthy process (Shakti Sustainable Energy Foundation 2018). Alternatively, a carbon tax could be introduced by the central government using the residuary powers of the Parliament under Article 248 of the Constitution or under existing legislative frameworks such as the goods and service tax (GST) laws. Under this third, most plausible, option, all fuels could be brought under the GST, to be subject to GST plus a supplementary cess determined by carbon emissions intensity.

India has an established climate governance framework. In 2007, the government set up the Prime Minister's Council for Climate Change (PMCCC) as a high-level decision-making and coordination body. The PMCCC is chaired by the Prime Minister and regularly brings together experts from relevant ministries and institutions to review and update the national climate strategy. Supported by the Executive Committee on Climate Change, the PMCCC coordinates and monitors climate policy implementation, working with various agencies at the national level. The Ministry of Environment, Forest and Climate Change (MoEFCC)—Ministry of Environment and Forests (MoEF) until May 2014[20]—oversees climate policymaking, among a broader environment and forestry mandate. It works with other ministries, such as those in charge of Power or Water, for sector specific issues. Depending on the division of responsibilities as laid down in the constitution, state or regional departments may also be involved. The MoEFCC also coordinates different intergovernmental working groups that advise the government on climate related issues (UBA 2013, p. 79). The Expert Group on Low Carbon Strategies for Inclusive Growth was established by the Planning Commission of India in 2009. With members

[20] The renaming itself also indicates a swivel in importance towards climate change for the ministry.

representing stakeholders from different groups in society and politics, it was set to develop a strategy to align the climate change response with broader national objectives.[21]

Alongside the evolution of the climate institutions, India's climate legislative and policy framework has also been in development for over a decade.[22] After it was established by the government in 2007, the PMCCC released the National Action Plan on Climate Change (NAPCC) in 2008. The NAPCC forms the legal basis for and is a major pillar of climate policy in India.[23] It contains targets and strategies for eight priority areas, so-called "missions", covering the period up to 2022. It mandates the concerned ministries for each mission to prepare a detailed plan of action and requires each state to also prepare their climate change action plans (GLOBE International 2013; Government of India 2008; UBA 2013, p. 82). Three of the eight missions relate to climate change mitigation: the National Solar Mission, the National Mission for Enhanced Energy Efficiency and the National Mission on Strategic Knowledge for Climate Change. Other key regulations and government strategies include the Energy Conservation Act (2001), Electricity Act (2003), National Environment Policy (2006), National Electricity Plan, and National Electric Mobility Mission Plan.[24]

Largely driven by energy security considerations, India has introduced a series of renewable energy and energy efficiency policies (Ebinger 2016). The Solar Mission introduced clear targets for solar energy in three phases from 2010 until 2022 and introduced Renewable Purchase Obligations (RPO) and transparent auctioning processes to support these targets (UBA 2013). The Indian government has enhanced its renewables targets: to achieve cumulative renewable capacity of 175 GW by 2022[25] and expand them to 2030, aiming for 40% non-fossil-based power capacity by 2030. At the Leaders' Summit on Climate in April 2021, India reiterated its target of 450 GW of renewable energy by 2030.

Moreover, India has introduced several market-based instruments, such as the Perform, Achieve and Trade (PAT) and the Renewable Energy Certificate (REC) schemes (see details of these mechanisms in UBA (2019) and Moarif and Rastogi (2012)). Launched in 2012 and implemented by the Bureau of Energy Efficiency (BEE), the PAT scheme covers almost 500 facilities in eight energy-intensive industrial sub-sectors, namely thermal power plants, aluminium, pulp and paper, chlor-alkali, cement, iron and steel, textiles, and fertiliser. Mandatory energy consumption targets are placed on companies and those that outperform their targets are awarded certificates that can be traded to weaker performers or banked for future use (PMR 2017b; UBA 2013, p. 82).

[21] Its final report was published in 2014 (Planning Commission of Government of India 2014), and it also made contributions to the Twelfth Five Year Plan (FYP), India's centralized and integrated national economic programs, covering the period 2013-2017, which further advanced its climate policymaking.

[22] It is worth noting that India's institutional framework of energy policy, which can be dated back to the era of the global oil crisis in the 1970s, was developed much earlier than that of climate policy. Founded in 1982, the Department for Non-Conventional Energy Resources, first becoming the Ministry of Non-conventional Energy Sources (MNES) (1992) and later the Ministry of New and Renewable Energy (2006) became a central actor in the promotion of India's renewable energy policy. Various other ministries and national institutions have been involved since. After India's economic liberalisation in the 1990s, energy policy received new impetus.

[23] There is no top-level climate change law in India yet. Similarly to the institutional setup, the policy framework of the energy sector has also a much longer history of climate.

[24] See the LSE Climate Change Laws of the World database at https://climate-laws.org/ and the International Energy Agency policies database at https://www.iea.org/policies for more details.

[25] The government recently increased its previous 2022 capacity target for renewables from 175GW to 227.6 GW according to https://climateactiontracker.org/countries/india/2018-08-22/

The REC scheme awards renewable power producers with credits, which can be sold to entities that have a RPO.[26] These existing instruments, on the one hand, may constitute the building blocks towards gradually introducing a carbon pricing instrument by strengthening the government's regulatory expertise and technical capacities (UBA 2019). On the other hand, they may also create obstacles regarding policy coordination (e.g., how these policies could be mutually reinforced instead of conflicting with each other). Perhaps more importantly, they may also raise the question of whether another market-based instrument should be introduced targeting the same sector(s). In addition, India also has a coal tax in place since 2010, imposed both on domestically produced and imported coal, formally called "Clean Energy Cess" and recently renamed "Clean Environment Cess" (ibid).

Besides these, India has introduced other climate-related policies such as fuel efficiency standards, energy conservation building codes, and e-mobility promotion in the transport and buildings sectors (Climate Transparency 2020; UBA 2013; Ministry of Environment and Forests of India 2012; PMR 2017a). However, despite a relatively comprehensive climate policy framework, implementation and enforcement in India has been lagging (UBA 2013, p. 89; Infrastructure Development Finance Company Ltd. 2010; UBA 2019). The main institutional problem hindering the implementation of India's climate and energy transition is the weak coordination between the federal and state governments. The result is a disconnect between the priorities of the states with those of the federal government. Other key barriers to successful implementation are the lack of personnel and financial resources in the area of climate change policy (UBA 2013, p. 88; Jörgensen et al. 2015). These institutional and financial barriers would be important to tackle if the country decided to introduce carbon pricing.

India's nationally determined contribution (NDC) is intensity-based: 33% to 35% below 2005 emissions intensity by 2030 (unconditional) and the non-fossil share of cumulative power generation capacity to 40% by 2030 (conditional on financial support and technology transfer) (Government of India 2015). The country also has a carbon sink target within its NDC, which is to create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030 (ibid). This NDC is rated as 2 degree compatible by the Climate Action Tracker, while not yet 1.5 degree compatible (Climate Action Tracker 2015). An intensity-based NDC does not affect a country's ability to introduce carbon pricing. It may, however, influence the design of the instrument. For example, in China, an intensity-based target paved the way for an ETS with an intensity-based cap subject to ex-post adjustment, as opposed to an absolute cap (ICAP 2021; Zeng and Couwenberg 2016). India's NDC further states that it "is experimenting with a careful mix of market mechanisms together with fiscal instruments and regulatory interventions to mobilise finance for climate change", but does not explicitly mention Article 6 mechanisms.[27] This in practice does not necessarily pose significant limitations on the country to take up carbon pricing as a domestic policy.[28]

A robust carbon pricing policy with a long-term price signal demands a long-term climate strategy as well as strong judicial and legal institutions. India does not yet have a measurable long-term overarching climate target nor sector-specific long-term targets, e.g., for renewables. Overall, India ranks 43rd out of 95 countries in the Climate Laws, Institutions and Measures (CLIM) Index, which offers a comparative assessment of the extensiveness and quality of climate

[26] The State Pollution Control Boards (SPCB), the MoEFCC and the Central Pollution Control Board also took the first steps for an ETS covering SO2 and NOx, piloting it in three states. It was not implemented nationally.

[27] It is reported though that India as one of the largest host countries of the CDM projects would be interested to be able to continue sell its CDM credits to developed countries in the post-2020 new international carbon market regime. This is not explicitly mentioned in its NDC though.

[28] The EU and China do not include international MBMs in their NDCs and yet have domestic ETSs in place.

change mitigation legislation, policies, measures, and institutions (Steves et al. 2013. India ranks 51st out of 141 countries in the WEF's judicial independence index (WEF 2019). The efficiency of the legal framework in settling disputes ranks similarly (ibid).

3. Economic dimension

India is the world's second largest country in terms of population and the fifth largest economy, with a GDP of USD 2.87 trillion measured in current prices and exchange rates in 2019, surpassing France and the UK (IMF 2021). Its GDP growth has been among the highest in the world over the past decade, regularly achieving an annual growth rate of 6-7% (World Economic Forum 2020). Such a big and fast-growing economy combined with its energy mix dominated by fossil fuels makes India the world's third largest emitter after China and the US. Therefore, carbon pricing has the potential to unlock substantial economic efficiency gains and reduce the cost of mitigation to society.

However, India is in a challenging situation considering its economic and emissions profile – in which its absolute GDP and emissions are among the largest of the world while per capita levels are very low still. The largest driver of India's overall GHG emissions is CO_2 emissions from fuel combustion (UBA 2019; Climate Transparency 2020). 43% of total emissions is from the power sector, the largest contributor, followed by industry with 31%, transport (14%), and agriculture, buildings, and other energy-related sectors making up the rest (Climate Action Tracker 2020; Enerdata 2020; Climate Transparency 2020). Despite strong economic growth, India belongs to the lower-middle income countries category; its GDP per capita was almost USD 7000 in 2019 (in current international $) according to the World Bank. The country's Human Development Index (HDI) of 0.645 in 2019 ranks 131st among 189 countries (UNDP 2020). Its per capita emission is among the world's lowest (UBA 2019). The country's large population, GDP and emissions combined with its low emissions per capita and urgent development needs could complicate the decision on a carbon pricing policy.

In addition, inequality is a major problem in India – access to development and new opportunities has been uneven, especially by geographical location (World Bank 2020a). There is the significant challenge of poverty alleviation and a huge urban-rural gap (PMR 2017a). India remains home to one quarter of the world's poor; only around 39% of its rural residents can access sanitation facilities and nearly half the total population still defecate in the open (UN 2021). When developing its climate policies, India has taken a co-benefit approach with development at its core (Friedrich Ebert Stiftung 2017). The prime objective is to meet its poverty and sustainable social development goals (ibid; UBA 2013, p. 43). This may make the government favour a carbon tax over emissions trading, given the instrument's greater capacity to generate revenues that could be directly spent on economic and social development domains.[29] More broadly, any sound carbon pricing instrument to be introduced in India would need to properly harness co-benefits. This could be done for example by targeting certain key sectors or regions with broader sustainability and development relevance like forests and biodiversity, integrating air pollution control in the development of the instrument, or using the revenues generated in a dedicated manner.

India's electricity mix is dominated by coal generation (71% in 2019), which has increased considerably and steadily over the last decade (Enerdata 2020). Globally, India is the second largest coal consumer after China (IEA 2018). India is increasingly producing power from renewables (20.8%), among which hydro represents the largest share (10.8%), followed by wind (3.8%), solar (3.1%) and biomass and waste (3.1%) (ibid). In 2019, India's fossil fuel

[29] ETS could also generate revenue through auctioning of allowances – however, jurisdictions tend to start with free allocation as is the case in the EU, China, South Korea and Mexico.

subsidies totalled USD 13.3 billion (compared to USD 8.2 billion in 2010 and the last decade's peak of USD 20.7 billion in 2013). 99% of the subsidies quantified were for the consumption of fossil fuels, and only 1% for their production. Most of the subsidies were for petroleum use, at USD 13.1 billion (OECD-IEA 2020). The fossil dominant electricity mix and the significant subsidies for fossil fuel consumption on the one hand make carbon pricing policy more difficult due to vested interests. On the other hand, carbon pricing can be effective in breaking the persistence of energy mixes dominated by fossil fuels and help to leapfrog transition towards low carbon energy system (Burke 2013; Taylor 2020).

India's electricity sector sees a combination of public and private players regarding generation while power transmission is dominated by state-owned companies. Among the public players, there are both PSUs and state-level corporations (Indian Power Sector 2012). Around 45% of generation is privately owned, a sharp increase since 2008 when only 8% was private (IEA 2020). Most of the generation (55%) is still owned by government, 30% by the states and 25% by the central government, and India has several electricity transmission operators in the country. With a government shareholding of 57.9%, the PowerGrid Corporation of India is responsible for the inter-state transmission of electricity and the development of the national grid and the intrastate lines are owned by the state transmission utilities. As recent reforms opened the sector to private or merchant investment, private-sector entities also build, own and operate interstate transmission lines. Overall, India's power system has undergone massive transformation, thanks to significant reforms by the Government of India (Beyer 2020). However, some of the toughest, and most-needed, reforms in particular electricity tariff system reform remain to be achieved (ibid).

4. Technical dimension

India has set up various MRV institutions, driven by international reporting commitments and domestic policymaking goals. However, there is no overarching GHG MRV law in India (TERI 2020). The most important MRV institution is the Indian Network on Climate Change Assessment (INCCA). Established in 2009, it is responsible for national inventory and climate research. It reports to and works under the MoEFCC and receives financial support mainly from international donors.[30] The group is split into two clusters, one focussing on estimating GHG emissions for national inventories (involving some 60 institutions) and the other focusing on impact, vulnerability and adaptation assessments (UBA 2013, p. 79).

India takes a project-based approach to its national GHG inventory. The inventory is compiled by a central unit called the NATCOM (National Communication) Cell/Project Management Unit (PMU), an ad hoc entity that runs under the GEF-UNDP-GOI NATCOM project (TERI 2020, p. 18).[31] The inventories are finalised based on technical and stakeholder consultations and a final review by the National Steering Committee (NSC), an inter-ministerial body chaired by the Secretary MoEFCC (ibid). A technical advisory committee (TAC) is also established with experts from academia, research, and other relevant groups. Expert institutions are contracted for each inventory circle separately.[32] Overall, the data collation and inter-ministerial coordination are conducted only on ad-hoc basis and data collection is decentralised (TERI 2020).

India has submitted two national communications (NCs) to date, with the third in preparation. The first in 2004 included the first national inventory for 1994, and the second in 2012 with data for 2000 and 2007 (UNFCCC 2021). In addition, it has submitted two Biannual Update Reports

[30] Such as the Global Environmental Facility (GEF) through United Nations Development programme (UNDP).

[31] The unit is a team of individual consultants reporting to a senior officer of the ministry (UBA 2013; Government of India 2012).

[32] This means that across different inventory circles the data collection for certain sector may be done by the same or different institutions depending on the availability of capacity and financial resource.

(BURs) (2016 and 2018). India's first inventory used the IPCC 1996 guidelines and covered a limited scale: only emissions of CO_2, CH_4 and N_2O by main sources are covered. After the INCCA was established, an inventory for the year 2007 was set up and published in 2010 (Ministry of Environment and Forests Government of India 2010; UBA 2013). It included major improvements in the level of detail and used country-specific emission factors (ibid). However, as mentioned, the MRV exercise in India takes place irregularly and takes a project-based and decentralised approach.

Private sector and other non-government actors have also taken initiatives to collect activity data and prepare inventories on a voluntary basis. Most significant among these include GHG Platform India, India GHG Programme and the Carbon Disclosure Project. However, these initiatives often face issues of data availability, comparability and completeness. Most of them are also limited to a particular sector(s) (TERI 2020, p. 22).

Furthermore, there is a lack of institutional and financial capacity at the national level to prepare BURs and NCs sustainably. The country could potentially build on this current practice and move beyond the project-based ad-hoc approach by establishing a permanent central agency (ibid, p. 26).[33] Overall, India needs to improve its institutional capacity and the regulative framework of its MRV system, if it is to successfully pursue a carbon pricing policy. Particularly for an ETS, a robust facility-level (as opposed to entity-level) MRV system is necessary.

More broadly, India has already explored several MBMs to promote domestic renewable energy and energy efficiency. These policies help build technical and institutional capacities relevant to carbon pricing, such as those related to benchmarking, MRV, market infrastructure (e.g., an IT system, registry and trading platform) and trading regulations (PMR 2017a; UBA 2019). These could be the foundations of the technical expertise required to operate the various elements of a functioning carbon pricing policy.

In addition, India has more than a decade of experience with project-based GHG crediting mechanisms, most prominently under the UNFCCC's Clean Development Mechanism (CDM). The country has also worked with voluntary offsetting standards such as the Verified Carbon Standard or the Gold Standard and has had first experiences with REDD+ (UBA 2019). Since 2005, India has been an active participant in the CDM, registering the second highest number of projects globally, representing 15.98% of CDM projects in Asia and 12.7% of global CDM projects (PMR 2017a). This can facilitate the adoption of carbon trading, as it creates regulatory expertise and vested interests in such a policy (Paterson 2012; UBA 2021).

India has also participated in the World Bank's Partnership for Market Readiness (PMR) but made limited progress. The country was granted USD 8 million in funding under the PMR in 2017 for three projects: piloting an MBM for the waste sector; piloting an MBM for the Micro Small and Medium Enterprises (MSME) sector; and developing a National Meta Registry (PMR 2017b). However, only the second made progress (PMR 2019a).[34]

Indian companies have made their own efforts towards carbon pricing. In March 2020, 40 large Indian companies were reported to have priced or are planning to price carbon internally (Chandra 2020). Non-state institutions like CDP India are also working with business to promote the carbon pricing agenda. According to CDP and TERI (2019), there are a growing number of Indian companies taking up internal carbon pricing (ICP), dominated by high emitting

[33] This could also build on broader environmental and energy legislative, regulative, and institutional processes. For example, its Central Pollution Control Board (CPCB) monitors and collects data on environmental pollutants and gases (non-GHG), and the BEE has required the designated consumers (DCs) under the PAT Scheme in the 11 energy intensive sectors to provide reports containing energy consumption data.

[34] This may be also partially due to India's general election in 2019.

sectors such as materials and manufacturing, with 13 of these 40 companies in these sectors. An ICP is a voluntarily determined price used within a company to value the cost of a unit of CO_2e emission. A range of carbon pricing types are used in their ICP initiatives, including a shadow price, and implicit price, offsets, and internal fees. These actions help develop businesses' capacity regarding MRV, carbon management and pricing. They can also enhance the business community and general public's acceptance of carbon pricing.

Institutional fragmentation may pose challenges for carbon pricing policy both regarding how policy interactions can be managed and whether the involved ministries and agencies can work together effectively. In particular, India's energy sector is overseen by a multi-ministerial structure that includes the MoP, MoC, MoPNG, MNRE, the Department of Atomic Energy, the BEE, the Central Electricity Regulatory Commission (CERC) and Planning Commission, among others (Simmons and Chapman 2014; IEA 2020). Different actors among them are involved in India's existing MBMs on renewable and energy efficiency. For example, the REC scheme was established by the CERC while RPO obligations are decided by each state's State Electricity Regulatory Commission (SERC). PAT is mandated by MoP and implemented by BEE, an agency under it with the CERC acting as the market regulator by defining the regulatory framework for trading of the energy saving certificates (Moarif and Rastogi 2012; IEA 2019b).[35] Without concerted efforts to demarcate roles and processes, the current complex configuration of responsibilities across ministries and agencies could impede the smooth operation of a carbon pricing policy.

The experience with these MBMs also illustrates another key technical and institutional challenge: coordination between the central and state governments. For example, REC has faced a major problem regarding lack of compliance of the obligated entities, as enforcement responsibility lies within the hands of individual state governments who tend to shy away given their high prioritisation of energy supply stability (PMR 2017a; UBA 2019). In the Indian context the coordination with state governments regarding the implementation and enforcement of an ETS may be more critical as compared to a carbon tax. However, India's experience with the coal tax has also revealed potential issues for a levy system such as states keeping the revenue for their own use rather than transferring to a national fund as requested by the federal government. If India chooses to implement a carbon tax, it would need to coordinate its policy design (such as the scope and level of the levy) with the existing coal and other fossil fuel taxes and ensure that the revenues are collected and used in a way that are agreed and actually implemented between the central and state governments.

5. Multilateral dimension

India's integration with the global economy has risen significantly since the 1980s,[36] in tandem with the country's accelerating economic growth. Being a WTO member since 1995, a member of the South Asian Association for Regional Cooperation (SAARC) and a signatory country to the South Asian Free Trade Area (SAFTA); India's international trade (the sum of imports and exports) has increased from 14.1% of India's gross domestic product (GDP) in 1980–1984 to 51.3% in 2011–2015 (World Bank 2017). More than half the revenue of some of India's largest companies such as the Tata Group now comes from outside India, and the country's banks and companies have also started to be active in international capital markets. (Das et al. 2017)

India's top trading partners are the EU, the US, the UK, China and other Asian countries like Singapore, Bangladesh, and Nepal (World Bank 2021; European Commission 2021; UBA 2021). Among them, the EU (and Germany which as a single country ranks 8th among India's exporting

[35] See also https://www.weforum.org/agenda/2015/09/what-is-the-future-of-indias-climate-governance/

[36] In particular through a series of macroeconomic reforms started in 1991.

partners), the UK and China all have a domestic ETS in place. The EU is also considering a Carbon Border Adjustment Mechanism (CBAM), and the Biden administration in the US has hinted its interest to explore this instrument as well. India's export portfolio sees a mixture of carbon-intensive and other types of products (World Bank 2021). The impact of a CBAM would much depend on the level at which the price of carbon is set (or is market-determined) and the basis adopted for the imposition of a carbon tax on imports (Goldar and Bhalla 2012). In any case, the potential negative impact on India's domestic manufacturing value added and employment could be substantial (ibid).

Regarding foreign investments, Singapore emerged as the largest source of FDI in India during the last fiscal year with USD 14.67 billion in investments. It was followed by Mauritius (USD 8.24 billion), the Netherlands (USD 6.50 billion), the US (USD 4.22 billion), the Cayman Islands (USD 3.7 billion), Japan (USD 3.22 billion), and France (USD 1.89 billion) (Invest India (National Investment Promotion and Facilitation Agency of India) n.d.). The major sectors attracting FDI are services, computer hardware and software, trading, telecommunication, and tourism (Statista 2020). Hence, the overall threat of international arbitration disputes to stall India's action on climate change with carbon pricing is arguably limited.

India's participation in international carbon pricing initiatives is limited. Other than the PMR, a recent initiative is the Climate Warehouse, where the World Bank is working to support client countries through analytical and technical work to participate in post-2020 climate markets. Thus far, asset development efforts have focused on several countries, including India (World Bank 2020b, p. 91). The Indian government has not yet participated in the Bank's Carbon Pricing Leadership Coalition (CPLC) although two Indian companies are partners.

India's broader diplomatic interests may contribute positively to a carbon pricing collaboration, especially with other big powers like the EU and China turning increasingly to carbon pricing as a central climate policy instrument. India's involvement in the G20, Major Economies Forum on Energy and Climate (MEF), BASIC (Brazil, South Africa, India, and China), and BRICS (Brazil, Russia, India, China, and South Africa) can also have an impact. India does have international climate diplomacy ambitions, which may in turn inject momentum on promoting carbon pricing within India. For example, India jointly launched the International Solar Alliance (ISA) in the lead up to the UNFCCC climate conference (COP21) in 2015 (International Solar Alliance 2020). Headquartered in India, the initiative aims to help countries located in the intertropical zone to access solar energy technology more easily. In this regard, if India decides to establish an ETS it could potentially facilitate regional or international trading with other countries which generates international climate diplomacy benefit – this is a unique advantage of ETS as compared to carbon tax (UBA 2021).

India is also part of emerging efforts among South Asian countries to cooperate on climate change. South Asia is not only very disaster-prone but also the most densely populated geographical region where the majority of world's poor and vulnerable are to be found (Pandey 2015).[37] Several attempts have been made to promote regional climate collaboration and create a common framework for action in implementing coordinated policies (Huque 2018). Key initiatives are the South Asian Association for Regional Cooperation (SAARC) and the South Asia Cooperative Environment Programme. However, internal tensions resulting from "geopolitical imbalances" tend to hinder the progress of meaningful regional environmental and climate cooperation, and these regional initiatives seem to focus more on adaptation (ibid). In addition, as compared to other sub-regions in Asia such as East Asia and Southeast Asia, South Asian countries have yet to pick up the carbon pricing agenda regionally; momentum in individual

[37] The countries in the region include India, Nepal, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives, and Afghanistan.

countries is limited (World Bank 2020b; ICAP 2020), with Pakistan the only country considering an ETS.

6. Carbon pricing readiness and options

India's readiness and options towards carbon pricing present a mixed and complicated picture based on the preceding analysis. As one of the world's most populous, fastest growing, largest GHG emitting, major energy (especially from fossil fuels) consuming countries, India's sheer and growing size indicates great potential for deploying carbon pricing as a cost-effective and flexible way to achieve emissions reductions. In addition, India's integration into the global economy, broader diplomatic interests, and the increasing threat posed by its major trade partners' potential to introduce CBAM policies could also motivate the country to make progress on carbon pricing. However, India's per capita GDP and energy consumption are both low, and inequality remains a major problem. India therefore sees economic and social development as the highest national priority. This might act against pricing carbon which is often viewed as adding costs to industrial sectors which provide employment and income. Related to this, the huge vested interests of the fossil fuel sectors also pose challenges for a carbon pricing policy to take off the ground.

In terms of carbon pricing instrument choice, different factors tend to favour different instruments. The weak regulatory and institutional capacity for MRV and insufficient enforcement at the subnational level would support a national carbon tax as the preferred instrument. Existing market-based instruments (and the associated regulatory, technical and institutional experience), extensive experience with project-based mechanisms, business sector's own initiatives and a trading system's advantage of providing flexibility and potential for regional or international trading may favour an ETS.

Either way, India's climate policies must continue to be designed to meet both development and environmental goals. As its NDC states, 'the Indian development process is guided by the aspiration of making India prosperous and progress on the path of "Development without Destruction"'. Any carbon pricing instrument would benefit from highlighting the instrument's co-benefits and how these can be realised. Another common challenge for a carbon pricing instrument in India, regardless of its form, is the issue of policy interaction and institutional coordination. The government must answer key questions including how a new carbon pricing instrument could best fit into the existing policy mix with a range of policy instruments already covering upstream and downstream portions of the GHG emissions profile, across various sectors, and whether further streamlining is needed. Regarding institutional coordination, effective cross-ministerial coordination at the central level as well as federate-state alignment are key pre-conditions for effective carbon pricing in India.

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A.5 Indonesia Factsheet

Indonesia			
Overall		**Political**	
Capital	Jakarta	**Electricity from fossil fuels**	84.0% of total generation (2019)
Govt structure	Presidential representative democratic republic	**Brown lobby**	Indonesian Coal Mining Association (APBI); Indonesian Electrical Power Society (MKI); Indonesian Independent Power Producers Association (APLSI)
GDP **GDP per capita**	USD 3,338.1 billion (2019) USD 12,334.9 (2019)	**Green lobby**	WAHLI; Golongan Hutan
Population	270.6 million (2019)	**Perceived corruption**	Score=40 (2019) Min=9; Mean=43; Max=87; Germany=80
Legal		**Economic**	
Key government departments	Coordinating Min. for Econ. Affairs; Min. of Environment and Forestry; Min. of Energy & Mineral Resources; MoF; MoI; Environment Fund Agency; Nat. Dev. Planning Agency	**Income group**	Upper-middle income
Key legal instruments	2007 RANPI; 2011 RAN-GRK; 2017 Government Regulation on Environmental Economic Instruments	**Gini index**	38.2 (2019) Perfect equality/inequality=0/100; Germany=31.9 (2016)
Related policies	2014 National Energy Policy; 2010 Climate Change Sectoral roadmap	**Importance of industry**	Value-added: 38.9% of GDP (2019) Employment: 23% of total (2020) CO2 emissions: 65.9% of total (2018)
FDI	1.8% of GDP (2019)	**Fossil subsidies**	31.6% of GDP (2017)
		Electricity market	Single buyer model; partially liberalised

Indonesia

Technical		Multilateral	
MRV status	REDD+ scheme; GIZ and PMR assistance in MRV development	**Openness**	37% of GDP (2019)
UNFCCC reporting	2 BURs submitted; receiving assistance from GEF in drawing up 4th	**International agreements**	WTO (1995); ASEAN (1967); RCEP (2020)
Experience with carbon markets	JCM; CDM; REDD+ scheme	**NDC**	(Un)Conditional: (29%) 41% reduction including LULUCF in GHG emissions by 2030 compared to projected BAU level
Participation in WB initiatives	Not a CPLC partner PMR implementing country	**NDC assessment**	Highly insufficient (CAT); NDC welcomes market mechanisms that facilitate and expedite tech. dev. and transfer, payment for performance, technical cooperation, and access to financial resources

Carbon pricing readiness and options

- An established legal framework is in place. An ETS is legally mandated and set to be fully operational by 2024.
- Significant experience with existing market mechanisms and international cooperation, advanced MRV infrastructure and assistance from multilateral carbon pricing initiatives such as the World Bank PMR and German GIZ hold promise for the launch of its own system. Voluntary ETS pilot scheme announced in March 2021 is set to inform the development of a national ETS.
- Potential barriers include the only partial liberalisation of the electricity market where state-owned utility PLN holds a virtual monopoly; difficulty to reform market due to constitutional constraints.

1. Political dimension

Indonesia's economy is in large part still dominated by fossil fuels. 84% of total electricity generation in Indonesia in 2018 and almost three quarters of the country's total primary energy supply comes from coal, oil, and natural gas. Oil and gas production in particular have a long history. Indonesia has played a significant role in the international development of production sharing contracts between governments and extraction companies and the commercialisation of liquified natural gas (PwC Indonesia 2019). Coal is a crucial driver of economic growth, set to contribute 30% of the total national primary energy mix by 2025 (NEP 2014). Over 300 power plants are currently operating, under construction or planned (Coal Plant Tracker 2020). In fact, rather than phasing out coal, Indonesia increased its coal capacity from 26,800 MW in 2018 to 27,100 GW in 2019 (Climate Transparency Report 2020), further increasing the risk of stranded assets. The 2018 national electricity development plan (RUPTL) indicates that coal-fired power plants will make up 37% of the increase in installed capacity by 2027. Although recent years have seen a relative stagnation in oil and gas production due to regulatory instability and an uncertain investment climate, domestic demand for electricity continues to grow. The vested interests of these carbon-intensive industries could pose a significant political barrier to the successful introduction of carbon pricing. Particularly in view of the Economist Intelligence Unit's assessment of Indonesia as a "flawed democracy" (EIU 2019), politics is seen to be susceptible to the influence of prominent groups such as the Indonesian Coal Mining Association (APBI); the Indonesian Electrical Power Society (MKI), which voices views on technology, the business environment and regulations for the power sector to the government; and the

Indonesian Independent Power Producers Association (APLSI), which strives to work also at the international level.

Green groups can work to counteract the carbon-intensive industries' resistance to carbon pricing. However, the green lobby has "little sway" in Indonesia (Diela and Widianto 2020). Environmental issues are often reported rather as social justice issues, so green NGOs' agendas struggle with being "hijacked" in the debate (Parker and Prabawa-Sear 2020). The most influential organised groups include the Indonesian Forum for the Environment (WAHLI), which is part of the Friends of the Earth International network and unites more than 600 environmental advocacy NGOs and individuals across the country; and the Golongan Hutan (Golhut) coalition, of which Greenpeace Indonesia is also part, working to hold political candidates accountable for environmental issues (Walton, 2019).

General trust in public institutions and the population's attitude to green issues also play a role in the viability of carbon pricing. Despite a dip in confidence since the COVID-19 pandemic, 60% of survey respondents still at least "somewhat" trust the administration. Indonesia's average score of 40 (global mean 43) in Transparency International's perceived corruption in dex[38] is explained by the country's history of corruption in public institutions, which has to an extent also warded off foreign investment (Cook 2019). Indonesia's coastal geography and resulting vulnerability to the impacts of climate change were again made stark in January 2020; severe flooding affected more than 18,200 people (AHA Centre), and the aftermath spurred (although short-lived) public criticism of the government's handling of climate issues (YouGov 2019). However, 18% of Indonesians do not believe in anthropogenic climate change, one of the highest percentages among the world's 23 biggest countries (ibid), and there has been no significant public protest against for instance coal thus far, due to electricity needs trumping environmental concerns (Palma 2018).

Indonesia is a presidential constitutional democracy. Described as "presidential with parliamentary characteristics" (King 2009), power is largely decentralised to local and provincial governments. For a large part of Indonesia's democratic period since 1998, the political campaigns of both Islamic and pluralist parties were collaborative and "lacked ideological competition", but since 2014 politics has polarised significantly and become much more religiously charged (Warburton 2020). Despite this, research has shown that outside of views on Islam's role in society, there is an ideological convergence among political parties across a broad spectrum of policy areas (Aspinall et al. 2018). The Indonesian Green Party was established in 2012 and has members in all 34 provinces. After some failed attempts, it continues to seek registration in the 2021 general election, actively supported also by WAHLI and the Australian Greens (King 2019; CNN Indonesia 2019).

Despite Indonesia's heavy reliance on fossil fuels, the government has given carbon pricing – particularly an ETS – serious consideration since 2017. A carbon market strategy is now firmly in place. Regulations for a two-phase pilot market initially covering the power sector launched in 2021 (ICAP 2021a). The first pilot phase, announced in March and initially running until August 2021, is voluntary and intensity-based, with participants trading allowances and offset credits from renewable energy generation. It covers 80 coal-fired power plants (74% of which owned by state-owned utility PLN) and over three quarters of CO2 emissions from the power sector. This will move to a mandatory ETS with auctions in the second pilot phase, with the voluntary ETS continuing operation until the national ETS is implemented. Full operation of an ETS is mandated by 2024. The process has been orchestrated by the Coordinating Ministry for

[38] Higher values of the index indicate lower perceived corruption. For reference, the value of the index in Germany is 80 in 2019. For details see https://www.transparency.org/en/cpi/2020/index/nzl.

Economic Affairs but broader control of the ETS will lie with the Ministry of Environment and Forestry (MoEF) (ICAP 2021b; Reklev 2019).

2. Legal dimension

After a series of constitutional reforms lasting from 1999-2002, Indonesia confirmed the principle of separation of powers (Mahfud 2011); today, the president is both head of state and the government. The executive branch consists of the government and includes a cabinet, and legislative power lies with both the government and the two People's Representative Councils (the DPR and the DPD). Commission VII of the DPR is responsible for developing energy and environment regulations and approving energy-related legislation. To become law, a bill can come from the DPR, DPD or president but must be approved by both the executive and legislative branches, meaning the president—currently Joko Widodo since April 2019—holds significant veto power (Sherlock 2010). Natural resource management and environmental considerations are devolved and are today the jurisdiction of district governments, who may keep most revenues generated through this. This has been seen to accelerate the degradation of natural resources, as short-term gains from extraction or exploitation are prioritised (ADB 2005). The judiciary is independent of both the executive and the legislature, but corruption is rife (US Department of State 2020), potentially jeopardising the protection that market players need following the introduction of a carbon price.

Indonesia has passed "meaningful" legislation on climate change. However, key initiatives are often part of "decrees and regulations passed by individual ministries" rather than parliamentarians, rendering them "less effective" due to a structural hierarchy inherent in the Indonesian legal system (Nachmany et al. 2014). The 2007 Action Plan to Respond to Climate Change (RANPI) launched by the MoEF was its first major legislative climate response. This was followed in 2008 by the formation of the National Council on Climate Change by 17 Ministers and chaired by the president. The Council was tasked with coordinating climate policies, including establishing a carbon trading mechanism, but after a government reshuffle in 2015, it was disbanded and its responsibilities transferred to the Coordinating Ministry for Economic Affairs (World Bank PMR 2017). In 2010, the government introduced the Climate Change Sectoral roadmap and Climate Change Trust Fund to help connect international climate finance and domestic investment (Tänzler and Maulisia 2013). Indonesia's flagship climate law, the existence of which is highly conducive to the successful establishment of carbon pricing policy, is the 2011 National Action Plan to reduce emissions Presidential Decree (RAN-GRK). This framework document covers 70 programs in the forestry and agriculture, energy and transportation, industry and waste sectors and across all levels of government, the private sector, and civil society; it is the foundation of Indonesia's Nationally Appropriate Mitigation Action (NAMAs) that also use financial instruments such as taxation and investment policies (Nachmany et al. 2014). In 2017, the Government Regulation on Environmental Economic Instruments was passed, providing foundations for an ETS by mandating implementation by 2024; a presidential regulation is scheduled for 2021, which will provide a national framework for carbon pricing (ICAP 2021a).

These regulations and policies support Indonesia's NDC: a commitment to reducing GHG emissions by up to 41% by 2030 compared to projected BAU levels (29% unconditionally, with an additional 12% if provided support by developed countries) (Government of the Republic of Indonesia 2016). Other relevant laws include the 2004 Ministerial Decree that promotes RE and energy conservation from all fronts: investment, financial incentives, energy pricing, R&D, and RE institutionalisation. The Minister of Energy and Mineral Resources' (MEMR) National Biofuel Roadmap 2006-2025 aims to increase the uptake of biofuels to replace fossil fuels. The 2014

National Energy Policy also aims to gradually reduce electricity subsidies and includes a 23% renewables target in the primary energy mix by 2025 (NEP, 2014).

Foreign direct investment, 1.8% of Indonesia's GDP in 2019, is a significant economic driver in the country (World Bank 2019), but corruption, regulatory uncertainty, ambiguous legislation concerning tax enforcement, and bureaucratic inefficiencies have frustrated foreign investors. President Jokowi's economic reform agenda seeks to incentivise investment into certain sectors, including export-oriented manufacturing, oil and gas refineries, and petrochemicals (US Department of State 2020), which may not bode well for the environmental policy agenda. Singapore, the Netherlands, the United States, Japan, and Hong Kong were the top sources of FDI in 2018 (ibid). In 2019, 42.9% of FDI flowed to the manufacturing sector, and 14.9% to mining, quarrying, electricity, gas, and water (Santander Trade 2019). Indonesia has signed international investment agreements with 41 countries, including several regional arrangements such as the ASEAN Economic Community since 2016; the Regional Comprehensive Economic Partnership since 2020; and a commitment to ratifying the ASEAN Comprehensive Investment Agreement (ACIA), which covers the manufacturing, agriculture, fishery, forestry, mining and quarrying sectors (US Department of State 2020). Indonesia has in the past faced seven investor-state dispute settlement arbitration cases, although none were decided against Indonesia. Policymakers are increasingly alert to the slowness and high cost of the court system as it works in international arbitration (ibid) – with the potential to stoke unease regarding the risk of international arbitration and carbon trading.

3. Economic dimension

Indonesia is an upper-middle income country and the 7th largest economy in the world by GDP (using PPP adjusted figures) and the largest in South East Asia. It has a young population, with over 270 million inhabitants in 2019 and is still growing. The country has significant fossil fuel reserves, particularly coal, with its reserves-to-production ratio showing that coal could last for 60 years (BP 2018). In 2019, Indonesia exported the second most coal in the world (232.3 Mtoe) after Australia and showed the highest growth in coal exports (IEA 2019). It has had staccato membership to OPEC since 1961 but since 2004 is a net oil importer, due to large increases in demand (Guild 2020). Although gas production has slowed in recent years, Indonesia was still 7th in the world for LNG exports in 2018 (OIES 2020), and state oil and gas company PT Pertamina is the only Fortune 500 company in the country. In the same year, Indonesia emitted 542.9 million tonnes of CO_2, and its emissions have increased more than fourfold since 1990. The distribution of emissions spans electricity and heat production (40.1%), transport (28.6%), and industry and energy (26.2 %), with buildings, agriculture, and fishing making up the rest (World Bank 2019). The emissions-intensive industrial sector, consisting of mining and quarrying, manufacturing, construction, and public utilities, contributed to almost 40% of GDP in 2019 and 23% of total employment in 2020 (ibid). The government plays a large role in the country's market economy, setting prices for basic goods including fuel, rice, and electricity. Differing from some of its Asian neighbours such as Malaysia, Singapore or Thailand, Indonesia's economy is driven much more by domestic activity than exports. What it does export—oil and gas, coal, minerals, electrical equipment, crude palm oil—goes mostly to Japan, China, India, Singapore, and South Korea (Asialink Business 2020; IEA 2019).

The fiscal burden of fossil fuel subsidies in Indonesia is very high—31.6% of GDP in 2017 (IMF 2017)—and the government has committed to phasing out this "wasteful spending", with energy subsidy reforms underway since 2015 (MEMR and MoF Indonesia 2019). Still, in June 2020, the price of electricity in Indonesia remained well below the global average, at USD 0.105 per kWh for households (Global Petrol Prices 2020). Low-income households are heavily subsidised, paying less than a third of the average electricity supply cost in 2017 (PLN 2017). The

government has largely also kept fuel and electricity prices stable to maintain citizen's purchasing power (PwC Indonesia 2018), and there is a broad expectation that the public will be "shelter[ed]" from price changes (Laan and McCulloch 2019). This may prove problematic in terms of public acceptance if these prices increase for the consumer because of a passed down carbon price.

The MEMR is tasked with creating and implementing energy policy via the Directorate General of Electricity and the Directorate General of New and Renewable Energy, and Energy as well as with regulating Indonesia's power sector. The generation capacity in Indonesia struggles to meet demand, and several regions still suffer from blackouts.

Power market reform began in the early 1990s when the generation market was opened to competition and IPPs began to build, install and operate power plants, and then sell electricity to state-owned utility PT Perusahaan Listrik Negara, or PLN for short, for distribution. The 2002 Electricity Law expanded this competitive structure also into the retail market, but this was reversed two years later when the Constitutional Court ruled that electricity is a public good and should therefore remain exclusively under governmental control (ibid). Today, Indonesia's electricity market is still dominated by PLN, which holds a *de facto* monopoly over generation, transmission, and distribution. Despite PLN's engagement with IPPs since 1985, IPPs are in effect an "out-sourced element of the PLN monopoly supply chain", and Indonesia fits broadly into the single buyer model. Until 2013, PLN's revenue was also directly affected by regulated tariffs set (with a few exceptions) by the government and approved by parliament. If prices fell below the cost of production (as it often did) the Ministry of Finance compensated PLN through a subsidy. Since then, the stabilisation of the average cost of electricity supply and PLN's increased ability to pass on costs to consumers have stabilised the electricity subsidy (Setyawan 2014; PwC Indonesia 2018).

Despite constitutional barriers to electricity market restructuring and disincentives to foreign and domestic investment stemming from artificially low electricity tariffs, it has been argued that there is much room for incremental reform to improve incentives, such as the removal of the price cap on mandatory sales of domestic coal to PLN, and thereby bring down the cost of generation (Purra 2010). However, the lack of a competitive mechanism to coordinate IPP and PLN generation and the existence of a legal mandate for PLN to provide energy at an affordable price (Guild 2019) means there is still a long road to reaching wholesale and retail competition where a carbon price would be passed down to consumers to incentivise emissions reductions.

Indonesia has significant potential for renewables, particularly geothermal (due to its location in areas of high volcanic activity) and biofuels (Pujantoro and Tampubolon 2020). Although 16.7 GW of installed RE capacity is planned by 2028, and policies have been introduced to spur renewables, such as the Biofuel Roadmap 2006-2025 and the 10,000 MW Crash Programme for geothermal, regulations have been seen to make investment in renewables unattractive (Climate Transparency 2019). Feed-in-tariffs were introduced in 2011 for solar, biomass, wind, and hydropower. However, costs were largely absorbed by PLN rather than consumers, and an unpredictable regulatory environment once more stymied investor confidence (Guild 2019). Indonesia's easy access to fossil fuels, the influential brown lobby, and limited regulatory quality meant there was no significant boost to renewable energy growth (ibid). Regulation under the 2014 National Energy Policy requires the development of RE to consider "economic viability" (PwC Indonesia 2018). Furthermore, a 2017 directive requires RE producers to sell to PLN at 85% of the average generation cost in each local grid, meaning they compete directly with cheap PLN power from coal, and there is limited possibility for wider uptake (Palma 2018).

4. Technical dimension

A robust MRV infrastructure and government knowledge and capacity are critical to the success of carbon pricing. Indonesia already has solid, "deeply institutionalised" experience with MRV in the forest management sector, thanks to its involvement in the REDD+ scheme and the mobilisation of new actors and resources, and the formal anchoring of MRV responsibilities in regulatory arrangements (Ochieng et al. 2018). GHG MRV in Indonesia is currently coordinated by the Minister for Environment and is conducted in a semi-decentralised manner with the help of several digital registry systems such as the web-based 'PEP' tool (Prihatno 2019b). An MRV system is already in operation for the industry and power sectors. To further Indonesia's technical capacity in this regard, the German GIZ is currently implementing a (sub)national capacity-building project designed to help consolidate a robust MRV system by integrating PEP and establishing a data management system (BMU, 2021). Lacking still is governmental expertise in the energy, waste, and the industrial sectors (Prihatno 2019a), but Indonesia has already received support from the World Bank's Partnership for Market Readiness initiative, through which the design of governance aspects of the MRV system in these sectors has been mapped (World Bank PMR 2017). Capacity-building efforts for MRV targeting relevant senior government staff and private sector stakeholders have also been part of the PMR strategy, which is being implemented in partnership with the UNDP (ibid). A pilot MRV programme for GHG emissions was launched in the Java-Madura-Bali grid (covering approximately 70% of electricity demand) in 2018 (ICAP 2021a). After a study and stakeholder consultation on four market-based instruments were conducted in 2018, a pilot ETS was chosen for further development. The newly launched voluntary ETS pilot will further familiarise stakeholders with compliance and offset mechanisms and provide the relevant technical exposure to such a system (ICAP, 2021b).

Indonesia's public sector institutional capacity for policymaking has in the past been hindered by bureaucratic overlap between key stakeholders such as the Ministry of Finance and Ministry of Energy, and lack of coordination, resulting in ad hoc processes and lack of clarity (Warburton 2016). In the private sector, large multinationals that actively factor carbon pricing into their growth strategies operate out of Indonesia, including Shell, BP, and ExxonMobil; the former two have also announced 2050 net zero targets. However, in 2019, the WEF Global Competitiveness Index ranked Indonesia 74th in the world for strength of auditing and reporting standards within corporate governance (Schwab 2019), indicating the private sector's perhaps weaker capacity to comply with a carbon price.

5. Multilateral dimension

Indonesia has held membership to the WTO since 1995 and is part of the G20, giving it firm standing in terms of global economic cooperation. The country is also one of the original five members of ASEAN, which has played an important role in its foreign and security policy. However, studies have concluded that Indonesia has shown "inert attitudes" towards deeper regional economic integration within the ASEAN framework due to reasons of competitiveness, particularly under the incumbent Jokowi administration (Artner 2017; Heiduk 2016). Despite this, in November 2020, Indonesia signed the Regional Comprehensive Economic Partnership, in doing so becoming part of the world's biggest free trade bloc and giving it greater platform to cooperate internationally.

Indonesia's main trade partners include China, Japan, the United States, and India (World Bank 2019). Its ties with countries in the region that already place or are considering a price on carbon are an important factor in its trajectory towards its own carbon pricing instrument and hold potential for symbiotic carbon market exchanges. These include China, where a national ETS covering the power sector launched in 2021 in addition to its existing ETS pilots in

subnational jurisdictions; Singapore, which has had a carbon tax effective since January 2019; and Japan, which has both a carbon tax and subnational baseline and credit systems. (World Bank 2020). The ASEAN states have also agreed on key targets, including a 30% reduction in energy intensity and an increase in the share of renewables in the energy mix to 23% by 2025 (compared to 2005 levels) (ASEAN 2019); levels of ambition here are also expected to rise (Phoumin et al. 2021). Indonesia is also involved in the ASEAN Center for Energy, which represents the Member States' interests in the energy sector, as well as in a UNFCCC Collaborative Instruments for Ambitious Climate Action (CI-ACA) study on cooperative MRV alongside other ASEAN states as a building block for potential regional carbon market development in the future (UNFCCC 2019). Furthermore, it partakes in the ASEAN Climate Change and Energy Project (ACCEPT), a regional climate policy and carbon pricing initiative funded by the Norwegian Government whose Secretariat is located in Jakarta. The bilateral relationship with Norway has been cemented since 2010; in 2020, Indonesia received its first USD 56 million result-based payment from Norway as part of the REDD+ cooperation scheme, which allows the country to generate forestry offset credits that can then be counted towards Norway's emissions targets (Oktavianti 2020). These activities are all likely to facilitate the more extensive use of carbon pricing in Indonesia.

Indonesia is an implementing country of the World Bank's PMR, through which a framework for a market-based instrument was developed throughout 2017; this was supervised by a dedicated Working Group led by the MoEF (World Bank PMR 2017). Experience with international market mechanisms is also critical to the functioning of a national carbon pricing policy. For Indonesia, this includes with the Japanese Joint Crediting Mechanism, with 26 registered projects to date, and the Clean Development Mechanism, hosting 153 projects to date. Indonesia has also taken membership actions to 297 multilateral environment-related treaties (IEA 2020), including regional treaties such as the ASEAN Agreement on Transboundary Haze. Indonesia's NDC "welcomes market mechanisms that facilitate and expedite technological development and transfer, payment for performance, technical cooperation, and access to financial resources" (Government of the Republic of Indonesia 2016). However, the NDC is assessed as "highly insufficient" by the Climate Action Tracker, similarly unambitious as some neighbours' such as Vietnam, Singapore, Australia (insufficient-critically insufficient) and Malaysia, or even less ambitious than others' such as the Philippines (2° compatible) (Climate Action Tracker 2020).

6. Carbon pricing readiness and options

Plans to implement a carbon pricing mechanism in Indonesia are already well underway, with an established legal framework in place and an ETS legally mandated and set to be fully operational by 2024. A voluntary pilot ETS for the power sector has just been launched in 2021 and serves as preparation. Despite the influence of the fossil fuel lobby, the country has experience with existing market mechanisms and international cooperation, as well as a relatively advanced MRV infrastructure in some sectors. Indonesia has also received substantial and targeted assistance from carbon pricing capacity building initiatives through the World Bank PMR and German GIZ.

Barriers that may yet impede the efficacy of such a market-based policy instrument include fossil fuel dominance and lobby power, alongside the partial liberalisation of the electricity market, where the state-owned utility PLN holds a virtual monopoly over generation, transmission, and distribution. The limited scope for a carbon price to be passed down to industry and consumers could mute additional downstream abatement. Constitutional hurdles in this regard remain and make a market structure overhaul difficult, but incremental reform and a continued gradual removal of subsidies to PLN would be beneficial to the success of a carbon price in Indonesia. Past policy pushes for an increase in renewables and a reduction in

fossil fuel subsidies, for example, have also been less than successful due to political economic conditions, corruption, regulatory instability, and lack of coordination between key stakeholders and therefore lack of confidence from investors.

Several factors could help Indonesia meet these challenges, including continued support from the aforementioned capacity-building initiatives; concerted effort and transparency from politicians and key stakeholders keen to fulfil their promises or meet their climate targets; and an awareness raising campaign that could increase public interest in the national climate change response. These would ultimately boost environmental issues—and carbon pricing—up the political and social agenda.

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A.6 Malaysia Factsheet

Malaysia			
Overall		**Political**	
Capital	Kuala Lumpur	**Electricity from fossil fuels**	83.4% of total generation (2018)
Govt structure	Federal constitutional monarchy	**Brown lobby**	Petronas; ExxonMobil
GDP **GDP per capita**	USD 943.3 billion (2019) USD 29,525.6 (2019)	**Green lobby**	WWF Malaysia; Malaysian Nature Society; MIEEIP
Population	32.0 million (2019)	**Perceived corruption**	Score=53 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Min. of Energy & Natural Resources; Dept. of Environment; SEDA; Energy Com. Min. of Env. & Water	**Income group**	Upper-middle-income
Key legal instruments	Renewable Energy Act; Environmental Quality Act; National Biofuel Industry Act	**Gini index**	41.0 (2015) Perfect equality/inequality = 0/100; Germany=31.9 (2016)
Related policies	National Renewable Energy Policy; Five-Fuel Diversification Policy; National Climate Change Policy	**Importance of industry**	Value-added: 37.4% of GDP (2019) Employment: 27% of total (2020) CO2 emissions: 70.8% of total (2018)
FDI	2.1% of GDP (2019)	**Fossil subsidies**	13.9% of GDP (2017)
		Electricity market	Partially liberalised and unbundled with full wholesale competition under a single buyer model

Malaysia			
Technical		**Multilateral**	
MRV status	Partially developed with support from UNDP Low Emission Capacity Building Program	**Openness**	123% of GDP (2019)
UNFCCC reporting	3rd biennial update submitted	**International agreements**	WTO (1995); ASEAN (1967); RCEP (2020)
Experience with carbon markets	CDM; (indirect) JCM	**NDC**	(Un)Conditional: (35%) 45% reduction in GHG intensity of GDP by 2030 compared to 2005
Participation in WB initiatives	Not a CPLC partner Not a PMR partner	**NDC assessment**	Ambition not assessed by CAT; No refence to carbon pricing
Carbon pricing readiness and options			

- An established energy and environmental policy framework alongside strong regional economic integration provide the foundations for the successful introduction of a carbon price in Malaysia.
- A heavy reliance on fossil fuels and the resulting resistance from carbon-intensive industries, the importance of the energy sector on export and tax revenues, the current political climate, and low technical and administrative capacity are likely to be impeding factors.

Political dimension

Vested interests of carbon-intensive industries can present significant challenges for carbon pricing. In 2018, over 96% of Malaysia's total primary energy supply and over 83% of its electricity generation stemmed from coal, natural gas and oil sources, (IEA 2018). Crucially, coal plants were still being built as recently as 2019 (STEC 2019), increasing the risk of stranded assets and therefore opposition towards a carbon price. Malaysia has substantial oil and gas reserves (US EIA 2020). The country is the 5th largest LNG exporter in the world, and its government receives 15-20% of its revenues from petroleum (OIES 2020), with oil and gas giant Petronas (ranked among Fortune 500's largest corporations in the world) a significant contributor to government revenue (Latiff 2020) and ExxonMobil a notable actor in the energy sector. The sudden decline in crude oil and gas exports in 2020 due to the Covid-19 pandemic led to a 31.5% trade deficit (Teoh, 2020). Vested interests of high-emitting industries mean economic priorities often supersede environmental goals, and energy policies consequently rank affordability above reliability and sustainability (Ujang 2019). It has also been argued that the interests of energy-intensive sectors such as oil and gas have severely impeded the development of full solar and wind potential both politically and economically, due to high export revenues (Greenpeace 2020).

The weight of carbon-intensive industries in resisting carbon pricing can be counteracted by green industries. The green movement in Malaysia is arguably one of the most prominent in the region (Yew and Tayeb 2017). Key NGOs include WWF Malaysia and the Malaysian Nature Society and since the 1990s have increasingly formed coalitions with other community and established groups. Such collaboration has been facilitated by access to international environmental networks, digital media, and demonstrations, and groups have mobilised strategically to protect natural reserves and shape national programs, such as the Low Carbon City Framework in 2011 (Hassan 2016). The green lobby in Malaysia has also faced challenges, such as the restricted registration of organisations and implied difficulty to mobilise due to

"subtle state-imposed constraints". Lobbying efforts by green groups have been impeded by being portrayed as aggravating existing racial polarisation. The highly institutionalised party system has in the past resulted in friction within green movements as contentious activities become rapidly politicised (Yew and Tayeb 2017).

Malaysia's climate policy over the years has focused on the renewable energy (RE) industry, including via the establishment of the Sustainable Energy Development Authority (SEDA) and continuous national-level RE target-setting and policies since the 1990s. There is also a growing energy efficiency industry. The Malaysia Association of Energy Service Companies was set up under the 1999-2008 Malaysian Industrial Energy Efficiency Improvement Project (MIEEIP), an initiative funded by the UNDP, GEF and the Malaysian government. MIEEIP worked alongside the government, and members had a cooperative and concerted interest in the development of additional environmental policies including carbon taxes and markets.

The public acceptability of carbon pricing depends in part on trust in the government and the population's attitude to green issues. Until 2014, energy subsidies in Malaysia meant that the retail price of any energy product was set by the Automatic Price Mechanism whereby if the market price exceeded the retail price, the government would pay the difference. These subsidies were reformed in 2014 and were complemented by cash transfers to vulnerable groups, the financing of development projects, and a law to reduce profiteering. The experience of removing essentially negative carbon prices and the channeling of funds back into society (7.3 million people benefitted in 2016) holds promise for carbon pricing (Bergaoui 2017). The government has explicitly acknowledged that the management of distributional impacts, stakeholder communication, and transparency are critical for the success of such reforms and policies (ibid). In 2019, Malaysia was ranked 51st among 198 countries assessed by Transparency International for its perceived levels of public sector corruption, which is better than many jurisdictions in the region and other developing countries. However, political scandals have also done much to undermine trust in government. The 1MDB scandal exposed in 2015, where over USD 700 million was embezzled from a state fund set up to promote development through foreign investment and collaboration, also brought to light murky connections with oil and energy companies such as PetroSaudi and Abu Dhabi's International Petroleum Investment Company (Eusoff 2018). In early 2020, 59% of Malaysians ranked government as the least trustworthy institution (Ipsos, 2020). Surveys on the public acceptance of renewables development have uncovered resistance, particularly among the older generation, to paying more for energy (Zainudin and Ishak 2017), a reluctance that could also transfer to the prospect of increased energy prices as the result of a carbon price.

Malaysia is a federal constitutional monarchy. The monarch is head of state, and executive power lies with the cabinet led by the prime minister. The federal government shares executive power with 13 states, and legislative power is exercised by the federal parliament, consisting of an upper house/senate, lower house/senate, and 13 respective state assemblies. However, the Constitution empowers the king to appoint a prime minister who is expected to have backing in the lower house, without the need for a vote. Since gaining independence in 1957, Malaysia has "oscillated between authoritarianism and mere illiberalism" (Lemière 2020), with left-wing parties briefly making some headway in parliamentary elections during the 1960s (Boon-Kheng 2006). A turning point in 2018 saw the electorate successfully ousting the then-governing, scandal-tainted coalition that had been in power for 60 years. But since then, Malaysia has seen a reversal back to politicians from the previous government spurred by help from the king. The 2019 Economist Intelligence Unit's democracy score for Malaysia of 7.16 shows it to be a "flawed democracy" (EIU 2019), susceptible to influence by actors such as Petronas, which is state-

owned. The Green Party of Malaysia was formed in 2010 and has relied primarily on social media to mobilise actors (Lai 2012). It is currently not represented in the legislature.

2. Legal dimension

Under the Malaysian Constitution, responsibility to legislate environmental laws is in the hands of the federal government. The Department of Environment is charged with implementing climate policies (Aiken and Leigh 1988). Taxation power is also largely centralised (income and corporate, sales, export and import). States are therefore limited in their means of accruing tax revenue, and this adds to friction between the federal and local governments that stems also from differences in political aims, capacity, and language and has been identified as a key hurdle for decarbonisation, as federal policies are not always implemented at the local level (Susskind et al. 2020).

The Environmental Quality Act in 1974 was Malaysia's first and main environmental legislation. The Department of Environment was set up a year later; the government is currently revising the act to include climate change and a mandate for GHG management and reporting. Diversifying energy supply, such as through the 2001 Five-Fuel Diversification Policy, has been an environmental policy priority throughout. Sustainable development was a cornerstone for over three decades of five-year Malaysia Plans, but not until 2006 did climate change response become an explicit component. Since then, mitigation and adaptation policies; the establishment of SEDA to promote renewable energy generation; and the promotion of energy efficiency have been established in regulation and feature prominently in Malaysia's development strategies. In 2009, the National Climate Change Policy was introduced, which acts as a framework to harmonise existing climate policies, guide public sector and industry stakeholders, and steer Malaysia's development towards a low-carbon economy. The 2009 National Renewable Energy Policy is designed to support green technology development and domestic renewables and has underpinned subsequent energy initiatives and targets (Mustafa et al. 2019).

Malaysia's climate framework underwrites its commitment to reducing GHG intensity by up to 45% by 2030 compared to 2005 (35% unconditionally, with an additional 10% if provided support by developed countries), which is a key component of the country's NDC. However, the absence of an absolute emissions reduction target has led some to question the NDC's level of ambition (Ashfold et al. 2018). In 2020, Environment and Water Ministry pointed to the consideration of a carbon tax and reiterated the potential of a new Climate Change Act in the near future, which would pave the way for mandatory reporting requirements and the use of economic instruments, but this would "depend on policymakers' understanding and demand from the public" (Jalil 2020). Other key regulations and government strategies include the National Biofuel Industry Act of 2006; the National Land Public Transport Master Plan, and the Green Technology Master Plan for 2017-2030, a cross-sectoral initiative to incentivise green growth with the help of technology.[39]

Foreign direct investment in Malaysia makes up 2.1% of its GDP (World Bank 2019). In 2019, 47.9% of this flowed into the carbon-intensive manufacturing sector (particularly refined petroleum) and 8.5% into the mining and quarrying sector (DOSM 2020b). Since 2020, Malaysia is part of the Regional Comprehensive Economic Partnership. The country has also signed 51 international investment agreements (IIAs), mostly bilateral investment treaties, which are currently in force (UNCTAD 2020). Although the level of regulatory restrictiveness on FDI in Malaysia is lower than in some neighbours and trade partners such as China and Indonesia, it is higher than the OECD average (OECD 2018), which may increase the risk of arbitration

[39] See the LSE Climate Change Laws of the World database at https://climate-laws.org/ and the International Energy Agency policies database at https://www.iea.org/policies for more details.

concerning carbon pricing. Regional IIAs include the ASEAN Comprehensive Investment Agreement (ACIA) that covers the manufacturing, agriculture, fishery, forestry, mining and quarrying sectors. More recent IIAs' sectoral coverage can be much broader such as the 2018 Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), which covers all sectors. The rise in "investment-related judicial activism" means Malaysian policymakers are increasingly aware of the high cost of exposure to investor-state dispute settlement mechanisms in areas including environmental legislation, of which carbon pricing is part (Ayub 2019).

3. Economic dimension

Malaysia is a growing upper middle-income country with a young population and an open economy. Malaysia also has significant fossil fuel reserves; it had the 15th largest gas reserve in 2018 and the 27th largest crude oil reserve in the world in 2020 (US EIA 2020). Malaysia's CO_2 emissions amounted to 228 million tonnes in 2018 and have increased more than four-fold since 1990. The distribution of emissions spans electricity and heat production (49%), transport (27%) and industry (21%), with buildings, agriculture, and fishing making up the rest.[40] Electricity is sourced largely from coal (45%), natural gas (37%), and hydro (15%); oil, biofuels and solar PV account for the remaining 3% (IEA 2018).

Machinery and transport equipment, mineral fuels, and manufactured goods together make up 70.3% of exported commodities, and petroleum oils and gases are also in the top ten (UN Comtrade 2020a). 7% of the population is employed in the manufacturing sector (DOSM 2020a), and trade in merchandise goods made up 121% of GDP in 2019 (World Bank 2020a) due to a significant share of imports which are processed further and ultimately exported. Despite the Five-Fuel Diversification Policy, fossil fuels are still a key driver of the Malaysian economy (Gouldson et al. 2014), making up over 96% of the total primary energy supply (2018). Industry, comprising mining and quarrying, manufacturing, construction, and public utilities made up 37.4% of GDP in 2019 and 27% of total employment in 2020 (World Bank 2019; 2020). Malaysia has been a net energy exporter although its net exports have declined significantly since the mid-2000s (IEA 2018).

Due to their high fiscal burden, Malaysia stopped subsidizing automobile gas and diesel in 2014, but other fossil fuel subsidies remain, with almost 0.5% of GDP devoted to fossil fuels subsidies in 2019 (IEA 2020). Although the rate of subsidy has been decreasing, the new government may reverse this trend. State-owned Petronas contributes significantly to the government budget: in 2020, it will pay a dividend of USD 8.2 billion, despite losses due to the pandemic, having paid USD 13 billion in 2019 (Latiff 2020). Based on a broader measure of subsidies, which includes damages from congestion, local pollution and climate change, the IMF estimates that fossil fuel subsidies were almost 14% of GDP in 2017 (IMF 2017).

Regulatory oversight of the Malaysian energy sector is the responsibility of the Energy Commission of Malaysia (Aziz and Khor 2020). The electricity industry is known as the Malaysia Electricity Supply Industry (MESI). Its first reform (MESI 1.0) has been ongoing since 2010 and is now ending. It is aimed at energy supply security, having economically efficient tariffs, and improving customer satisfaction (Aris et al. 2019). There are currently 25 coal plants operating in Malaysia, although none are currently being built (Global Energy Monitor 2020). Electricity is generated by private independent power producers and three vertically integrated companies that operate as regional monopolies, including Tenaga Nasional Berhad (TNB), Southeast Asia's largest publicly listed electricity utility (ERIA 2017). The electricity generated is then sold at pre-determined wholesale prices to the Single Buyer Department of TNB, established in 2012 and

[40] The industry CO_2 emissions in Table X combines the emissions from "electricity and heat production" with "industry" to make it consistent with the scope of industry's contribution of GDP and employment.

responsible for distribution and retail (Aziz 2020). In 2017, a New Enhanced Dispatch Arrangement was implemented, allowing wholesale electricity generators to compete based on their variable costs rather than fixed power purchase or service level agreement rates. However, the current energy market framework means that competition remains at the level of bidding for power projects and generation, with little direct effect on end-consumer electricity prices.

The federal government announced plans last year to review the MESI 2.0 initiative, which aims to increase efficiency, streamline regulations and key processes, and decentralise the supply industry. These reforms would entail the further liberalisation of the electricity market from generation to distribution, by opening up to new competitors, liberalising price controls (which in theory would allow carbon costs to be passed on), and moving from the single buyer model with signed power purchase agreements (PPAs) to a more competitive wholesale electricity market model. MESI 2.0 would remove guaranteed capacity and energy payments, allow third-party grid access, and the Commission would stop approving independent power producer projects tied to PPAs (Lim 2019). Competition would extend down the value chain, allowing the reflection of a carbon price and empowering consumers to choose between retailers (Aris et al. 2019).

A Feed in Tariff for generation up to 30 MW was introduced in 2011 and managed by SEDA as part of the Renewable Energy Act, providing long term contracts (up to 21 years) with fixed returns for individuals or companies and funded by the Renewable Energy Fund paid for by electricity consumers. While the FiT scheme increased RE capacity (for example between 2011-2014 from 65 MW to 239 MW), its overall success was constrained by the limited size of the RE Fund (Yusoff and Rosli 2015). Politicians were also seen to be reluctant to increase the RE levy to boost this fund (ibid). To boost solar energy potential, the Net Energy Metering (NEM) scheme replaced the FiT in 2016 for residential, commercial, industrial, and agricultural consumers. However, due to residential customers being charged with low electricity tariff rates, the NEM has primarily benefited large customers, and the policy change has limited the appeal of renewables (Razali et al. 2020). In 2018, SEDA introduced an e-bidding mechanism for biogas RE, and later small hydro, to facilitate price discovery and promote competition (SEDA 2020); this experience of managing such a system may prove beneficial for carbon trading.

4. Technical dimension

A key hurdle for the implementation of both carbon taxes and ETS is the limited government capacity to develop and operate a robust MRV system in Malaysia. Related challenges include the mistargeting of funds towards "self-fulfilling research" rather than demand-driven areas, and lack of negotiators for international funding pitches (Leoi 2018). Furthermore, Malaysian stakeholders have most commonly cited the absence of a central repository for emissions data as an obstacle for emissions mitigation (Susskind et al. 2020). First steps in MRV development took place during the MIEEIP, which ended in 2008. The programme made significant contributions to the energy sector, particularly regarding capacity-building in data collection, benchmarking, and auditing and by compiling a database of over 1,500 industrial installations (van der Akker 2008). Between 2013-2015, the UNDP implemented the Low Emission Capacity Building Programme for Malaysia, with the aim to assist the country in enhancing its national GHG inventory systems and design an MRV framework with various pilots in the main industrial sectors (UNDP 2020). In 2018, Malaysia submitted its second biennial update report to the UNFCCC, with explicit plans to improve the GHG inventory system under the IPCC 2006 Guidelines by further disaggregating data; this also outlined sector-specific accounting strategies for energy, transport, agricultural, LULUCF, and waste. These strategies are to be supported by an additional voluntary carbon reporting program, which should boost business awareness,

knowledge, and capacity for MRV (Malaysian Ministry of Science, Technology and Innovation 2018).

Malaysia has further MRV experience due to involvement in international market-based instruments such as the CDM and the JCM. Domestic MRV for the UNFCCC is coordinated by the Ministry of Energy and Natural Resources, with data collated by the MRV Technical Working Group (Malaysian Ministry of Science, Technology and Innovation 2015). Government experience with broader environmental policies and market mechanisms such as these can facilitate the introduction of carbon pricing. In Malaysia's case, these also include for instance the formation of SEDA, the agency that promotes renewable energy in power generation. However, Malaysia's broader institutional framework to address climate change is often a consequential co-benefit outcome of agencies' core responsibilities (Malaysian Government 2015), and no centralised agency is in place to manage decarbonisation policies. There was some success in the 2010s with the Performance Management and Delivery Unit (PEMANDU), an agency tasked with designing and delivering government priorities under the National Transformation Plan by delegating responsibility to specified agencies and ministries, encouraging stakeholder involvement, and harmonizing the strategy with Malaysia's GHG targets. However, PEMANDU has since been discontinued. Its successor, the Civil Service Delivery Unit, is perceived to be less effective and influential (Susskind et al. 2020).

As for the private sector, in 2019, the WEF Global Competitiveness Index ranked Malaysia 29 th in the world for strength of auditing and accounting standards within corporate governance (Schwab 2019). Numerous large multinational corporations operate out of Malaysia, such as infrastructure conglomerate YTL Corporation (70% of its revenues stem from overseas). Some already consider carbon pricing in their investment decisions (Petronas 2018), others have implemented an internal carbon price (CDP 2017) or have set longer term environmental targets. For instance, in 2008, YTL acquired a 75% stake in YTL-SC Carbon, the largest CDM consultancy in Malaysia (YTL Corp. 2020), and in 2020 Petronas announced a 2050 net zero goal (Petronas 2020).

5. Multilateral dimension

As a member of the WTO since 1995 and ASEAN since 1967, and as a highly open, trade-dependent economy, Malaysia is in a promising position in terms of its multilateral cooperative capacities. In November 2020, Malaysia signed the Regional Comprehensive Economic Partnership, in doing so becoming part of the world's biggest free trade bloc, giving it greater platform to cooperate internationally. Over the years, its export destinations have diversified into East Asia and away from Europe. Malaysia's main partners in trade include China, Singapore, USA, Hong Kong, and Japan, which together received 51.5% of Malaysia's total exports in 2019 (UN Comtrade 2020b). FDI in 2019 Malaysia originated primarily from Singapore (19.8%), the USA (12.7%) and Japan (10.8%) (DOSM 2020b). ASEAN plays a significant role in the country's development strategy and its members account for approximately a quarter of Malaysia's trade. Malaysia is a key player in shaping regional economic integration, particularly under the ASEAN Economic Community Blueprint, which aims to facilitate cohesive economies, competition, innovation dynamism, sectoral cooperation, and resilience in the region (ASEAN Secretariat 2015). Malaysia has also signed numerous regional free trade agreements through ASEAN, among many other bilateral FTAs (Devadason 2018).

Malaysia has strong ties with countries in the region with carbon pricing instruments already in place or under consideration. These include China where a national ETS covering the power sector is expected soon in addition to the existing ETS pilots in subnational jurisdictions;

Singapore, which has had a carbon tax effective since January 2019; Indonesia where the government has mandated the establishment of an ETS by 2024; Thailand where a voluntary ETS is piloted; Vietnam where an ETS is under consideration with recent focus on capacity-building; and the Philippines where both a national carbon tax and an ETS are being assessed (Aleluia 2019; World Bank, 2020). Malaysia is also involved in the ASEAN Center for Energy, which represents the Member States' interests in the energy sector. While the country has not participated in World Bank programs such as the Partnership for Market Readiness (PMR) or Carbon Pricing Leadership Coalition (CPLC), it is involved with the ASEAN Climate Change and Energy Project (ACCEPT), a regional climate policy and carbon pricing initiative funded by the Norwegian Government that is just starting. However, the absence of domestic carbon pricing plans may soon expose the country to disruption arising from carbon border adjustment mechanisms that may emerge in the region or in trade partners further a field such as the US and EU.

Malaysia has evolved from a recipient to a donor of development support. Currently, the German GIZ is working with Malaysia to implement various projects in ASEAN countries regarding energy efficiency and climate change mitigation in the transport sector. Although not currently part of a wider or regional multilateral architecture explicitly relevant to carbon pricing, Malaysia has experience with the Japanese Joint Crediting Mechanism which supported the Low Carbon Society Blueprint for Iskandar, a development corridor in the Johor region. This in turn catalyzed subsequent federal level climate mitigation action (Gordon 2016). Malaysia has also ratified 21 multilateral environment-related treaties (Schwab 2019), including regional treaties such as the ASEAN Agreement on Transboundary Haze, and has experience in hosting Clean Development Mechanism projects, with 157 registered projects to date. However, its NDC shows no intentions to use international market mechanisms to achieve its contributions and is not particularly ambitious (Ashfold et al. 2018) relative to its neighbours and main trade partners such as the USA and Vietnam (critically insufficient), and Japan, Indonesia, and Singapore (highly insufficient) (Climate Action Tracker 2020).

6. Carbon pricing readiness and options

Malaysia's established energy and environmental policy framework and strong regional economic integration provide the foundations for the successful introduction of a carbon price. Yet the influence of the fossil fuel vested interests, the energy sector's importance for export and tax revenues, the country's current political climate, and low technical and administrative capacity are likely to be limiting factors.

The economy and energy system in Malaysia rely heavily on fossil fuels, and strong resistance to carbon pricing may therefore be expected. However, the experience with the fossil fuel subsidy reform, the ongoing liberalisation of the electricity market via MESI 1.0 and 2.0, and the push for increasing renewables in the energy mix bode well for market-based instruments They could also provide the entities subject to a potential future carbon price in these key sectors with the ability to adapt successfully. Many of Malaysia's key trade and investment partners already have (sub)national carbon pricing in place or upcoming, so learning from their experiences through forums provided by ASEAN and RCEP will be valuable.

With numerous renewable energy and energy efficiency laws in place and a well-defined NDC including an intensity target submitted, Malaysia's legal environment also holds promise. There has already been discussion on a Climate Change Act and on revising existing laws to mandate MRV, important steps towards successful carbon pricing. The fragmented distribution of powers and responsibilities between the federal states and national government could hinder this.

Furthermore, the many international investment agreements currently in force could be used to challenge the introduction of carbon pricing.

Events inducing political uncertainty, for example when the incumbent coalition was formed after ousting the previous and relatively new government without a general election, could undermine the basis on which long-term policies can be adopted and maintained. The potential for democratic institutions to be diluted by incumbent politics holds true also for the judiciary, with the executive able to appoint judges to the courts. The frictions between the federal and state governments regarding the use of tax revenues could limit the progress towards for carbon pricing. The malleability of and fragmentation between these institutions could therefore obstruct the protection that market players need for the successful introduction of a carbon price.

Malaysia has reasonable experience with international carbon market instruments such as the CDM and JCM. The country has undergone capacity-building programs implemented by the UNDP. However, without concerted political and administrative effort to build on past initiatives on GHG inventory and MRV, as well as a push to streamline Malaysia's technical capacity, the lack of a dedicated institutional setup may impede the introduction of carbon pricing.

When viewed through the lens of the analysis in UBA (2021), it is not clear which carbon pricing instrument the Malaysian context indicates. Vested interests and the economic weight of carbon-intensive producers, a heavy reliance on fossil fuels, a small but growing green lobby and recent liberalisation efforts in the electricity sector tend to favour emissions trading. However, the low technical capacity, current legal framework and inadequate experience to support the design and operation of an ETS are important obstacles. Moreover, an ETS may be challenged under the country's IIAs. A carbon tax may offer a preferred alternative in that it relies on existing tax infrastructure and is less likely to be challenged internationally. Moreover, the experience from the recent energy subsidy reforms can be useful. At the same time, the low public acceptability of taxes and the federal structure of Malaysia work against the introduction of a carbon tax, which is also likely to face heavy resistance from the industrial actors, particularly oil and gas producers. As an open economy with important trade and financial links to countries that have both carbon taxes and markets, Malaysia also has challenge of managing the trade-offs involved in aligning its carbon pricing instrument with some but not all its international partners.

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A.7 Mongolia Factsheet

Mongolia			
Overall		**Political**	
Capital	Ulaanbaatar	**Electricity from fossil fuels**	93% of total generation (2018)
Govt structure	Semi-presidential republic	**Brown lobby**	Mongolian Mining Association, Business Council of Mongolia
GDP **GDP per capita**	USD 41.5 billion (2019) USD 12,862 (2019)	**Green lobby**	Mongolian Environmental Civil Council; Mongolian Renewable Industries Association; Mongolia Banking Association Sustainable Banking Initiative
Population	3.2 million (2019)	**Perceived corruption**	Score=35 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Ministry of Environment and Tourism, Ministry of Energy	**Income group**	Lower-middle income
Key legal instruments	2011-2021 National Action Programme on Climate Change	**Gini index**	32.7 (2018) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	Renewable Energy Law Mongolia Sustainable Development Vision 2030 State Energy Policy Green Development Policy of Mongolia (2014 – 2030)	**Importance of industry**	Value-added: 38.5% of GDP (2019) Employment: 19% of total (2020) CO2 emissions: 72.7% of total (2018)
FDI	17.5% of GDP (2019)	**Fossil subsidies**	32.3% of GDP (2017)
		Electricity market	Limited unbundling and partially liberalised: cost-based pool market with single buyer

Mongolia			
Technical		**Multilateral**	
MRV status	No MRV; National GHG inventory updated to 2014	**Openness**	126% of GDP (2019)
UNFCCC reporting	1st biannual report submitted; 3 National Communications submitted; 2nd biannual report and 4th National communication in development	**International agreements**	WTO (1997); Japanese-Mongolia Economic Partnership (2016); Asia Pacific Trade Agreement (2020);
Experience with carbon markets	JCM, CDM	**NDC**	(Un)conditional: (22.7%) 27.2% below BAU (excl. LULUCF) by 2030
Participation in WB initiatives	Not a CPLC partner Not a PMR partner	**NDC assessment**	Ambition not assessed by CAT; No reference to carbon pricing

Carbon pricing readiness and options

- An active civil society and engaged green lobby indicate political willingness for low-carbon development, however low institutional capacity and trust in government do not bode well for carbon pricing potential.
- Lack of overarching climate policy framework and a specific legal mandate make carbon pricing unlikely in the near term.
- Substantial foreign investment in Mongolia's mining sector, several free trade agreements with jurisdictions already pricing carbon, and sizable international support and climate finance indicate potential for multilateral collaboration on carbon pricing, but significant sovereign debt is an inhibiting factor.
- Dependence on an inefficient coal power fleet will require effective electricity sector regulations to enable carbon price to incentivise low-carbon energy sector development. Mongolia's use of market mechanisms and commitment to continuing energy market reforms is promising though the lack of regulations or strategy post-2020 does not bode well.
- Mongolia has complied with UNFCCC reporting obligations and has experience with JCM, CDM and NAMAs. However, substantial additional MRV capacity technical capacity is needed.

1. Political dimension

Mongolia's population of 3.2 million (2019) relies heavily on fossils fuels to generate electricity, with 93% of electricity produced stemming from fossil fuels (2018), 88% of which is generated by coal-fired power plants (2018) (World Bank 2021a; IEA 2021). Mongolia has substantial vested interests in fossil fuels, as 95% of investment projects in electricity generation are directed to coal-fired power plants, with 3% reserved for hydropower, and the remaining 2% for several renewable energy projects (OECD 2019). Though Mongolia is a net exporter of energy due to abundant coal reserves, a recent surge in economic growth has rapidly increased electricity demand, resulting in Mongolia becoming a net importer of electricity, primarily from Russia (OECD 2019). Fossil fuels reserves are also a major part of the Mongolian economy, as the extractive sector is a crucial economic sector in Mongolia, representing 23.7% of its GDP and 83.7% of total exports in 2019 (EITI 2020). Foreign investors, especially China and Russia, are quite active in extracting fossil fuels for their own domestic electricity use (Hans et al. 2020; OECD, 2019). The country generates a significant portion of its income from the extractive industry, receiving approximately 23.7% of its GDP from the mining sector in 2019 (EITI 2020).

Air quality is low by international standards, especially in the capital city of Ulaanbaatar, and is a major political issue (IEA 2020; Energy Regulatory Commission n.d.; UNDP, 2019). Despite government efforts to improve air quality through a Law on Air Pollution Reduction in the Capital City (2011) and the Law on Air of Mongolia (2012) as well as substantive dedicated funds, the level of air pollution has not decreased, resulting in a strong response from civil society, including the formation of a group called 'Mothers and Fathers against air pollution' who have been proactively pushing the government to take urgent action (ibid). Other green lobby actors are active in Mongolia as well, including the Mongolian Environmental Civil Council (MECC) which represents approximately 700 environmental NGO's that have branches established in each Mongolian province, though is dependent on financing from the Ministry of Environment (UNDP 2014).

Additional green efforts are taking place climate in the finance front, including the Mongolian Renewable Industries Association, established in 2017 to support the rapid growth of renewable energy, the Economic Policy and Competitiveness Research Centre, which runs the Green Economy Coalition's Mongolian dialogue hub to help develop local capacity for financing and demonstrate the value of green investment, and the Mongolian Banking Association's Sustainable Banking Initiative. These efforts are well reflected in the Mongolian financial sector, as all Mongolian Banks have adopted the Mongolian Sustainable Finance Principles developed by the aforementioned sustainable banking initiative in 2015 (Sustainable Banking Network 2018). Mongolia has also received international support in developing climate finance. The Ministry for Environment has worked with the Global Green Growth Institute (GGGI) to develop a green energy strategy for the country, and Mongolia has received approximately $262 million from the Green Climate Fund for a number of different projects, as well as a $30 million grant from the World Bank as a part of the Government's Scaling Up Renewable Energy Programme (GGGI 2015; Green Climate Fund 2021; World Bank 2015). However, the green lobby is tempered by a politically strong Mongolian Mining Association representing 29 mining companies, as well as the Business Council of Mongolia, 50 of whose 250 members are mining and energy companies, and a slew of foreign mining companies with extraction interests in Mongolia (Ahlers et al. 2020).

Despite substantive investment and public support, institutional capacity continues to be a hindrance to low-carbon development, as 69% of people think government corruption is a key problem, and Mongolia is listed 11th among 180 countries ranked on Transparency International's global corruption index with a score of 35. (Transparency International 2020a; 2019) Mongolia's institutional capital deteriorated in recent decades as the government did not use the revenues from extracting minerals to this end (World Bank 2020a). Though public spending initiatives have increased since 2008, including social transfers and public investment, there is still corruption across established institutions, including utilities, as 22% of people who used the services of a utility in the previous 12 months paid a bribe (Transparency International 2020b). These sentiments are reflected in the in the World Bank's Governance indicators which indicate low government effectiveness, regulatory quality, and control of corruption. (World Bank 2019a).

Mongolia is a unicameral parliamentary system that elected a new Parliament in June 2020, bringing the Mongolian People's Party to power with control of 62 of the 75 Parliamentary seats in the national parliament, known as the State Great Khural. Though a Mongolian Green Party focused on sustainable development exists and has previously held a couple of seats in the parliament, they have not managed to secure a seat since 2016, nor been a member of the coalition government since 2008 (General Election Committee of Mongolia 2020; Global Greens n.d.). In terms of climate and environment, the Mongolian government has a constitutional

mandate to undertake measures for protecting the environment, as well as the sustainable use and restoration of natural resources, all plans for which need to be submitted to the parliament for approval (Constitute Project 2020).

2. Legal dimension

Currently Mongolia does not have a flagship climate law, however the 2011 – 2021 National Action Programme on Climate Change (NAPCC) is the key government policy document that highlights specific adaptation and mitigation measures and actions, and establishes a foundation for green economic growth and development (Grantham Research Institute n.d.). The NAPCC is complemented by several other national policies, including the Mongolia State Policy on Energy 2015 – 2030 which outlines a goal to increase the share of renewable energy in the national energy capacity to 20% by 2020 and 30% by 2030, as well as a goal to reduce GHG intensity in energy production from 0.52 tCO_2e in 2013 (baseline) to 0.49 in 2023 and 0.47 in 2030 (State Great Hural of Mongolia 2015). Additional energy targets are highlighted in the Mongolian Sustainable Development Vision 2030, which re-emphasizes the renewable energy target of 20% by 2020 and 30% by 2030, as well as includes a target to build a nuclear power plant by 2030 (State Great Hural of Mongolia 2016). Finally, the Green Development Policy 2014 – 2030 lays out a step-by-step plan for achieving long-term mitigation goals and specifies ministries responsible for implementation. It also identifies potential funding sources but does not provide specific budget estimates (OECD 2019). These goals are realized through additional regulations, including the 2007 Renewable Energy Law, which sets tariffs for different renewable energy sources, both for grid connected projects and for off-grid installations (IEA 2018).

In 2019 the Government amended the Renewable Energy Law to reduce the feed-in-tariffs across all renewable technologies and solidify principles for an auction scheme that is location, capacity, and technology specific to incentivize greater capital investment (Hans et al. 2020). Renewable energy development was also supported by the National Renewable Energy Programme, which finished at the end of 2020. Though unattained, the programme's main goal was to gradually increase the share of renewable electricity to 20-25 % by 2020 and provide power to all distant districts, known as *soums*, and settlements by introducing renewable generation (IEA 2013). Mongolia also has a 2015 Law on Energy Conservation that approves a national energy conservation program, highlights a list of energy-saving technologies to import, establishes an Energy Conservation Council, and outlines energy efficiency financial incentives (Energy Regulation Commission 2015). Mongolia's national renewable energy and energy efficiency laws are reflected in its recently updated NDC, which commits to increasing the share of renewable electricity capacity to 30% of total electricity generation capacity by 2030, reducing building heat loss by 40% by 2030 compared to 2010 levels, and improving the efficiency of coal-fired heating plants and thermal power plants (Government of Mongolia 2020).

Mongolia submitted an updated NDC towards the end of 2020, stating its commitment to unconditionally reduce its emissions to 22.7% below BAU levels in 2030 excluding the LULUCF sectors. The NDC also articulates a conditional commitment to increase the target to 27.2% below BAU level in 2030 if mitigation measures such as carbon capture and storage and waste-to-energy technology are implemented (Government of Mongolia 2020). Though the updated NDC reflects a larger commitment than the original NDC pledged in 2015, which articulated a conditional commitment of 14%, it also makes use of an updated 2030 baseline, which has been increased to 74.3 $MtCO_2e$ in 2030, compared to 51.3 Mt in 2015 (Government of Mongolia 2014). The adjustment is due to both a change in methodology for measuring its base year emissions and adding agriculture, waste, and some industrial sectors to the scope of the NDC. Given that existing legislation tries to identify renewable energy and energy efficiency priorities and address energy poverty but does not outline extensive policies to address climate issues, it is not

surprising that Mongolia ranks 53 out of 93 on the CLIM index, with an overall score of 0.28 (European Bank for Reconstruction and Development 2011).

Key to Mongolia's ability to beget more renewable energy generation is attracting more foreign direct investment in renewable projects. Currently, investment in metal, coal, and natural gas production absorb more than 70% of Mongolia's FDI, and Canada, the European Union, and China are all quite active in Mongolia (OECD 2019). China in particular plans to invest even more extensively in Mongolian gas and coal, reserving approximately USD 30 billion of credit for Mongolian projects as a part of the Belt and Road Initiative (OECD 2019). The emergence of a carbon pricing mechanism could diminish foreign investments in the gas and coal sectors, as a carbon pricing placed at the point of extraction could make removing fossil fuels from the earth more expensive and less attractive to foreign interests. Mongolia has worked to reform its regulatory investment framework to attract more FDI, increase transparency, and create a level playing field for domestic and international investors, which will be critical for needed investments to develop the nascent renewable energy sector. However, the country is considered to be a risky investment destination, as it ranks 74th on the World Bank's Ease of Doing Business index, and has a substantive level of public debt, rising to 87.6% of GDP in 2016 (World Bank 2019b). China's intention to extend further credit through the Belt and Road Initiative could also exacerbate risk of sovereign default in the future.

Implementing necessary policies to address both climate and fiscal challenges to spark climate action and investments will require coordination between the Ministry of Nature, Environment, and Tourism (MNET), Mongolia's UNFCCC representative, the Ministry of Mineral Resources and Energy (MMRE), responsible for fuel and energy policy, and the Ministry of Finance. Mongolia's strategic documents, policy documents, and 3-5 year plans clearly define the country's intent and plan to address climate issues, however lack of capacity and a longer-term, mid-century plan are lacking, and do not bode well for carbon pricing readiness.

3. Economic dimension

As a lower-middle income country, Mongolia's GDP has grown significantly in the past two decades, increasing from USD 8.9 billion in 2000 to USD 41.5 billion in 2019, measured in current PPP terms (World Bank 2021d). Mongolia's growth stems almost exclusively from a mining boom in minerals, coal, and gas, which has grown the economy approximately 7.2 % a year since 2004 and generated substantial revenues (World Bank 2020a). Revenues have in turn been used in generous social assistance programs that have eliminated extreme poverty and kept rising inequality in check (World Bank 2020a). Mining accounts for nearly one-quarter of GDP, up from one-tenth in 2000, and foreign direct investment (FDI) is concentrated in the mining sector, making up 73% of FDI in Mongolia in 2019 (World Bank 2020a). However, Mongolia's reliance on mining-driven prosperity has come at the expense of underutilizing other factors of production, especially the Mongolian population (World Bank 2020a), as mining only made up 19% of total domestic employment in 2020. Mining has also undermined the country's credit worthiness, as the government has borrowed extensively to continue investing in the sector and in-turn enhanced its exposure to commodity shocks (World Bank 2021h; World Bank 2020a). Instead of investing revenues to make the economy less volatile, Mongolia has spent most of its mineral revenues on politically popular social transfers, public investments, and civil servant wages and pensions (World Bank 2020a). The result has been macroeconomic volatility and a lack of investment in human and institutional capital. To improve the situation, the Mongolian government can redirect spending to reduce debt, create more productive jobs for the labour force, and strengthen public investment management and transparency practices (World Bank 2020a).

Increased GDP growth has also come with increased energy demand. Growing energy demand has been primarily met through increasing coal and oil-fired generation, resulting in fossil fuels contributing 97% to the country's TEPS, and 93% of electricity generation. Mongolia has substantial coal reserves estimated at 173 billion tonnes and has leveraged coal generation as its primary energy source with much smaller contributions from hydropower, wind, oil, biomass and imported electricity from Russia and China. Based on IEA data, electricity, and heat production accounts for more than half of the country's CO2 emissions (IEA 2021). Total energy demand across all sectors is expected to increase by 2.7 times by 2030 relative to 2010 levels (Ministry of Environment and Tourism, 2018).

The share of coal-fired installed capacity is high, 80% in 2019, but expected to decrease to 60% in 2030 and 52% of the total installed capacity in 2050 due to increasing renewable energy capacity. However, total installed coal-fired capacity is projected to roughly double in the next few years, with approximately 1350 MW of new coal generation announced to augment the existing 816 MW (Global Energy Monitor 2021; Hans et al. 2020). Coal is also the main source for Mongolia's heat production, with coal-fired combined heat and power (CHP) plants used to combat against extremely cold temperatures (ADB 2020a). In addition, Mongolia exports its coal resources, specifically to China, Hong Kong, and Singapore, however exports have decreased in recent years given increasing domestic energy demand (Mongolian Customs 2017).

Renewable energy capacity is also expected to grow to 20% of total installed capacity by 2023 and 40% by 2040, which if realized would achieve the renewable energy targets in Mongolia's 2015 State Policy on Energy and updated NDC. However, challenges around financing and grid connectivity create high uncertainty (Hans et al. 2020). Some renewable energy projects have been developed, including: the 52 MW Salkhit wind farm, the first-ever 10MW solar plant operationalized in Darkhan under the Japan-Mongolian Joint Credit Mechanism (JCM), a second 10MW solar project established by the private sector through the JCM, and a Green Climate Fund (GCF) funded 10MW solar plant funded through the Mongolian entity XacBank (IRENA 2016; Ministry of Environment and Tourism 2018). Approximately 60% of renewable capacity planned for construction between 2020 and 2030 is expected to be hydropower, however building large-scale hydropower projects has proved to be challenging due to cross-border environmental concerns (Hans et al. 2020). The Ministry of Energy has identified that Mongolia has the potential to develop renewable energy resources up to 2.6 terawatts, and new policies could rapidly accelerate renewable energy development (IRENA 2016). However, realizing these resources will depend on updates to the national and regional grid, de-risking capital investment and reforming the power sector (IRENA 2016).

On the demand side, Mongolia highlighted in its third national communication to the UNFCCC that one of the main factors contributing to energy usage is heat loss in buildings. The State Policy on Energy 2015-2030 highlights a goal to reduce building heat loss by 20% by 2023 and by 40% by 2030 as well as implement energy efficiency standards for new buildings (Ministry of Environment and Tourism 2018). Mongolia's updated NDC also outlines additional energy efficiency objectives, highlighting reducing fuel use in individual households through stove efficiency as an additional action to augment Mongolia's mitigation contribution (Ministry of Environment and Tourism 2018). Finally, the 2009 Global Environmental Facility (GEF), Korean Management Corporation (KEMCO), and UNDP Mongolia funded "Building Energy Efficiency Project" (BEEP) also focuses on enhancing energy efficiency in the wider Mongolian building sector by removing the barriers, including noncompliant and outdated building codes, norms and standards (REEEP 2014).

Given Mongolia's dependence on coal power, electricity sector regulations will be key in enabling a carbon price to incentivize a transition to a low-carbon energy sector. Mongolia

claims to have deregulated and privatized the power sector in 2001 through the passage of the Energy Law of Mongolia (REEEP 2014). The law sought to vertically separate the different entities of the sector by breaking up the generation, transmission, and distribution companies, however, all 18 energy companies continue to be government-owned and operate under a Single-Buyer model (REEEP 2014). In this model, five power generation companies sell electricity at regulated tariffs to the Central Regional Electricity Transmission Company (CRET), which in turns sells the purchased electricity at wholesale prices through a spot market to ten distribution companies (REEEP 2014). Specific regulated tariffs are set for generation, transmission, distribution and end-use respectively, with an auction market organized amongst generators based on their offered generation tariff (REEEP 2014; IRENA 2016). Given that tariffs are heavily regulated, without further reform it is unlikely that a carbon price can achieve its full potential in Mongolia's electricity sector (Acworth et al. 2019). Furthermore, electricity markets have not been particularly successful due to reported challenges around collecting revenue at the distribution level and because of revenue shortfalls for generation companies (IRENA 2016). The Mongolian ruling party identified in its 2020 Election Programme that energy market reforms are necessary to increase the efficiency of the energy sector and transfer it to a proper market system, as well as introduced solar energy as a heat source in local areas, however key laws or regulations have yet to be developed for the post-2020 period (Mongolia Weekly 2020).

4. Technical dimension

In addition to submitting an updated NDC in late 2020, Mongolia has complied with UNFCC emissions reporting obligations, submitting three National Communications in 2001, 2010, and 2017 in-line with the UNFCCC Guidelines for National Communications for Non-Annex Countries. Mongolia also submitted a Biennial Update report in 2017 and has launched projects to prepare for its fourth National Communication and second Biennial Update Report through the Mongolian National Environment and Climate Fund (Environment and Climate Fund). As outlined in its Third National Communication, Mongolia's National GHG inventory was updated for 2014, with the most recent inventory update having taken place in 2006 (Ministry of Environment and Tourism 2018; 2010). Mongolia does have some experience with MRV as the country is working in conjunction with the United Nations Development Programme (UNDP), to implement a NAMA in the building sector, which includes a component to develop an MRV system for that sector (Ministry of Environment and Tourism 2018). However, Mongolia does not have an established MRV system, and has identified that there is a strong need for technical capacity to develop one.

Mongolia has also identified its need for capacity building and knowledge sharing to successfully implement its NDC, including increasing the number of personnel who have extensive expertise on climate change policies, international treaties, and climate finance, as well as enhancing the knowledge of decision-makers and policymakers at the national, sectoral, provincial, and municipal level (Ministry of Environment and Tourism 2018).

Mongolia has however demonstrated some capacity with both market-based mechanisms and environmental taxes, indicating some existing capacity for implementing a potential carbon pricing mechanism. The 2019 amendment of the National Renewable Energy Law established a feed-in-tariffs across all renewable technologies, and anticipates finalizing an auction scheme that is location, capacity, and technology specific to incentivize greater capital investment (Hans et al. 2020). A range of fees and other taxes are payable for activities that occur in the extraction of natural resources, including a water pollution fee, air pollution fee, land use fee, and a natural resources usage fee (PWC 2021). Mongolia also makes use of an air pollution tax, which places fee on air pollutants generated from burning coal, automobiles, and organic substances (UNDP 2019).

As a signatory of the Kyoto Protocol, Mongolia also has experience with international carbon market mechanisms, including Clean Development Mechanism (CDM), Joint Crediting Mechanism (JCM), and Nationally Appropriate Mitigation Actions (NAMAs). Mongolia has a CDM National Bureau established at the Ministry of Nature and the Environment that is registered with the Secretariat of the UNFCCC and has reviewed and approved four CDM proposals and projects. Under the joint Japanese-Mongolian JCM, a 10MW solar plants was installed, and through multilateral financial cooperation two 50MW wind parks were established (Ministry of Environment and Tourism 2018). Mongolia also submitted a list of NAMA's to the UNFCCC secretariat in 2010 (Ministry of Environment and Tourism 2018). Finally, Mongolia is participating in a virtual pilot operationalizing Article 6 led by the Swedish Energy Agency focused on renewable district heating (Swedish Energy Agency 2020).

Though Mongolia has complied with UNFCCC requirements and has some experience with market mechanisms for environmental issues, its lack of technical infrastructure such as an MRV system, as well as lack of a plan to develop one inhibits its readiness for carbon pricing.

5. Multilateral dimension

International trade, particularly exports of primary products, is crucial for Mongolia's economy with the country's sum of exports and imports amounting to 126% of GDP in 2019. Main exports include coal (40%), copper ores (24%), iron ores (7.5%), gold (5.5%), crude oil (4.8%), and the hair of Kashmir goats (3.9%) (UN Comtrade 2021). Mongolia's largest trade partner is neighbouring China, as 88.9% of total Mongolian exports and 98% of coal exports alone go to China, and with much smaller volumes destined to the United Kingdom, Singapore, Switzerland, and Russia (ibid).

Mongolia participates in several international trade agreements. It joined the World Trade Organisation (WTO) in 1997 and signed the Japanese-Mongolia Economic Partnership in 2016, the Asia Pacific Trade Agreement in 2020 and a Partnership and Cooperation Agreement (PCA) with the EU in 2017 to establish dialogue and facilitate trade between the two countries (European Commission 2020). Mongolia is currently considering several free trade agreements, including the Mongolia-People's Republic of China Free Trade Agreement, the Mongolia-Republic of Korea Free Trade Agreement, and the Eurasian Economic Union-Mongolia Free Trade Agreement (ADB 2020b). Through these trade arrangements many of Mongolia's current and potential trading partners, including Korea, China, the European Union, and Japan, have implemented carbon pricing instruments, offering opportunities for Mongolia to collaborate on carbon pricing through already existing multi and bilateral relationships.

Mongolia collaborated with several international actors on climate change related activities and projects which could form a useful foundation to build upon for developing a carbon pricing instrument in the country. These actors include the Global Environmental Facility (GEF), the Asian Development Bank (ADB), the United Nations (UN), United Nations Development Programme (UNDP), the World Bank (WB), the UN-REDD, the Global Green Growth Institute (GGGI), the German Corporation for International Cooperation (GIZ), as well as the governments of Germany and Japan. Only Mongolia's cooperation with Japan has involved carbon pricing directly. The two countries have worked through a JCM project to conduct joint research on improving the efficiency of thermal power plants and studies on implementing a NAMA in the power sector (Ministry of Environment and Tourism 2018).

6. Carbon pricing readiness and options

Mongolia has high-level political commitments to engage in more sustainable, low-carbon development, however it is unlikely that the central Asian country will be ready to use carbon pricing as a climate policy tool in the near future. Mongolia has an active and engaged civil

society and green lobby eager to pursue renewable energy development and diminish air pollution. However, low institutional capacity and trust in government bodies, as well as a lack of an overarching climate policy framework and a carbon pricing mandate make implementing a carbon pricing mechanism particularly challenging.

Mongolia has attracted not only substantial foreign investment in the mining and minerals sector but also significant climate change related international support and investments, indicating an emerging international interest in developing the country's renewable energy sector. However significant foreign debt paired with a partially liberalised energy sector that lacks regulatory commitment to continuing energy market reforms are causes for concern for international investors. What's more, though Mongolia has complied with UNFCCC reporting obligations and has some experience with JCM, CDM and NAMAs, the country lacks substantial technical capacity to further GHG reporting and MRV development amongst other topics. Mongolia's NDC makes no mention of carbon pricing.

Against this backdrop, a carbon tax would better suit Mongolia should the government choose to adopt carbon pricing. The government has already implemented a tax on polluting activities that occur through extracting natural resources and contribute to air pollution, specifically in the coal and transport sectors. Thus, a carbon tax would be less of an administrative lift and likely possible for the government to implement, especially given public support for low-carbon development and policies that improve air quality. For the tax to be effective, it will need to be coupled with meaningful electricity market reform and increase to a level that will influence covered entities to invest in low-carbon alternatives. What's more, given the government's track record of mismanaging mining revenue (World Bank 2020a), a carbon tax will only be effective if the revenue generated is transparently re-invested into additional climate policies and programs that benefit the Mongolian economy and people.

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A.8 Pakistan Factsheet

Pakistan			
Overall		**Political**	
Capital	Islamabad	**Electricity from fossil fuels**	64.5% of total generation (2018)
Govt structure	Federal parliamentary republic	**Brown lobby**	Pakistan Petroleum Limited; Mari Petroleum; Asia Petroleum Ltd.
GDP **GDP per capita**	USD 10601 billion (2019) USD 4898 (2019)	**Green lobby**	Pakistan Green Party; LEAD Pakistan, NNCC, World Bank; SDPI
Population	216.6 million (2019)	**Perceived corruption**	Score= 32 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Min. of Energy; Min. of Climate Change; CCI.	**Income group**	Lower-middle income
Key legal instruments	Climate Change Act; Energy Efficiency and Conservation Act; Council of Renewable Technologies Act	**Gini index**	33.5 (2015) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	National Climate Change Policy; Policy for Alternative and Renewable Energy	**Importance of industry**	Value-added: 18.3% of GDP (2019) Employment: 25.8% of total (2020) CO2 emissions: 59.6% of total (2018)
FDI	0.8 % of GDP (2019)	**Fossil subsidies**	6.6% of GDP (2017)
		Electricity market	Partly liberalised: Partially unbundled single-buyer model with limited wholesale competition, regulated tariff structure, and mainly state-owned assets

Pakistan			
Technical		**Multilateral**	
MRV status	Under development	**Openness**	30.4% of GDP (2019)
UNFCCC reporting	2nd national communication (2018); updated NDC underway	**International agreements**	ECO (1985); WTO (1995); BRI/CPEC (2013); AIIB (2015)
Experience with carbon markets	CDM; NAMA	**NDC**	20% below BAU including LULUCF (conditional on international support)
Participation in WB initiatives	Not a CPLC or PMR partner	**NDC assessment**	Ambition not assessed by CAT

Carbon pricing readiness and options

- The government is exploring options for introducing an ETS through the National Committee on Establishing Carbon Markets. It enacted the Climate Change Act in 2017 providing the legal and institutional infrastructure for climate policy which can facilitate the adoption of a carbon pricing instrument.
- A brand-new coal fleet has been constructed over the past six to eight years, whose capacity has effectively been capped after the government's announcement in December 2020 to halt further investments.
- Pakistan's current electricity market design is conducive to internalising a carbon price contingent on additional market regulations being introduced. Sectoral readiness is set to increase further once the objective to establish competitive markets is realised.
- Technical capacity, including the creation of an MRV system, is currently a bottleneck that has been identified by the government which is expected to release an implementation strategy in the near term.
- Support for a green agenda by civil society contrast with well-protected FDI in coal power, and the government's ambition to boost domestic oil and gas production in the face of high reliance on energy imports and structural fiscal deficits.
- Pakistan can build on its international presence in organisations such as ECO, CPEC, and SAARC to pursue multilateral cooperation on climate change notably with China, Kazakhstan, and Turkey.

1. Political dimension

Pakistan has experienced steep increases in energy demand during the past decades which has tempered its ambition to curb emissions growth in key sectors of the economy.[41] Between 1990 and 2018, total final energy consumption nearly tripled as a result of increases in GDP, industry and population growth. In 2018, fossil fuels contributed for 62% of the country's TPES and 65% of electricity generation which puts it at the lower end of the jurisdictions considered here — mainly owing to high shares of biomass and large hydropower potential (IEA 2021). However, coal has made significant inroads into the electricity sector in recent years following the conclusion of investment agreements under the Chinese Pakistan Economic Corridor (CPEC).[42] Being nearly absent from the mix before 2015, the share of coal-fired power rose to 19% of total generation in 2019-20 (NEPRA 2020). As of December 2020, eight coal plants were under construction and will add an additional 4.6 GW of capacity to the grid once completed (PPIB 2020). The government's embrace of coal has given rise to an interest group with a stake in

[41] The government projected a fourfold increase in total emissions between 2015 and 2030 in its INDC (2016).

[42] For a list of energy investments under CPEC, see http://cpec.gov.pk/energy

Pakistan's new carbon-intensive infrastructure that will serve the power sector for the coming decades, which may increase resistance to carbon pricing and delay its adoption.

The trend of surging coal power was brought to a halt in December 2020 when Prime Minister Imran Khan announced that further investments in coal plants beyond those currently in the pipeline would not be considered, thereby precluding nearly 27GW of additional capacity that was projected to be constructed between 2030-2047 (NTDC 2020). The announcement comes on the back of growing support for a low-carbon development pathway. A 2019 study developed under the UNFCCC's CI-ACA workstream in collaboration with Pakistan's Ministry of Climate Change (MOCC) found there to be high potential for an ETS covering power and energy-intensive industries.[43] In response, a National Committee on Establishing Carbon Markets tasked with advancing Pakistan's carbon pricing strategy going forward was created and subsequently announced at COP25 in Madrid. Provisions for domestic credit instruments under Article 6, an MRV system, and a carbon pricing communication strategy are currently in the drafting process (ICAP 2021).

Concrete climate policy responses in Pakistan can count on the support of a nascent green coalition comprising domestic political actors (e.g., the Pakistan Green Party), advocacy groups and think tanks (e.g., Green Pakistan, LEAD Pakistan, National Network on Climate Change (NNCC), Sustainable Development Policy Institute), and initiatives with international backing focussed on promoting low-carbon economic growth in the country (e.g., The Civil Society Coalition for Climate Change (CSCCC); GIZ renewable energy and energy efficiency projects). Furthermore, development banks play an important role in project financing. The World Bank recently funded USD 450 million of a USD 727 million renewable energy project as part of its broader country portfolio worth USD 10.5 billion (World Bank 2020a). Multiple RE projects have also been realised through the CPEC, being rebranded under the BRI's International Green Development Coalition (BRIGC) overseen by the Chinese Ministry of Ecology and Environment (MEE).

Garnering public support will be key if the government is to press ahead with plans for carbon pricing. Pakistan ranked 120th out of 198 countries on perceived corruption in 2019 with a score of 32 (TI 2021), indicating relatively low trust in government. Its performance in regulatory quality and government effectiveness as measured on a scale from -2.5 to + 2.5 were equally low, with scores of -0.64 and -0.68 respectively (World Bank 2021). These indicators underline the importance of careful policy design and capacity building to ensure the instrument's effectiveness and compatibility with Pakistan's socioeconomic objectives.

2. Legal dimension

Pakistan is a federal parliamentary republic whose provinces are represented equally in the Senate (upper house) and according to size of the population in the National Assembly (lower house). Executive power lies with the national cabinet, consisting of the national ministers and headed by the prime minister. Imran Khan's centrist Pakistan Tehreek-e-Insaf (PTI) party secured 156 seats out of the 342-member National Assembly in the general election of 2018 and has since led a majority government with five small coalition parties. Pakistan's constitution was reformed in 2010 through the milestone Eighteenth Amendment Act 2010 that reverted presidential powers previously attained under alternating periods of military rule to the parliament and the prime minister's office.[44] The Act vests substantial autonomy with the

[43] Aleluia, João, Syeda Hadika Jamshaid and Nicolas Muller. 2019. Study on the Introduction of Carbon Pricing Instruments in Pakistan. UNFCCC Regional Collaboration Centre – Bangkok, July 2019.

[44] Including the power to dissolve parliament that was previously exercised by the president. For a summary of the changes to Pakistan's constitution, see Hussai & Kokab (2012).

provinces modelled on the principle of dual-federalism. 17 ministries (including on planning, industry, food, agriculture, education, rural development, and social services) were devolved to the provincial level accompanied by fiscal decentralisation and an expanded tax base that includes environmental charges (Shah 2012). Sub-national governments are empowered to enact energy and climate policy in their jurisdiction although in practice decision making power in these areas is shared with other provinces and the federal government[45] (Shah 2012; Aleluia, Jamshaid and Muller 2019). Carbon pricing in Pakistan will hence need to be established through multi-level governance building on support from provincial authorities.

The Federal Ministry of Energy (MoE) and Ministry of Climate Change are responsible for national policy strategy and coordination. Generally, climate adaptation is seen to take priority over mitigation rationalized by the disproportionate climate impact Pakistan is facing relative to its emissions.[46] That said, the government has also increasingly positioned itself on a mitigation response in recent years. Environmental regulation in Pakistan dates to the 1980s and was consolidated with the creation of a legislative and institutional framework through the Pakistan Environmental Protection Act in 1997. The MOCC was established in 2012 after the environment ministry had been devolved to the subnational level the year before. Shortly after its launch, the MOCC released the National Climate Change Policy 2012 (NCCP), providing an economy-wide blueprint for adaptation and mitigation measures that included a carbon tax on electricity generation as one of the options to be considered. The strategy also reserved a role for increased exploitation of domestic coal resources, underlining the challenge of meeting the country's soaring energy demand. Climate priorities were reiterated in Pakistan's long-term growth strategy of 2014, titled Vision 2025, raising climate change on the political agenda to a national cross-cutting issue.

Emission reduction targets have been set through Pakistan's NDC (2016), which projects a nearly fourfold increase in emissions between 2015-2030 to reach 1603 $MtCO2_e$ by the end of the decade, while peak emissions are expected farther beyond 2030. Pakistan has committed to reducing emissions by up to 20% compared to BAU emissions by 2030 subject to the availability of international funding estimated at 40 billion USD.[47] To this end, the government adopted the Pakistan Climate Change Act, 2017, which enabled an institutional climate infrastructure to be developed consisting of: 1) a Climate Change Council consisting of government executives headed by the prime minister; 2) the Pakistan Climate Change Authority ("Authority") comprising members across ministries and provinces appointed by the prime minister and tasked with formulating and implementing policy mechanisms to advance Pakistan's low-carbon agenda, advising the government and creating a GHG registry; 3) a Climate Change Fund to be funded with donations, endowments or grants in support of low-carbon investment, adaptation measures, and research. The creation of delineated responsibilities through these newly established government bodies improves Pakistan's institutional readiness in implementing carbon pricing. High-profile legislation has further been enacted in the areas of energy efficiency (Energy Efficiency and Conservation Act 2011, 2016) low-carbon energy (Alternative Energy

[45] Electricity has been entrusted with the Council of Common Interest (CCI), a federal-provincial body reinvigorated since the constitutional reform of 2010 that holds decision-making power in key policy areas including railways, minerals, oil and natural gas and industrial policy, amongst others (Shah 2012). Furthermore, federal regulations continue to apply in devolved policy areas until alterations by the competent authority have been made. See Article: 270AA "Declaration and continuance of laws etc.".

[46] In the Global Climate Risk Index 2020, Pakistan ranks 5th on countries most affected by climate change since 1999 (Eckstein et al. 2020).

[47] The government of Pakistan has not yet released updated GHG data post 2015.

Development Board Act 2010; Pakistan Council of Renewable Technologies Act 2010), as well as in climate adaption.[48]

Strong legal institutions that protect market participants' property rights are an important condition for carbon pricing. According to the Global Competitiveness Index, Pakistan's judicial independence has declined in the years prior to 2018, ranking 80 th globally in that year (WEF 2019). This finds support in other indices, which report a weak performance on the rule of law and the judiciary being politicised often aligning with the military on crucial matters (Miller et al. 2020).

3. Economic dimension

Pakistan is a lower-middle income country with 217 million inhabitants and a per capita income of USD 4,898 in 2019 when measured in current international dollars. The economy has grown consistently over the past decades though be it with fluctuating rates ranging between 1.0% and 7.5% since the turn of the century. While Pakistan's export-led growth strategy starting in the late 1980s has boosted total export value, growth rates lag behind some its East Asian neighbours reflecting a lack of diversification to higher value-added products, also within the export dominant textile industry (Hamid, Nabi and Zafar 2014). The share of exports of total GDP has been declining gradually, while the share of imports has risen (10.1% and 20.3% in 2019 respectively) on the back of an overvalued exchange rate and high defence spending.[49] As a result, Pakistan has had to deal with a growing current account deficit, compounded by a financing gap partly attributed to security challenges, recurring electricity shortages and regulatory hurdles (e.g., corruption, weak contract enforcement) that have adversely impacted investor confidence (Doing Business 2020).[50] Multilateral creditors have stepped in to provide budget support as recent as 2019 when the IMF agreed on a USD 6 billion bailout accompanied by fiscal restructuring, exchange rate corrections, and energy sector reforms, amongst others (IMF 2019). The bailout is expected to catalyse additional funding of approximately USD 38 billion from key partners such as the World Bank, the Asian Development Bank, China, the UAE, Saudi Arabia and Qatar several of whom have since confirmed their financial support.

Pakistan's economy contracted 1.5% in FY20 due to COVID-19—the first contraction for decades—while consumer price inflation increased following higher energy tariffs, food prices, and a weaker currency (World Bank, 2020). Pakistan recorded a moderate current account surplus early in 2021 supported by increased inflow of remittances and multilateral financing, while the trade deficit grew. The economy is expected to recover from 2021 onwards with gradually rising growth rates up to 3.4% in 2023 (World Bank, 2021). Costs of capital are relatively high with the central bank's policy rate having ranged from 5.8% to 13.3% in recent years (World Bank, 2020; Focus Economics, 2020). In this environment, carbon pricing can contribute to creating the necessary long-term investor certainty on low-carbon technologies especially when complemented by de-risking measures. The State Bank of Pakistan has provided subsidized loans for low-carbon projects (Malik et al. 2018), which would support the effectiveness of a carbon pricing instrument.

Inequality in Pakistan is moderate, and low compared to the region, but inflation, high shares of low-income groups and a large informal economy are persistent features that would need to be carefully considered in a carbon pricing mechanism. Pakistan's abundant labour force has meant

[48] For an overview, see Grantham Research Institute: https://climate-laws.org/legislation_and_policies?from_geography_page=Pakistan&geography%5B%5D=134&type%5B%5D=legislative

[49] World Bank Data, 2021.

[50] According to the same study, Pakistan has, however, substantially improved on bureaucratic efficiency and transparency in recent years.

that employment is relatively high in industry where most emissions are concentrated (table). The sector has not yet surpassed agriculture in terms of employment, the latter providing jobs to more than one-third of the working population albeit declining as the economy industrialises further. Employment is highest in the services sector at 39%. Excluding agriculture, 71% of the workforce is employed in the informal economy, which has remained fairly constant between 2006 and 2018 (PBS 2019). With a such large level of informality, upstream application of carbon pricing may increase the reach of the carbon price signal and reduce the MRV and enforcement burden. Measures that buttress labour market flexibility can furthermore ensure an efficient re-allocation of workers and mitigate unemployment pressure as the Pakistan economy transitions towards lower carbon production.

Pakistan has sizeable fossil fuel reserves (oil, shale gas) that are frequently updated through exploration activities and the discovery of new fields.[51] It produced 95 thousand barrels of petroleum per day in 2015 up from 70 thousand in 2011 but far below daily consumption of ~505,000 b/d in 2015 (BP 2020; EIA 2016). International oil companies (IOCs) such as ENI and Shell, as well as the Hong Kong listed United Energy Group Limited (UEG) are active in oil and gas production activities in Pakistan working by means of concession contracts and joint ventures with Pakistan's state-owned oil companies. The Pakistan military, with commercial assets in the economy worth over USD 100 billion, has recently also moved into oil and gas (Shakil 2019). The government has aimed to become self-sufficient in oil production, but several failed exploration activities have so far made this goal unattainable. Nonetheless, ramped up production may be expected in the coming years which would help reduce Pakistan's fiscal deficit and import dependency but may potentially affect the stringency and scope of a carbon pricing instrument, if adopted.[52]

There is significant potential for a carbon price to support abatement opportunities in Pakistan's electricity sector —be it within certain structural constraints. The sector has been dealing with several interrelated challenges in recent years namely: increasing electricity demand, high losses in transmission and distribution (T&D), limited financial resources of the National Transmission and Despatch Company (NTDC), and subsidised electricity rates (IRENA 2018; IMF 2019). Taken together, these have left a supply-demand gap leading to frequent load shedding and electricity shortages. The dire financial situation of the electricity sector is reflected by the accumulation of debt on distribution companies as a result of unpaid government subsidies with cascading effects throughout the supply chain (known as circular debt in Pakistan) approximating USD 4.5 billion (Tauhidi and Chohan 2020).[53] Under a carbon price, pass through of carbon costs down to the end consumer must hence be guaranteed to avoid further accumulation of debt —and ensure the full effectiveness of the price signal. Low-

[51] For example, see Sana Jamal in Gulfnews, July 2020: https://gulfnews.com/business/energy/pakistan-confirms-large-oil-and-gas-discovery-in-khyber-pakhtunkhwa-province-1.1594966345877

[52] The government plans to attract 5 billion USD in FDI in the oil and gas sector through its Public Sector Development Program (Nasir 2020).

[53] Several issues have resulted in low-cost recovery rates of generation units averaging 76%. Starting with the government not having borne the full costs of its energy policy, debt has accumulated in the supply chain from the NTDC (single buyer) cascading upstream to the point where fuel producers have had to cut delivery in some cases, aggravating energy security challenges. Several causes lie at the root of the issue, including T&D efficiency losses, electricity theft, delayed compensation for subsidized retail tariffs, and discrepancies in the tariff structure itself, as well as higher costs from fuel imports along with a shift to thermal generation that started in the 1980s (Tauhidi and Chohan 2020). The sheer size of the debt has evolved into a macroeconomic issue, which took centre stage in the IMF's recent bailout package where it pushed for higher electricity tariffs —which have since been revised upward.

income groups can be shielded from the effects of the electricity price increases with targeted redistribution of revenues through amendments of the current tariff policy.[54]

The existence of a new coal fleet will limit the role of the carbon price in incentivising an early coal phase out due to the high costs involved, guaranteed minimum offtake specified in long-term contracts, and broader sectoral challenges identified above. However, as electricity demand growth continues, a carbon price can accelerate declining conventional generation shares by tapping into the country's vast renewable energy potential outgrowing conventional assets and replacing the planned retirement of 10GW thermal capacity in the next 15 years (World Bank 2020b).[55] It can do so thanks to a market design that makes the integration of a carbon price relatively straightforward.

Pakistan's electricity market is partially unbundled with limited competition in generation and a single buyer of electricity.[56] The government has retained significant ownership in the generation segment (GENCOs), and full ownership in T&D (the grid operator and single buyer, NTDC; 10 regional distributors, DISCOs). The regulator, NEPRA, is responsible for tariff setting and allows generators to choose between a cost plus and upfront feed-in-tariff mechanism where variable renewable energy (VRE) projects are increasingly awarded through competitive tenders (IRENA 2018). The NTDC updates the tariffs on a quarterly basis for adjustments in fuel costs and ranks generators according to lowest variable cost where nuclear, hydropower and VREs are designated as must-run capacity (NTDC, 2021). With administered prices the pass through of carbon cost is not guaranteed. However, the fuel cost adjustments could provide an avenue for internalising environmental costs at regular intervals and minimal regulatory burden, hence enabling merit order effects and preserving the long-term incentive for low-carbon investment. Proper attention would need to be given to the flexibility underlying Purchase Power Agreements (PPAs) for thermal generators, which fix annual capacity factors that may take precedence over economic dispatch considerations.[57] Market reforms were introduced in 2018 aiming to establish competitive wholesale and retail markets (NEPRA 2020), which would further support the effectiveness of a carbon pricing instrument once completed.

Pakistan has been an early supporter of low-carbon electricity generation. The Alternative and Renewable Energy Policy 2006, updated in 2011, aimed to attract private investment through guaranteed offtake, insurance against unforeseen events, tax exemptions, the possibility to generate carbon credits, and for prosumers, net-metering. The policy has recently been updated with The Policy for Alternative and Renewable Energy, 2019, which explicitly aims to replace conventional capacity with low-carbon sources of supply to achieve the government's target of 30% renewable energy generation by 2030 while lowering costs through competitive bidding for renewable capacity procurement (GoP 2019).

4. Technical dimension

Pakistan's ambition to introduce carbon pricing will require technical capacity, such as the ability to measure and report emissions. The government submitted its second national

[54] Electricity consumers in Pakistan are grouped into residential, industrial, commercial and agriculture and are charged through incremental block tariffs with time-of-use pricing. That is, rates rise progressively with demand and are higher during peak hours (IRENA 2018).

[55] Pakistan has nuclear power, large hydropower capacity with the potential for further additions, and a favourable geography to both solar PV and wind power.

[56] Liberalisation of the electricity sector started in the 1990s by opening the generation segment to the private sector managed by the then newly established Private Power and Infrastructure Board (PPIB) (1994) part of the Ministry of Energy - Power Division; the creation of an independent regulator (the National Electric Power Regulatory Authority, or NEPRA 1997); and the unbundling of the main utility through the WAPDA Ordinance (1998).

[57] Capacity factor is the ratio between generation output and maximum output capacity over a certain period.

communication on climate change to the UNFCCC in 2018, in which it identifies the development of an MRV system as a short-term priority (MOCC 2018). It did so as well in the 2013 implementation framework for climate change (GoP 2013). Further progress in this area is needed, also illustrated by outdated GHG reporting dating back to 2015.

Prior experience with market-based instruments may provide a useful starting point for the implementation of a carbon price. Examples in Pakistan include ongoing work for establishing monitoring activities in the context of REDD+, the use of international carbon crediting mechanisms (mainly CDM) for low-carbon projects, as well as the use of competitive tenders for renewable energy procurement. The government had approved 76 host country projects by the end of 2018, 36 of which have been registered by the CDM Executive Board (Ayaz, n.d.). Project activities have also been registered under the Voluntary Carbon Standard (VCS) and Gold Standard though these are fewer compared to projects under the CDM framework. Pakistan also participates in the UNFCCC's Nationally Appropriate Mitigation Action (NAMA) programme. However, in the absence of sufficient funding for NAMA projects, interest in the scheme has waned in recent years (Aleluia et al. 2019).

Pakistan is not participating in the PMR/CPLC. A capacity building strategy, possibly with support of international partners such as the PMI, ICAP, CI-ACA, or GIZ, can spearhead the development of an operational infrastructure building on the government's newly established climate framework and substantial human capital. Updates in these areas are expected to be coming soon.

5. Multilateral dimension

As a middle power situated at the junction of Central, West and South Asia, as well as alongside major trade routes, Pakistan has been of key strategic importance to the region. Economic integration has improved substantially as part of trade liberalisation over the past decades. Pakistan has been a WTO member from the start (1995), is a member of the South Asian Association for Regional Cooperation (SAARC) and a signatory country to the South Asian Free Trade Area (SAFTA) that came into effect in 2006.[58] It has established multiple bilateral trade agreements since the 2000s with key partners including the EU, US, and China which are its major export markets in that order (WTO 2021).[59] Although tariff duties on industrial and agricultural goods have been greatly reduced, on par with emerging economies in the region (Khan 2017), tariffs and economic openness more generally remain well below that of industrialized economies (WTO 2015).

Pakistan's participation in regional institutions can serve as useful entry points for multilateral cooperation on climate change. The Economic Cooperation Organisation (ECO) that was founded in 1985 by Pakistan, Iran and Turkey aims for far reaching economic integration and sustainable development of its member countries through policy alignment. ECO expanded its membership in 1992 to encompass the Central Asian jurisdictions, as well as Afghanistan and Azerbaijan. In the Vision 2025 (2017), ECO identified six strategic areas including trade, connectivity, energy, and the environment and committed amongst others to aligning and integrating electricity markets, promoting renewable energy, the creation of an ECO Clean Energy Centre, and joint regional projects on climate/biodiversity. Pakistan has held good relations with Kazakhstan and Turkey, both ECO members with carbon pricing instruments in place and under consideration, respectively.

[58] Signatory countries are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

[59] Pakistan also has preferential trade agreements with Indonesia, Iran, Malaysia, Mauritius and Sri Lanka.

To the east, the intensification of Sino-Pakistan ties culminating in the USD 60 billion CPEC could provide an impetus for the adoption of carbon pricing, recently illustrated by the government's aim to supply offsets to the Chinese carbon market (ICAP 2019). CPEC has not been untroubled, however, with investments having stalled more recently as both parties review their commitments after several setbacks, leading the Pakistan government to hand oversight of the project to the military (Rehman and Walker 2020). Given the weight of CPEC, its success may well impact the feasibility of China-Pakistan climate cooperation going forward.

Regional political stability will be important for the success of multilateral cooperation with regards to carbon pricing. Pakistan-India ties are at a low with increasing violations of the 2003 cease fire agreement on both sides (CFR 2021), having deteriorated further since the nationalist turn of Prime Minister Modi's government and its revocation of the special status of Jammu and Kashmir. In addition, the 2640-kilometre-long border with Afghanistan has been a frequent site of conflict between Pakistan security forces and the Tehrik-i-Taliban Pakistan that maintains links with al-Qaeda. In Afghanistan, initial prospects for peace in the aftermath of the U.S.-Taliban agreement in February 2020 have been dashed by a continuation of domestic conflict, in which Pakistan has been embroiled by tacitly supporting the Afghan Taliban largely aimed at countering India's influence in the region (DoD, DoS and USAID 2020).

6. Carbon pricing readiness and options

The recent uptick in climate ambition and progress in assessing the potential for establishing a carbon market bodes well for carbon pricing in Pakistan. A new legislative framework for climate change and an energy sector conducive to market-based instruments are further indicators that carbon pricing can be successfully introduced with tangible impact. However, the so far limited progress in technical capacity, the political priority to increase domestic oil and gas production, as well as political unrest at the borders can limit its support and feasibility.

Pakistan has highly favourable endowments for a balanced low-carbon power mix that can drive the energy transition forward. Large unexploited hydropower potential, the presence of wind corridors and ample solar radiation, next to existing nuclear and gas capacity can provide the country with a reliable mix of dispatchable and variable low-carbon energy. The unbundled electricity sector, least-cost dispatch principle, and ongoing market reforms indicate high sectoral readiness for a carbon price given that prevailing financial woes and payment integrities are addressed and ameliorate in the coming years.

The creation of the National Committee on Establishing Carbon Markets, the recently announced halt to additional coal power, and updated renewable energy policy framework demonstrate that the government is serious about climate change. By promoting the development of domestic low-carbon energy sources, a carbon price can help address the country's high reliance on energy imports, structural fiscal and current account deficits as well as recurring energy shortages, challenges which have also given rise to calls for increased oil and gas production (despite having plateaued so far). Resistance against carbon pricing may arise from this area, and potentially from the Pakistan Army, which has large commercial interests in the economy and has recently moved into oil and gas. A disproportionate share of FDI in Pakistan's now sizeable coal fleet will also require careful attention as to how such interests may impact climate policy going forward.

The Climate Change Act (2017) sets clear responsibilities and devotes institutional resources that provide the foundation for the introduction of a carbon pricing instrument. Yet, weak protection of property rights and a judiciary that is perceived to align by and large with the military is a limiting factor. This may also hold true for Pakistan's federal structure, which could

entail a risk of sub-national authorities yielding to opposing interests of local actors while obstructing efforts initiated at federal level.

Pakistan can benefit substantially from regional experiences with carbon pricing through international institutions in which it has played a prominent role. These include to the north, Kazakhstan, to the east, China, and to the west, Turkey, with whom an FTA is being discussed that could provide a basis for further alignment on climate policy.

Considering Pakistan's domestic development priorities and market regulations, an ETS or hybrid instrument has been favoured over a tax. The flexibility that comes with an ETS aligns well with ongoing electricity market liberalisation and the need to improve the economic competitiveness of sectors that would be covered under a carbon price. Establishing an ETS requires high technical capacity. The way forward for the introduction of carbon pricing in Pakistan therefore starts with accelerating progress in this area by taking concrete steps towards establishing a fully operational MRV system.

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A.9 Philippines Factsheet

Philippines			
Overall		**Political**	
Capital	Manila	**Electricity from fossil fuels**	80% of total generation (2018)
Govt structure	Presidential republic	**Brown lobby**	PNOC; Oil and gas department DOE; Petroleum Association of the Philippines
GDP **GDP per capita**	USD 1,005.7 billion (2019) USD 9,302.4 (2019)	**Green lobby**	PE2; Green party; environmental NGOs
Population	108.1 million (2019)	**Perceived corruption**	Score=34 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Department of Finance; Department of Transport; Climate Change Commission; National Economic and Development Authority.	**Income group**	Lower-middle income
Key legal instruments	Climate Change Act; Renewable Energy Act; Low Carbon Economy Act	**Gini index**	44.4 (2015) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	RPS; FiT; green energy auctions; net-metering	**Importance of industry**	30.2% of GDP (2019) Employment: 20% of total (2020) CO2 emissions: 70.5% of total (2018)
FDI	2.0% of GDP (2019)	**Fossil subsidies**	3.65% of GDP (2017)
		Electricity market	Liberalised

Philippines			
Technical		**Multilateral**	
MRV status	Under development	**Openness**	69% of GDP (2019)
UNFCCC reporting	No biannual updates submitted	**International agreements**	WTO (1995); ASEAN (1967); RCEP (2020)
Experience with carbon markets	JCM, CDM	**NDC**	GHG emissions 75% below BAU by 2030 of which 72.29% conditional (NDC)
Participation in WB initiatives	PMR Technical Partner; Not a CPLC Partner	**NDC assessment**	CAT assessment not yet available for updated NDC

Carbon pricing readiness and options

- The Philippines is considering adopting an ETS, legislation for which is currently being reviewed by congress. If adopted, the ETS would complement an elaborate policy framework comprising a renewable portfolio standard, FiT, priority dispatch for renewables and recently increased fuel taxes, amongst others.
- The Philippine electricity sector is liberalised and well placed to adopt a carbon pricing instrument. Coal has become the largest fuel source in recent years. The young age of the fleet will limit opportunities for an early coal phase out.
- The Duterte Administration's push for constitutional reform to create a federal is currently unlikely to materialise but would have a major impact on the legislative process, including establishing new constituencies, that could shift the opportunities for the introduction of a carbon pricing instrument.
- Going forward, improving technical capacity for the creation of an MRV system and fully functional national inventory will need to be prioritised.

1. Political dimension

Thanks to sustained economic growth in the past decade, the Philippines is projected to be transitioning from lower middle-income to upper-middle income country in the coming years (World Bank 2020). Increased GDP accompanied a near doubling in electricity consumption between 2003-2019 mostly met through coal power with annual output by this source having nearly quadrupled during the same period. In 2019, fossil fuels contributed for 80% (and coal for 55%) of total electricity generated (IEA 2021). New coal plants are still being built, adding more than 4 GW of capacity to the grid in the next years and increasing total coal power capacity by at least 40% (DOE 2020). The heavy reliance on coal and the young fleet may increase resistance to carbon pricing given the risk for affected profit margins.

Despite this trend, the government headed by President Rodrigo Duterte has recently doubled down on its support for a low-carbon pathway, which now includes a moratorium on additional coal power, new renewable support mechanisms, and a bill that would pave the way for an ETS to be established. Increased climate ambition should be seen against the background of soaring energy demand and a growing trade deficit in energy that have rendered energy diversification and the promotion of indigenous energy resources into national priorities. In this vein, the Philippine Energy Independence Council (PEIC) was created in 2019 to provide a platform for stakeholders from the private and public sectors to tackle the national energy conundrum by increasing the production of both clean and fossil energy resources. Calls for ramping up fossil-fuels production have come from the Petroleum Association of the Philippines (PAP), amongst

others (Shell 2018). The state-owned Philippine National Oil Company (PNOC) is a key actor in the fossil fuel industry that engages in exploration and extraction of domestic oil, gas, and coal resources in collaboration with multinational oil majors. Limited reserves and production levels have so far prevented the rise of an entrenched export-oriented fossil fuel lobby (Guild 2019). Yet, the untapped reserves in the Reed Bank, partly claimed by China, are estimated to hold 11 billion barrels of oil and 5.4 billion cubic metres of natural gas. Further development of these could shift the energy dynamics in the Philippines going forward (EIA 2020). Fossil fuel interests may delay the adoption or reduce the stringency of a carbon pricing instrument. However, international experience has also shown that both can co-exist and even be complementary where low-cost gas enters the market replacing coal.

Renewable energy is the second largest electricity source and is set to dominate long-term capacity additions (DOE 2020), providing a solid business support base for carbon pricing. Numerous environment and climate consulting firms, companies providing energy efficiency services as represented by the Philippine Energy Efficiency Alliance (PE2), the Green Party,[60] as well as environmental NGOs hosted or active in the Philippines are likely to shape policy discussions in favour of a low-carbon agenda.

The successful introduction of carbon pricing often requires broad public support. In this respect, the high existing electricity prices in the Philippines may be a constraining factor, being among the highest in the region due to imported fuel costs, inefficiencies stemming from an overreliance on baseload coal, and significantly lower subsidies compared to neighbouring countries (Ahmed 2020). While high electricity prices can limit public support for a carbon price, tariffs reflecting costs along with a credible long-term policy framework were two key success factors of the government's FiT introduced in 2012 that delivered high growth rates in renewable energy capacity (Guild 2019). Country studies have also underlined the potential for increased renewable uptake to reduce electricity prices (Ahmed 2020), which can be supported through a carbon pricing instrument.

While overall purchasing power has consistently increased over the past years, its benefits have often not been widely shared. Corruption and cronyism have been pervasive across the government and are seen to have increased under the Duterte Administration despite strong anti-corruption rhetoric (Miller et al. 2020). In Transparency International's global ranking on perceived corruption of 2019, the Philippines dropped from 99th to 133rd (TI 2020). In this context, clear communication by the government on carbon pricing and addressing its distributional consequences will be key to garnering public support.

The Philippines is a constitutional republic that gives large decision-making power to the president who is limited to a single six-year term. Politics has been dominated by elite families that hold considerable sway over the legislative process, judiciary, and public resources. Elite-dominated policy making has made the political system prone to special interests and regulatory capture to the detriment of state capacity (Timberman 2016). The Philippines has experienced incremental democratic backsliding under the current leadership that has been most visible in the erosion of human rights and democratic checks and balances. Despite such challenges, democracy continues to enjoy high support with core principles such as political competition, constitutionalism, an independent media and civil society being firmly rooted in Philippine society (Timberman 2019).

[60] Active in regions with the ambition to become a national party. See https://www.greenparty.ph/

2. Legal dimension

Local government in the Philippines is divided into three successive tiers of administration: provinces and independent cities, municipalities, and the barangay. Bangsamoro is the sole autonomous region situated in the southern and predominantly Muslim island Mindanao. Following the ousting of the Marcos regime in 1986, a new constitution in 1987 allowing greater local autonomy within the unitary system was adopted. The Local Government Code of 1991 devolved several functions to local authorities, including local environmental management (Diokno 2012), but excluding energy and climate policy which have remained central competencies. Recent years have seen a revival of discussions surrounding constitutional reform with President Duterte advocating a federal system. To this end, the Consultative Committee submitted a revised draft constitution to the Administration in 2018 that is currently being discussed in congress. The reform would be subject to a national vote if adopted by both houses but is considered unlikely. If adopted, it would yield substantial economic autonomy and fiscal powers to the regions and likely rewire the legislative framework for carbon pricing.

The Philippines has adopted several flagship climate and low-carbon laws over the years that have forged institutional arrangements that will likely facilitate the introduction of carbon pricing. It was one of the first countries to establish a committee on climate change, dating back to 1991 and in the 2000s replaced by an executive level task force and advisory office (Andreas et al. 2008). With the enactment of the Climate Change Act in 2009 the government took legally binding steps in mainstreaming climate change in policy making, overseen by the newly formed Climate Change Commission (hereafter 'Commission'). This kick-started subsequent policies, such as the National Framework Strategy on Climate Change (2010) and the Climate Change Action Plan (2011) which identified strategic priorities and established a national roadmap for mitigation and adaption measures — the latter being emphasised given the country's high exposure to climate risk. The Philippines submitted its INDC in 2015 and ratified the Paris Agreement (PA) in 2017. It submitted its first NDC in 2021, aiming for a national reduction of 75% below baseline emissions by 2030—72% being conditional on support under the PA—and committing to reach peak emissions by the end of the decade.

In the energy sector, the Electric Power Industry Reform Act (EPIRA) was promulgated in 2001 aiming to restructure the electricity sector and establish energy markets (section 3). Major low-carbon laws are the Biofuels Act (2006), Renewable Energy Act (2008) and the Energy Efficiency and Conservation Act (2019) which have prompted a set of elaborate policies in support of climate mitigation. These will work alongside an ETS, legislation for which (the 'Low Carbon Economy Act' House Bill (HB) No. 2184) was conditionally adopted in 2020 and is currently undergoing technical review.

FDI comprised 2% of GDP in 2019, or USD 5 billion, well below the Central Bank's annual target (UNCTAD 2020). The majority of FDI (56%) went to the information and communication sectors. However, a combined 35% went to the electricity, gas and manufacturing sectors, some of which would be covered by a carbon pricing instrument (Santander 2021). The Philippines' constitution restricts foreign ownership of land and strategic assets (such as domestic energy resources) to 40%, thereby requiring international companies to establish joint ventures or operate through public-private partnerships. In principle, these arrangements do not preclude foreign investors from taking legal action (Pentsov 2017) against decarbonisation measures and could act as a barrier against the introduction of carbon pricing.

3. Economic dimension

The Philippines had a GDP of more than USD 1 trillion in 2019 when measured in purchasing power parity terms. Inequality, reflected by a score of 42.7 on the Gini index, is among the

highest in the region but has gradually decreased over the years along with declining poverty rates (World Bank 2020). In his presidential campaign, Rodrigo Duterte pledged to combat inequality and boost inclusive economic growth, which considering his broader populist rhetoric was initially expected to prompt interventionist economic policies. However, the government has remained firmly committed to a liberal market economy, most recently reflected by a corporate tax reduction to attract foreign investment (Venzon 2021). Moreover, fiscal consolidation has enabled a margin for debt financing used by the government to provide support to businesses and society affected by the economic impacts of COVID-19 (World Bank 2020). Tax reform has been a pillar of the administration's economic policy and has included income tax cuts, direct cash transfers to low-income households, and tax increases on fuels, beverages, tobacco, and imported energy sources such as coal and oil (DOF 2018). Where the corporate tax cuts can support trade exposed companies' competitiveness under a potential future ETS, increased taxes on primary energy can complement it to shift investment and consumption away from fossil fuels.

The tax reforms are instrumental in financing the government's flagship national infrastructure investment programme termed unequivocally 'Build! Build! Build!' (BBB).[61] Lacking or outdated infrastructure is widely seen as an impediment to continued economic growth in the Philippines (IMF 2020), which the programme targets by launching major construction projects in air, rail, and road transport —currently evaluated with a view to including emerging priorities such as health and digital infrastructure (de Vera 2020). Given the scope and ambition of the program, there are latent opportunities to accelerate the development of low-carbon infrastructure across the country which could complement and facilitate abatement under a carbon pricing instrument.

Industry at large, including the energy sector, accounts for a disproportionate share (71%) of national emissions compared to its share in employment (20%) and GDP (30%) (table).[62] Contrary to large exporting economies in the region, the Philippines has typically run a moderate trade deficit. That said, manufactured goods comprise the bulk of the country's exports (83%) mostly consisting of machinery equipment and electronics (WTO 2018). Given the economic weight and future growth potential of these sectors, ensuring their competitiveness under a carbon pricing instrument is important. Targeted transitional provisions under an ETS, such as free allocation of allowances, can complement the corporate tax cuts in limiting competitiveness concerns for trade-exposed industries but would restrict the revenue raising capacity of the government.

69% of total primary energy supply in the Philippines came from fossil fuels in 2018. Biofuels and waste, hydroelectric energy, geothermal power and —to a considerably smaller degree— wind and solar, constitute the low-carbon elements in the energy mix (IEA 2021). Most fossil fuel subsidies have been phased out with liberalisation efforts that started in the 1990s – including the replacement of the Oil Stabilisation fund for market-based pricing. Incentives continue to exist for domestic oil and gas production, and some minor subsidies remain in the electricity sector in support of marginal groups, however the larger subsidy costs (e.g., to IPPs by means of take-or-pay contracts) have been eliminated with the introduction of market reforms since 2001 (Mendoza 2014).

Electricity market liberalisation started in the Philippines with the implementation of EPIRA in 2001. To this end, the Energy Regulatory Commission (ERC) was established which jointly with the Department of Energy (DOE) oversaw the full unbundling of the electricity sector. It also

[61] See http://build.gov.ph/

[62] The services sector accounts for approximately 60% of GDP, followed by agriculture with less than 10%.

managed the transition towards electricity trading in the newly formed Wholesale Electricity Spot Market (WESM) since administered by an independent market operator. Additionally, the National Electrification Administration (NEA) promotes rural electrification by supporting electric cooperatives in providing electricity to remote areas. Regulated investor-owned utilities distribute and supply electricity to other end-consumers charging cost reflective rates plus wheeling charges (i.e.. reasonable rate of return policy) that are set by ERC (ADB 2018). Larger consumers have the option to directly negotiate contracts with registered retail suppliers without interference from the regulator. The Philippines has the most liberalised electricity sector in the region and is particularly suited to adopt emissions trading as cost pass through along the supply chain can be assumed. Moreover, market participants are already accustomed to the trading mechanism.[63] Yet, high electricity prices and their income effects will require careful consideration when introducing a carbon pricing instrument.

Geography is important in assessing structural market factors in the Philippines. Consisting of more than 7000 islands, the country has three separate electricity grids that span the three large island-regions (Luzon, Visayas, Mindanao). The fuel mix differs across these regions, gas infrastructure being present in the largest Luzon network, but absent in the others, which will have an impact on short-term abatement options under a carbon price. Coal is the (second) largest fuel source for generation in each of the regions (ADB 2018). As for the age of the fleet, most of the coal assets have been commissioned post 2010, with some older units dating back to the 1990s and 2000s (DOE 2021b). With a few notable exceptions, the early decommissioning of coal-fired power plants under a carbon pricing instrument would likely be unfeasible, retrofit investments forming the crucial next in line abatement option.

Renewable energy support is provided through the Renewable Energy Act (2008) and the National Renewable Energy Programme (NREP). The latter provides a blueprint for RE development during 2010-2030, targeting a near triple increase in overall RE capacity (DOE 2011). The government has introduced a range of instruments including a renewable portfolio standard for conventional producers, a feed-in-tariff scheme and several tax exemptions for RE producers as well as net metering for prosumers. Renewables are further supported through priority dispatch, ensuring their utilisation; an important criterion for electricity sector abatement under a carbon pricing instrument. The Department of Energy signalled in 2020 that it would launch green energy auctions, thereby joining countries around the world in adopting market-based mechanisms for least-cost renewable energy procurement.

4. Technical dimension

The Philippines has made significant strides in its ability to monitor and report emissions. It has submitted two National Communications and an INDC to the UNFCCC, which were assessed to be of high quality (Umemiya et al. 2017). The Philippines has benefitted from the UNDP low-emissions capacity building Programme (LECB PHL) of 2012-2014 in which sectoral MRV templates based on CDM methodologies were developed. An Executive Order in 2014 institutionalised a national system for GHG inventory management and reporting ("PGHGIMRS"), overseen by the Climate Change Commission (President of the Philippines, 2014). Under this reporting framework, the Departments of Agriculture, Energy, and Transportation are responsible for data collection in their respective sectors, the Department of Environment leading data collection in the waste, industrial processes, forestry, and land-use sectors. Despite such progress, the latest communication (NC2) dates from 2014 while no bi-annual update reports have been submitted, indicating that additional capacity is sorely needed for the

[63] Long-term PPAs between producers and distribution utilities exist in parallel to the WESM, whose prices may be less flexible compared to energy procured through the spot market. This could have implications for the role of a future ETS and requires further assessment.

introduction of a carbon pricing instrument. This has been picked up by the Commission which has identified high turnover rates of technical personnel, limited financial resources, as well as the unavailability of some activity data as some of the key technical constraints for developing a national GHG inventory and reporting system (Recabar et al. 2019).

The Philippines has been able to capitalise on international experiences to the benefit of government knowledge and institutional capacity. It became a technical partner to the PMR in October 2017 through which policy designs for pricing instruments and an implementation plan were developed. A feasibility study in the energy and transport sectors was conducted in 2019, alongside several stakeholder engagement events, public awareness campaigns and capacity building activities (PMR, 2019). It has also worked with GIZ to support the Commission in the design and implementation of climate policy. Prior experience with market-based policies can further facilitate the implementation of a carbon pricing instrument. The Philippines has participated in CDM and JCM projects thereby improving business familiarity with crediting mechanisms (CDM 2021; JCM 2021). In 2019, the Swedish Energy Agency commissioned a virtual Article 6 pilot with the Philippines, assessing the potential for investment in ITMOs to encourage the reduction of HFC emissions in the food cold-chain (SEA 2020). Energy trading, tradeable green certificates under the RPS, and use of auction mechanisms in the electricity sector also equip the government and market participants with relevant market experience to successfully introduce emissions trading.

5. Multilateral dimension

The Philippines has held membership to the WTO since 1995, has been an ASEAN member since 1967, and is a signatory to 24 environment-related treaties (WEF 2019). It has a relatively open economy, reflected by the overall value of trade approximating 69% of GDP (World Bank 2019). In 2020, the country signed on to the Regional Comprehensive Economic Partnership (RCEP), the world's largest free trade bloc. The Philippines currently has nine free trade agreements (FTAs) in force, while three additional FTAs are under negotiation (ADB 2020). It enjoys strong trade relations with Japan, Singapore, China and the United States, all jurisdictions with carbon pricing instruments in place or under consideration (World Bank 2021). The EU is the Philippine's fourth largest trading partner—accounting for 9% of overall trade in 2018—and an important export market (EC 2020). Diversified trade relations will likely mitigate the impact of a potential future CBAM in the EU, but should other trade partners follow suit, such multilateral incentives for carbon pricing in the Philippines will likely become more pronounced.

Participation in international organisations and regional initiatives can strengthen calls for carbon pricing. For the Philippines, this is most visible in the ASEAN Climate Change and Energy Project (ACCEPT) which facilitates energy-climate policy alignment in the region and advocates carbon pricing. The initiative provides guidance to authorities through in-depth regional and country-level analyses and builds a community of practice through capacity building workshops and conferences supporting the climate ambition of its members.

Furthermore, diplomatic ties are important for multilateral cooperation on carbon pricing. The Philippines' pivot to China under the Duterte Administration, aimed at attracting Chinese investment, has substantially improved ties between the countries but latent conflicts, especially over territorial and maritime rights, remain and could resurface under a presidency with a different geopolitical outlook. So far, revived Philippine-China ties have prompted cooperation albeit on a different front: oil and gas exploration activities in the Reed Bank (Castro 2020). Nonetheless, the fact that the region's economic majors have carbon pricing instruments in place or under consideration and have committed to net-zero targets (China, Korea, Japan) will likely

shape regional discussions on carbon pricing and may well encourage further uptake in aspiring countries such as the Philippines.

6. Carbon pricing readiness and options

The Philippines is firmly committed to accelerating its low-carbon energy transition most clearly illustrated by an elaborate policy framework that may soon be complemented by an ETS if the Low Carbon Economy Act passes congress. The recently announced moratorium on additional coal investments, tax increases on imported coal and oil, and a range of renewable support mechanisms send a strong signal on the future direction of the economy. Such policies increasingly receive support from a loose coalition of civil society groups and businesses in favour of an ambitious climate agenda but could be overshadowed by renewed calls for oil and gas exploration that, if successful, can shift energy dynamics and potentially increase resistance to carbon pricing.

Two decades after the start of electricity market reforms, the Philippine power sector is one of the most liberalised in the region and well suited to incorporating a carbon price signal given a high likelihood that the associated costs can be passed through the value chain. Counter to the underlying rationale for investment in coal power, high electricity prices have stemmed in part from an overreliance on base-load supply (i.e., coal) and could be reduced with diversification into renewable energy (Ahmed 2020). In light of high electricity prices, careful policy design of a future ETS is both possible and needed to avoid regressive income effects while preserving abatement incentives.

Electricity trading, and since recently, auction procurement, will provide relevant experience for the implementation of an ETS and ease its adoption by market participants. The Philippines has been able to further strengthen its institutional know-how and technical capacity for emissions trading by drawing on international experiences and support of organisations such as the PMR, UNDP and GIZ. A well-established legislative framework for climate policy has set clear responsibilities where designated institutions, such as the Climate Change Commission, have lead implementation efforts. Despite ongoing progress, technical capacity has been a bottleneck for the creation of a fully functional and comprehensive MRV system.

While the government has halted additional coal investments, existing projects are being finalised adding more coal capacity to a young fleet which will limit incentives for divestment under a carbon price. Despite these constraints, there is high potential for a carbon pricing instrument to support mitigation opportunities in the Philippines whose increasingly elaborate legal and policy framework would ensure effective implementation once the remaining technical hurdles are addressed.

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A.10 Russia Factsheet

Russia			
Overall		**Political**	
Capital	Moscow	**Electricity from fossil fuels**	63.99% of total generation (2018)
Govt structure	Federal state	**Brown lobby**	Gazprom, Rosneft, SUEK, INTER RAO, Novatek; Russian Union of Industrialists and Entrepreneurs
GDP **GDP per capita**	USD 1699.88 billion (2019) USD 29181.40 (2019)	**Green lobby**	Hevel, Rusnano, Nord Hydro, Avelar Solar Technology, Association for the Development of Renewable Energy
Population	144.4 million (2019)	**Perceived corruption**	Score= 28 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Min. of Energy; Min. Natural Resources and Environment	**Income group**	Upper-middle-income
Key legal instruments	Electricity Law	**Gini index**	37.5 in 2018 Perfect equality/inequality = 0/100; Germany=31.9 (2016)
Related policies	National Renewable Energy Policy; Five-Fuel Diversification Policy; National Climate Change Policy	**Importance of industry**	Value-added: 32 % of GDP (2019) Employment: 27 % of total (2019) CO2 emissions: 69 % of total (2018)
FDI	1.9% of GDP (2019)	**Fossil subsidies**	1.47% of GDP (2019)
		Electricity market	Liberalised

Russia			
Technical		**Multilateral**	
MRV status	Concept on the formation of an MRV system (2015, 2018)	**Openness**	49% of GDP (2019)
UNFCCC reporting	2019 national inventory report 3rd biennial report	**International agreements**	WTO (2012); Eurasian Economic Union (2010)
Experience with carbon markets	Joint Implementation	**NDC**	Limit GHG emissions by 2030 to 70% of 1990 levels (taking into account the maximum possible absorptive capacity of forests and other ecosystems and subject to sustainable and balanced social economic development)
Participation in WB initiatives	Not a PMR partner	**NDC assessment**	Critically insufficient Refence to financial and tax measures stimulating GHG emission reductions
Carbon pricing readiness and options			

- The endorsement of emissions trading (trading of emission reduction units) by the Russian government and its inclusion in a draft law on GHG regulation; the ETS experiment in the Sakhalin region; Russia's experience with the promotion of renewable energy and the liberalisation of the electricity market; deep economic ties with countries with an ETS; and the possible introduction of a carbon border adjustment mechanism in the EU provide the foundation for the introduction of an ETS in Russia.
- However, opposition from vested interests in the fossil energy industry and the perceived threat of decarbonisation on Russia's heavy dependence on hydrocarbons, as well as the controversial Joint Implementation experience, are limiting factors.

1. Political dimension

Vested interests of carbon-intensive industries can present significant challenges for carbon pricing. Russia is one of the largest producers of natural gas, oil and coal (BP 2020), and its economy and budget are heavily dependent on the export of these fossil energies (Mitrova 2019). It is also one of the major users of fossil energies. In 2018, over 15.95% of its electricity generation came from coal and 47.31% from natural gas (IEA 2018). Crucially, thermal power plants were recently built and modernised based on Russia's capacity remuneration mechanism, and new gas-fired and coal-fired power plants are envisaged in Russia's General Scheme for the Location of Electricity Installations by 2035 (Russian Government 2017). Vested interests in the Russian fossil energy industry oppose the introduction of carbon pricing and even the reporting of GHG emissions (Kokorin and Korppoo 2013). For instance, the Russian Union of Industrialists and Entrepreneurs "opposes any limits to CO_2 emissions on the grounds that such limitations will lead to an additional tax that will be used for unclear purposes, and that it will not bring any benefits" (Paramonova 2020). The coal company SUEK was found to be "politically active in its opposition to the increased regulation climate policy commitments would bring" (Martus 2017). Furthermore, Gazprom's gasification programme and natural gas subsidies, as well as vested interests of diesel suppliers, contradict the development of renewable energy in remote areas (Boute 2016; Tynkkynen 2014; Overland and Kjaernet 2009). Resistance to decarbonisation can also be seen at the state level, and in particular in Russia's Energy Strategy 2035 that considers the promotion of renewable energy abroad as a threat to Russia's energy security (i.e., the security of demand for Russian energy resources) (Russian Government 2020; Russian President 2019; Mitrova 2019). Significant delays in the adoption and implementation of

Russia's renewable energy support scheme illustrate the opposition that low-carbon technologies, and the introduction of low-carbon regulation, face in Russia (Smeets 2017; 2018).

At the same time, the case of Russia illustrates how vested interests in the clean energy sector can, at least partly, help overcome the opposition to renewable energy in a country heavily dependent on oil and gas (Smeets 2017; 2018; Boute and Zhikharev; 2019). After more than a decade of largely unsuccessful initiatives, the development of a local solar energy manufacturing industry in Russia, backed by major Russian industrial groups, including companies with heavy interests in traditional energies (e.g., Renova Group) eventually resulted in the implementation of Russia's renewable energy support scheme (Boute and Zhikharev 2019). These companies (e.g., Hevel) benefitted from a higher return on capital that the regulation ensured to early movers and from preferential local content requirements. It is unclear if these groups, combining renewable energy and fossil energy interests, will lobby for the introduction of carbon pricing, given its constraining effect on their fossil energy activities. Besides industrial interests in green energy, NGOs including WWF and Belona have attempted to shape the debate on decarbonisation in Russia (Berdin 2017), but it is unclear to what extent these attempts have been successful in Russia's highly centralised government. Furthermore, international initiatives, including the IFC (World Bank) Russia Renewable Energy Program, aimed to promote the transition of Russian energy towards sustainability.

The public acceptability of carbon pricing depends in part on trust in the government and the population's attitude to green issues. In 2019, Russia was ranked 137th among 198 countries assessed by Transparency International for its perceived levels of public sector corruption. The level of energy prices, including electricity, heating and natural gas prices, remains a topic of high political and social sensitivity in Russia (Boute 2015). Civil unrest following energy price increases in neighbouring countries contributes to the perception that higher prices can potentially trigger political instability. The short-term impact of the clean energy transition on energy prices is one of the reasons that explains the delay in the adoption and implementation of Russia's renewable energy support policy (Boute 2015). The resistance to energy price increases could also transfer to the prospect of increased energy prices as the result of a carbon price.

2. Legal dimension

Russia is a federal state. The Russian Federation consists of 21 Republics, nine 'Krais', 47 'Oblasts', four autonomous 'Okrugs', and two cities of federal importance (Moscow and St Petersburg). The Russian Constitution establishes shared federal-regional competences for the regulation of environmental protection and ecological security, and the establishment of common principles of taxation and dues in the Russian Federation. The federal authorities have the exclusive competence to regulate the federal energy systems and, on this basis, have heavily centralised powers at the federal level. The Federal Electricity Law pre-empts electricity sector regulation, which complicates regional initiatives to promote decarbonisation in the sector, including the promotion of low-carbon energy. The regions of the Russian Federation thus face constitutional obstacles in the adoption and implementation of their own decarbonisation policies (Boute 2013). Constitutional obstacles are also likely to extend to potential regional carbon pricing initiatives, as the Russian Constitution prohibits the creation of barriers to the free flow of goods within the Russian Federation. Federal inertia, failed or insufficiently ambitious legislative attempts on carbon pricing could thus not easily be overcome with regional alternatives. Given these constitutional constraints, federal approval is necessary to adopt and implement regional carbon pricing schemes that could act as a "laboratory" for other regional schemes or a federal mechanism. In this respect, the cooperation of the Russian Ministry of Economic Development and the government of the Sakhalin region regarding the introduction of a pilot carbon trading scheme in the Sakhalin region is an encouraging sign (Russian Minister of

Economic Development 2020). A regional inventory of GHG emissions and removals should be in place by August 2021, and by April 2022 a carbon registry is expected to start operation, with the objective to begin carbon trading in July 2022. According to the Russian Minister for Economic Development, the realisation of the Sakhalin experiment will make it possible to test different ways of regulating GHG emissions and assess their effectiveness in view of broader use throughout the country (Russian Government 2021; ICAP 2021). The Nizhni-Novgorod and Kaliningrad regions are already considering the introduction of pilot mechanisms, following the Sakhalin example (Mavrina 2021).

The Russian government has introduced to Parliament, and the State Duma has approved, a draft Law on Government Regulation of GHG Emissions that, if approved by the Federation Council and signed by the President, would provide the legal basis for the introduction of "economic mechanisms for regulation regarding GHG emissions and their absorption by sinks, including a mechanism for transferring emission reductions and greenhouse absorption units" (State Dumas 2021). These "economic mechanisms" include tax benefits and the recovery of investment costs in emission reductions, as well as the trading of GHG emission reduction units. The latter trading mechanism would enable entities that exceed their regulatory limits of GHG emissions to purchase emission reduction units from project developers. If adopted, the Law on Government Regulation of GHG Emissions would thus create the legal basis for a form of carbon trading in Russia. However, the draft law remains broadly formulated and its implementation will depend on the initiative of the Russian government. The experience with Russia's renewable energy support scheme that was implemented a decade after the creation of a legal basis for the support scheme, illustrates that there can be a significant time gap between the adoption of a legal basis governing a decarbonisation instrument and its implementation (Boute and Zhikharev 2019; Kamyshanskii and Chirish'ian 2017). In addition, the integrity of the mechanism will depend on how emission reductions are calculated – a real concern considering the criticism expressed regarding the carbon integrity of Russia's Joint Implementation scheme (Kollmuss, Schneider and Zhezherin 2015).

In the absence of a Russian "flagship climate law", climate policy in Russia is governed by Presidential Orders, including the Climate Doctrine and the Order on the Reduction of GHG emissions (Russian President 2013), and Government Decrees, including the Decree on the Realisation of Measures to Improve the Regulation of GHG Emissions (Russian Government 2016). These documents do not refer to carbon pricing as climate change mitigation instrument. Furthermore, the Russian Federal Electricity Law creates the legal basis for the promotion of renewable energy sources, mainly based on capacity payments to renewable energy projects selected on a competitive basis. The Federal Energy Efficiency Law provides the legal basis for the promotion of energy efficiency improvements, including a tariff regime facilitating the recovery of investments in energy saving measures (Boute 2012). Russia's experience promoting renewable energy and energy efficiency investments is relevant for carbon pricing as it created expertise in the field of low-carbon regulation.

At the international level, Russia's ratification of the Kyoto Protocol was decisive to its entry into force (Buchner and Dall'Olio 2005). Under the Paris Agreement, Russia 's NDC aims to limit GHG emissions by 2030 to 70% of 1990 levels. The ambition of this 30% reduction target should not be overestimated. First, it takes into account the "maximum possible absorptive capacity of forests and other ecosystems and subject to sustainable and balanced social economic development." Second, Russia's emissions in 1990 were high, before the economic downturn resulting from the collapse of the Soviet Union. Third, the Russian economy is characterised by significant potential for cost effective energy savings and thus GHG emission reductions.

Furthermore, in 2013, the Russian President already committed to a 25% reduction target (Russian President 2013).

Foreign investors in the Russian thermal electricity production sector include the German energy company Uniper and the Finnish energy company Fortum. Uniper has threatened to sue the Netherlands before investment arbitration for its decision to phase out coal-fired power plants (Niemelä, van Asselt, Kulovesi and Rajavuori 2020). Although the introduction of carbon pricing is a far less severe form of interference, it is not impossible that the foreign companies could threaten legal action if the profitability of their investments is at stake, resulting in possible "regulatory chill" (Tienhaara 2018). Russia is a contracting party to many bilateral investment treaties, including with Germany and Finland (Rubins and Nazarov 2008). However, the risk of possible legal action by Uniper and Fortum against carbon pricing in Russia is limited, as carbon pricing is likely to have a much less severe impact on their investments than competitors', given the relatively high efficiency of their power plants that were built or modernised based on Russia's capacity remuneration mechanism (Boute 2015).

3. Economic dimension

Based on its significant fossil energy reserves, Russia is a major producer and exporter of gas and oil. It is also an important exporter of coal, in addition to wheat, semi-finished iron, nickel and fertilisers. Energy intensive goods constitute 30% of Russia's exports, thus exposing the country to the impact of global decarbonisation efforts and carbon border adjustment mechanisms (Henderson and Mitrova 2020). Taking into account that industrial activities contributed to 32% of GDP in 2019, were responsible for about 27% of employment, and accounted for 69 % of total emissions in 2018, the decarbonisation of the industry is likely to have important economic and social implications. According to the World Bank (2020), "a green transition could pose significant challenges for the Russian economy unless the government undertakes pre-emptive steps toward decarbonisation." Given Russia's heavy dependence on hydrocarbons, decarbonisation is likely to have a negative impact on the Russian budget, in the absence of diversification of the economy (Mitrova 2020). However, Russia's Energy Strategy until 2035 continues to place fossil energy resources at the centre of Russia's economic development, with the objective of increasing the export of energy resources by 9-15%, although the government also recognises as a priority the development of environmentally friendly sources and the promotion of energy efficiency (Russian Government 2020).

Russia's CO_2 emissions amounted to 1,587 million tonnes in 2018 and have decreased by 2,163.5 million tonnes since 1990. The distribution of emissions spans electricity and heat production (50.47%), transport (16.32%) and industry (15.82%), with buildings, agriculture, and fishing making up the rest. The relatively high energy and carbon intensity and inefficiency of the Russian economy presents an important potential for cost-effective energy savings and GHG emission reductions (Bashmakov 2016; World Bank 2008). However, important regulatory, political, and financial risks in Russia increase the cost of capital for investments in low-carbon technologies, thus delaying the realisation of GHG emission reductions (Golub, Lugovoy and Potashnikov 2019). Investment risks are also a barrier to the introduction of carbon pricing, considering the proposed focus of Russia's carbon trading mechanism on emission reduction projects.

The affordability of energy supply is a key objective of Russia's electricity and natural gas policy, as recognised by the Federal Electricity Law and the Federal Gas Law. Russia therefore controls end-user prices, resulting in indirect subsidies amounting to USD 22,626 million for gas, USD 13,910 million for electricity in 2018 (IEA 2018).

The electricity sector was liberalised starting in 2003, resulting in the creation of a competitive wholesale market (Gore 2011). In principle, the regulator of the wholesale electricity market (the Market Council) was established as an independent (self-regulating) entity. In practice, however, the government retains control over the level of prices through price caps and other types of interference with the market (Boute 2015). The independence of the regulator is limited by the heavy representation of government-controlled entities in its institutional structure. Investments are centrally determined and are implemented on the basis of long-term capacity agreements and prices determined by the government (Boute 2015). The introduction of carbon pricing in the Russian electricity sector will have to take into account the level of government control over prices and investments, and in particular the risk that price caps could distort the merit order effect of carbon pricing, and that regulated investments could distort the signals that carbon pricing is supposed to send to investors (Boute 2017).

In the gas sector, independent (i.e., non-Gazprom) gas producers—that now account for around 50% of gas sales in Russia—have the right to independently determine the level of prices governing their supply transactions to domestic consumers (Henderson et al. 2018). However, Gazprom supplies remain subject to regulated tariffs (Henderson and Moe 2019). Historically, artificially low domestic gas prices aimed to ensure the affordability of gas supply and the competitiveness of the energy intensive industry, with the government's objective to transition to netback export parity repeatedly delayed. The impact of the COVID-19 crisis on gas prices, in parallel with EU and international decarbonisation, could change this dynamic.

Russia aims to achieve 4.5% of electricity production on the basis of renewable energy sources by 2024, a target initially set for 2020 (Russian Government 2013). To ensure the financial viability of renewable energy investments, Agreements for the Delivery of Renewable Energy Capacity are concluded between renewable energy investors and wholesale market consumers through the wholesale market financial settlement centre, which acts as an intermediary (Kozlova and Collan 2016; International Finance Corporation 2013). Every consumer must contract a certain percentage of renewable energy capacity in proportion to their peak electricity consumption. The capacity-based support scheme aims to enable renewable energy investors to recover their capital expenses, as well as their operating expenses, and gain a certain profit. In 2018, the CAPEX limits for wind and solar energy amounted to 109 thousand roubles/MW (1,690 USD/MW) and 107 thousand roubles/MW (1,650 USD/MW), respectively.[64]

Eligible renewable energy projects are determined on the basis of a competitive tendering process, in which the most cost-efficient bids are selected (Kozlova and Collan 2016). Project developers that successfully participated in the first competitive selection of solar capacity were affiliated to major industrial groups and influential stakeholders in the Russian energy sector (e.g., the Renova Group, Rosatom, Rusnano). The successful participation in the 2018 solar tender of the Finnish energy company Fortum confirmed the gradual opening of the Russian renewable energy sector to companies other than Russian industrial groups (Boute and Zhikharev 2019). Part of the difficulty for investors is to meet Russia's local-content requirements (70% for solar energy and 65% for wind). The promotion of low-carbon energy is closely linked to the objective of developing a green manufacturing infrastructure in Russia, resulting in an increased cost of decarbonisation (International Finance Corporation 2013).

4. Technical dimension

In 2015, the Russian government adopted the Concept on the Formation of a System of Monitoring, Reporting and Verification of GHG Emissions. The binding force of this document is limited, as it was adopted by resolution (*razporiazhenie),* i.e., policy document, and not decree

[64] At current prices and exchange rate USD 1 / 65 roubles.

(*postanovlenie*). In 2014-2017, a methodological base was elaborated for the implementation of the Concept, but there are still hurdles for the development and operation of a robust MRV system in Russia. According to Russia's NDC, "the current assessment system will in the future be supplemented with a monitoring, reporting and checking the volumes of GHG emissions at the level of organisations, as well as the constituent entities of the Russian Federation, which are recommended to organise an inventory of GHG emissions and removals on their territory".

The Russian state-owned bank Sberbank has experience with Joint Implementation projects. However, Russia's experience with Joint Implementation projects is controversial, given the criticism expressed regarding the integrity of Russian Joint Implementation projects (Kollmuss, Schneider and Zhezherin 2015). The Market Council—the wholesale electricity market regulator—has accumulated experience with the certification of renewable energy facilities and the regulation of capacity contracts with renewable energy investors. Regional tariff authorities have expertise with the financial aspects of energy efficiency improvement projects, the recovery of their capital expenses, and the impact on operating costs. The Head of "Roshydromet"—the Russian Federal Service for Hydrometeorology and Environmental Monitoring—is the national focal point under the UNFCCC. Roshydromet is under the supervision of the Ministry of Natural Resources and Ecology of Russia. It is charged with the inventory of GHG emissions and sinks (Russian Government 2016).

5. Multilateral dimension

Russia joined the WTO in 2012. Russia is also a member of the Commonwealth of Independent States and a member of the Eurasian Economic Union, the economic union with Belarus, Kazakhstan, Kyrgyzstan and Armenia (Grata 2020). Russia signed the Energy Charter Treaty, but withdrew again, terminating its provisional application in 2009 (Boute 2014).

Russia has strong economic and energy ties with countries in the region with carbon pricing instruments already in place, including the EU, China and Kazakhstan. The EU's plan to introduce a carbon border adjustment mechanism (CBAM) would cost Russian exporters more than five billion euros a year, as estimated by KPMG (Moscow Times 2020). Russia's critical reaction to the EU plan of introducing a CBAM indicates the impact that the latter could have on Russian exports (Morgan 2020), and possibly offers an indication of the influence that the EU ETS could have on the adoption of carbon pricing in Russia. Increasing concern on the carbon footprint of natural gas/LNG production and transportation could result in greater pressure on Russia to take action to internalise the carbon externality, taking into account the key role of EU member states as buyers of Russian gas. CBAM already seems to have impacted Russia's climate policy even before being fleshed out and adopted into EU law. According to the Head of the Environmental Protection Committee of the State Duma, the adoption of the draft Law on Government Regulation of GHG Emissions must be understood as a response to the EU CBAM (State Duma 2021). Furthermore, China—where a national ETS started operating in 2021—became an important buyer of Russian pipeline gas and LNG, as Russia diversifies its exports (Henderson and Moe 2019). As China's relevance for the Russian economy increases, it is likely that the pressure on Russia to internalise the carbon externality of its exports will increase.

The integration of electricity markets within the Eurasian Economic Union could also possibly influence the adoption of carbon pricing, as cross-border exchanges between Kazakhstan and Russia will have to take into account the cost of carbon on the Kazakh electricity – through the Kazakh ETS. At the moment Kazakhstan is the only member of the Eurasian Economic Union with an ETS, but EU regulatory influence in the region could possibly help put carbon pricing on the agenda of the Eurasian Economic Union concerning environmental cooperation (Pastukhova and Westphal 2018).

6. Carbon pricing readiness and options

The Russian government officially endorsed the possibility of introducing a form of carbon pricing, as both Russia's draft Law on Government Regulation of GHG Emissions and the Russian NDC refers to economic and fiscal mechanisms to reduce GHG emissions, including the trading of emission reductions. Russia is also promoting renewable energy and energy efficiency improvements. Yet the opposition from vested interests in the fossil energy industry and the perceived threat of decarbonisation on Russia's heavy dependence on hydrocarbons are likely to be limiting factors.

The economy and energy system in Russia rely heavily on fossil fuels, and strong resistance to carbon pricing may therefore be expected. The Russian government itself sees international decarbonisation as a threat to the Russian economy and budget and continues to promote the development of fossil energy for Russia's economic growth. Thermal electricity production continues to be central to Russia's security of electricity supply, with new gas-fired and coal-fired plants envisaged in Russia's long-term electricity forecast.

However, the liberalisation of the electricity market, the planned reform of the gas market and the push for increasing renewables in the energy mix bode well for market-based instruments. They could also provide the entities subject to a potential future carbon price in these key sectors with the ability to adapt successfully. Many of Russia's key trade and investment partners already have (sub)national carbon pricing in place or upcoming, increasing the pressure to adopt carbon pricing. Russia has significant potential for cost-effective renewable energy production and energy savings and must diversify its economy to adjust to international decarbonisation and peak oil demand.

With renewable energy and energy efficiency regulation in place and an NDC including an emission reduction target submitted, as well as a Concept for MRV, Russia's legal environment also holds promise. The adoption of the draft Law on GHG Emission Regulation would provide an important step towards the introduction of carbon pricing. However, the success of carbon pricing in Russia will critically depend on the implementation of the Law. Its broadly formulated provisions on economic instruments for GHG reduction leave considerable discretion to the Government, and scope for influence by the brown lobby to water down the ambition of the mechanism. Reference to the trading of emission reductions indicates that constraints on emitters are likely to be limited. Russia's previous experience with Joint Implementation shows that instruments labelled as emission reduction mechanisms can be affected by limited environmental integrity.

When viewed through the lens of the analysis in UBA (2021), carbon trading is likely to be the preferred instrument in Russia. Vested interests and the economic weight of carbon-intensive producers, a heavy reliance on fossil fuels, a small but growing green lobby and the liberalisation of the electricity sector tend to favour emissions trading. Russia is likely to adopt a softer variation of carbon trading by comparison to the EU ETS, one that focuses on the trading of emission reductions, presenting the risk of reproducing the controversial Joint Implementation experience.

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A.11 Sri Lanka Factsheet

Sri Lanka			
Overall		**Political**	
Capital	Sri Jayawardenepura Kotte	**Electricity from fossil fuels**	55% of total generation (2018)
Govt structure	Democratic socialist republic	**Brown lobby**	Ministry of Petroleum Resources Development; Ceylon Petroleum Corporation; Petroleum Resources Development Secretariat
GDP **GDP per capita**	USD 84,008.78 million (2019) USD 13,620.10 (2019)	**Green lobby**	Sri Lanka Green Alliance; Sri Lanka Green Building Council; Bio Energy Association of Sri Lanka
Population	21.8 million (2019)	**Perceived corruption**	Score=38 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Min. of Maha Weli Development & Environment; Climate Change Secretariat; National Advisory Committee on Climate Change (NACCC); Ministry of Power, Energy and Business; Sri Lanka Climate Fund	**Income group**	Lower-middle income
Key legal instruments	LTGEP 2018-2037; National Adaptation Plan (NAP) for Climate Change Impacts	**Gini index**	39.8 (2016) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	National Climate Change Policy Energy Sector Development Plan 2015-2025	**Importance of industry**	27.4% of GDP (2019) Employment: 27.9% of total (2020) CO2 emissions: 42.8% (2018)
FDI	9% of GDP (2019)	**Fossil subsidies**	6.19% of GDP (2019)
		Electricity market	Partly liberalised: Limited (i.e., functional) unbundling of transmission, distribution, and generation, mainly state-owned assets, and regulated tariff structure

Sri Lanka			
Technical		**Multilateral**	
MRV status	Partially developed with support from the PMR	**Openness**	52% of GDP (2019)
UNFCCC reporting	Submitted NDC in 2016; INDC submitted INDCs in 2015	**International agreements**	WTO (1995)
Experience with carbon markets	Kyoto Protocol CDM Sri Lanka Carbon Offset Scheme (SLCOS)	**NDC**	(Un)conditional: (4%) 20% reduction in energy emissions relative to BAU by 2030; (Un)conditional: (3%) 10% reduction in other emissions relative to BAU by 2030
Participation in WB initiatives	Not a CPLC partner PMR implementing country participant	**NDC assessment**	Ambition not assessed by CAT; No reference to carbon pricing

Carbon pricing readiness and options

- Working with the PMR to develop a new MRV and registry system.
- Experience with market-based mechanisms through a feed-in-tariff program, national offset scheme and CDM projects.
- A green lobby is present in Sri Lanka and prepared to support the country's climate ambitions, however the government's reliance on foreign gas and oil imports creates competing interests.
- The country's electricity market design is an inhibiting factor, as approved tariff methodologies that would enhance the effectiveness of carbon pricing have yet to be implemented.
- Sri Lanka can pursue multilateral cooperation on multiple fronts, including through established trade relationships through SAFTA, ASEAN, and RCEP.

1. Political dimension

As a rapidly developing lower-middle income country, Sri Lanka's energy demand has steeply increased over the past decade. Following the end of a 30-year civil war in 2009, the country has averaged over 5% of growth per year and poverty rates have declined dramatically from 22% in 2002 to 8.9% in 2019 (World Bank 2020). The August 2020 parliamentary election saw the Sri Lanka Podujana Peramuna (SLPP), a newer nationalist political party, win a two-thirds majority in parliament. Brothers Mahinda Rajapaksa and Gotabaya Rajapaska were elected Prime Minister and President respectively, beating out the more established political parties, the United National Party (UNP) and the Sri Lanka Freedom Party (SLFP). The government has identified three main priorities for its tenure: establishing a new constitution reversing the curtailment of presidential powers, promoting Buddhist heritage in the traditionally Muslim Eastern Province, and securing a safe and disciplined society (Wagner 2020).

The country is heavily reliant on fossil fuels for its energy needs, with fossil fuel fired generation accounting for about 55% of TPES and the generation mix in 2018 TPES (IEA 2021). Electricity demand continues to grow at an annual rate of 5.6% and the country's Long-Term Generation Expansion Plan (LTGEP) indicates that capacity additions of over 8 GW will be needed by 2037.

Fossil fuel fired generation played an important role in the country's high electricity prices. Production and delivery costs have risen due to growing demand and seasonal back-up needs increasingly being met with oil-fired generation (World Bank and International Finance Corporation 2019). A government mandated closure of two planned coal-fired generation projects has also contributed to the rise, as the closure compelled the Central Electricity Board

(CEB) to procure a mix of a diesel fuel combined cycle power plant, diesel generators and oil-fired power plants (ADB 2019). As Sri Lanka has already exhausted most of its large hydro potential, renewables (primarily solar and wind) are expected to account for the bulk of this non-fossil fuel–based capacity addition (Ceylon Electricity Board 2019).

Sri Lanka has been successful in stimulating the growth of some renewable energy projects, especially those up to 10 MW, however the country has not been able to develop utility scale projects (World Bank 2019). The technical resource potential for solar power generation is estimated to be 6 GW and has been supported through net-metering policies, and the exploitable wind power potential is estimated at 5.6 GW (ADB 2019). The constrained bankability[65] of current power purchase agreements has limited the flow of international capital for utility scale projects, and challenges with land acquisition as well as unavailability of transmission infrastructure have exacerbated the problem (Dutt 2020). Most renewable energy developers are domestic Sri Lankan entities as the limited bankability of contracts has constrained international equity investors from participating in the market (Dutt 2020).

Climate policy initiatives are further supported by civil society organisations, including the Sri Lankan Green Alliance (SLGA)[66], an alliance of small and medium green groups around Sri Lanka, as well as initiatives such as the Sri Lanka Green Building Council of Sri Lanka and the Bio Energy Association of Sri Lanka.[67] The country has also received substantial international support from organisations promoting low-carbon economic growth such as the World Bank, the Asian Development Bank, and GIZ, both in developing technical capacity for developing grid transmission expansion, and subsidy and feed-in-tariff policy design, and in strengthening[68] civil society to be more conscious of type and amount of energy use.

For Sri Lanka to meet its unconditional and conditional targets for the energy sector, it will need to attract financing from climate finance sources to de-risk investment in renewable projects. Generating international climate finance support for energy sector reforms that could support carbon pricing policies will be dependent on establishing confidence in government institutions and effective regulatory processes. Sri Lanka ranked 94th out of 198 countries on perceived corruption in 2019 with a score of 38 (Transparency International, 2021), indicating relatively low trust in government. The island nation's performance in regulatory quality and government effectiveness as measured on a scale from -2.5 + 2.5 were also low, with scores of -0.47 and -0.48 (World Bank 2020). These numbers indicate the need to build capacity in government institutions and regulatory structures to perpetuate needed energy sector reforms crucial for implementing carbon pricing.

2. Legal dimension

Sri Lanka is a Democratic Socialist Republic with a Constitution that tasks the state with ensuring the distribution of wealth, overseeing economic development, and raising educational and cultural standards. Political power is divided between the legislative, executive, and judicial branches with the executive branch wielding significant power as the Head of State, government, and armed forces, and an ability to appoint cabinet ministers and the justices of the supreme court. The legislative branch is a unicameral Parliament of 226 members, with 196 members elected in multi-seat constituencies and 29 elected by proportional representation, all elected to 6-year terms by a direct vote. The President is elected to office through presidential elections

[65] Refers to the willingness of well-established financial institutions to finance a project or proposal at a reasonable interest rate.

[66] http://surakimusrilanka.net/about/

[67] https://www.bioenergysrilanka.lk/

[68] https://www.giz.de/en/worldwide/37146.html

held nationwide. The President can dissolve Parliament at any time, and the main purpose of Parliament is to pass bills and resolutions. The President's deputy, the Prime Minister, leads the ruling party in parliament and shares many executive responsibilities.

The Ministry of Petroleum Resources Development (MPRD) and the Ministry of Power, Energy and Business Development (MOPE&BD) manage the country's energy sector, with the latter responsible for developing programs and policies pertaining to electricity, renewable energy, and energy efficiency as well as having oversight of the Ceylon Electricity Board (CEB) (ADB 2019). The Ministry of Maha Weli Development & Environment (MMDE)[69] acts as the national focal point to the UNFCCC and manages Sri Lanka's climate change policies and actions at the national level in coordination with sectoral agencies. Within the ministry, the Climate Change Secretariat, headed by the Director of the Climate Change Division, adopts a comprehensive national approach to address climate change challenges.[70] A National Advisory Committee on Climate Change (NACCC) has also been created under the MMDE to gather diverse viewpoints on and bring together principal actors for all activities pertaining to climate change.[71] Additionally, these institutional structures are mirrored by a National Climate Change Policy, and the 'Sri Lanka NEXT – A Blue Green Era' programme that identifies priority technologies and subsectors for a low carbon economy based on the country's sustainable development priorities.

In line with Sri Lanka's NDC commitment to use only renewable electricity generation by 2050 (ADB 2017), the LTGEP states a commitment to develop 1.4 GW of solar power and 1.2 GW of wind power projects by 2037. This generation could be used to replace some of the expensive imported oil-based power currently used to offset hydro resources. On the demand side, an energy efficiency building code was introduced in 2002, and then revised and published in 2008.[72] A second revision was recently completed and a mandatory requirement for new commercial buildings to comply with the code is expected. Continued energy improvements in buildings have been supported by the Sri Lankan Green Power Development and Energy Improvement Investment Programme (ADB 2019).

3. Economic dimension

Sri Lanka is a lower-middle income country with approximately 21.8 million inhabitants and a GDP per capita income of USD 13,620 in 2019. The economy has grown substantially in the past decade following the end of a 30-year civil war and significant government investment into the country's infrastructure. Higher growth has been accompanied by improvements in many socioeconomic indicators as the poverty headcount ratio, the percentage of the population living below the poverty line, has decreased from 18.6% since to 2022 to 4.1% in 2016. Inequality remains a problem with the country's Gini index increasing from 32.5 in 1985 to 39.8 in 2016 (World Bank 2021a).

Sri Lanka's economy is largely based on agriculture, services, and light industry. The industrial sector contributes 27% of GDP (2019), providing approximately 28% of total employment (2020) and accounting for 43% of CO2 emissions (2018) based on the World Bank definition of industry which includes the energy, mining and construction sectors. Compared to other countries in the region, Sri Lanka has struggled to diversify exports and its share of global trade has declined over time as the country's export structure has not evolved beyond apparel, tea, and rubber products since the early 1990s (CBS 2019). Sri Lanka's fiscal deficits have remained

[69] http://mmde.gov.lk/web/index.php?limitstart=15&lang=en

[70] http://www.climatechange.lk/About_us.html

[71] http://www.climatechange.lk/About_us.html

[72] Sri Lanka Sustainable Energy Authority. 2008. Code of Practice for Energy Efficient Buildings in Sri Lanka. https://policy.asiapacificenergy.org/sites/default/files/Building%20CODE.pdf.

high amidst declining tax revenue and increased government spending. Rising external commercial debt has elevated risk and associated premiums as well as interest costs, making it challenging for the government to invest in large infrastructure development projects and forcing them to rely more on international development loans. Moreover, lack of a skilled labour force and stagnated labour mobility have also contributed to immobility as a lower middle-income country (World Economic Forum 2019).

From a macroeconomic lens, substantive government debt and a lack of foreign direct investment have made it challenging for Sri Lanka to maintain high growth over extended periods of time (CBS 2019). To date capital investment needs have been largely supported by the government through international loans from multilaterals and donor funds, which has in turn led to a high level of government debt, so that debt service payments are more than 90% of the government's tax revenue (World Bank & IFC 2019). High public debt has contributed to high credit risk, and that in combination with policy uncertainty in the energy sector has led to a lack of internationally bankable projects (World Bank & IFC 2019).

As of 2018, 55% of Sri Lanka's electricity supply was generated from fossil fuels (IEA 2018). Both petroleum and coal are used for electricity generation and industrial processes, and demand for both has steadily increased (ADB, 2019). Petroleum imported as crude oil and finished products, provides the highest share of energy to the national economy (43% in 2017) followed by biomass (37%), and then coal (11%) (ADB 2019). Exploration for gas and petroleum has not resulted in commercial production, though some deposits of gas have been discovered offshore of the western coast, and more exploration is planned for the west and east coasts in conjunction with French utility Total (Petroleum Resources Development Secretariat 2017). The supply of coal-powered electricity increased with the establishment of the Puttalam coal-fired power plant in 2011 and further expansion of the project in 2013 and 2014 (ADB 2019). Much of the hydropower capacity in Sri Lanka has already been developed, though there is further potential for solar and wind power (ADB 2019). Sri Lanka's relatively young coal fleet will limit the role carbon pricing can plan in incentivising coal phase-out, though as electricity demand continues to grow, a carbon price could incentivise a decline in conventional generation through tapping into the country's renewable energy assets. However, lack of clarity on feed-in tariff policies and legal impediments have made it particularly challenging for the private sector to confidently invest in developing the renewable energy sector.

The electricity industry consists of state-owned enterprises with some limited private sector participation in power generation. The Ministry of Power, Energy and Business Development prepares energy policy, supervises the main state-owned power sector utility CEB, the state-owned distribution utility Lanka Electricity Company, Sri Lanka Sustainable Energy Authority, and several other state-owned entities in the energy sector (ADB 2019). The Public Utilities Commission of Sri Lanka (PUCSL) is the multisector regulator, which is presently empowered to perform the functions of technical, economic, commercial, and safety regulator of the electricity industry (ABD 2019). Power sector reform began in Sri Lanka in 2002 through the Electricity Reform Act, which broke the CEB into to several independent state-owned companies and established the PUCSL as the sector regulator (World Bank 2019). Further reforms continued with the Electricity Act of 2009, which enabled PUCSL to operate as the power sector regulator and introduced functional unbundling where all businesses remain under one corporate ownership, while generation, transmission, and distribution were separately licensed (ADB 2019). The act also issued general policy guidelines for the PUCSL to diversify fuel supply, better plan the transmission and distribution of the system, and formulate an electricity tariff to supply electricity at reasonable prices to ensure the financial viability of the sector. Though the 2009 Electricity Act effectively unbundled the CEB into separate business units and introduced some

competition into electricity generation, it failed to fully implement the newly established tariff methodology. Today, the electricity industry faces constraints due to capacity shortages and delays in building larger power plants, slow growth in renewable energy development, and a financial crisis due to non-cost reflective tariffs (ADB 2019). Electricity market reforms that implement the approved tariff methodology will be crucial to creating an enabling environment for a carbon pricing mechanism.

Sri Lanka has also demonstrated a commitment to low-carbon energy generation, specifically pledging to use only renewable energy for electricity generation by 2050 at the 22nd UNFCCC Conference of Parties in Marrakech as a part of the Climate Vulnerable Forum, and articulating various targets aimed at increasing the adoption of renewable and sustainable forms of energy through Sri Lanka's 2016 NDC submission (ADB 2017). The PUCSL's Draft Activity plan for 2021 highlights these targets and puts forward a budget for research on grid integration limits for intermittent renewable sources that will inform policy advice to be prepared for the government (PUCSL 2021). However, though the country's Least Cost Long Term Generation Expansion Plan for 2018 – 2037 highlights intentions to add substantial hydro, min-hydro solar, wind and biomass generation, it also foresees additional oil-, coal- and natural gas-fired generation (PUCSL, 2021). The National Gas Plan also highlights a goal to increase the penetration of natural gas across all sectors to achieve a minimum of 30% of natural gas in the energy mix and replace coal and oil generation, while simultaneously committing to minimizing greenhouse gases to help achieve Sri Lanka's NDC (National Policy on Natural Gas of Sri Lanka 2020).

4. Technical dimension

Sri Lanka submitted its Intended Nationally Determined Contributions (INDC) in 2015 and submitted a Nationally Determined Contribution in 2016. Sri Lanka has also submitted two national communications, one in 2000 and one in 2012, and has developed national GHG inventories as a part of these communications (Hemashantha et al. 2019). Recognizing that achieving emissions reductions will require a substantial contribution from the power sector, Sri Lanka has established specific NDC targets for the energy sector. The targets consist of commitments to establish large scale wind, solar, biomass, and hydro plants, introducing demand side management activities, increasing sustainable energy policies to increase the share of renewable energy, and converting fuel oil-based power plants to LNG (Ministry of Mahaweli Development and Environment of Sri 2016).

Sri Lanka has also worked to develop better capacity to measure and report emissions, specifically through a project with the Partnership for Market Readiness (PMR) focused on strengthening the government's capacities to implement national climate policies/strategies/actions and design or strengthen market/non-market mitigation instruments (PMR 2019). The project has worked to identify the needs and institutional responsibilities necessary for a new MRV and registry system and gone on to begin the design process for a national system. The Sri Lankan Climate Fund also conducts organisation and project level GHG verification in accordance with ISO 14064-3 standards, meaning that the MMDE has some experience with organisational and project level GHG quantification, monitoring and reporting (Ministry of Mahaweli Development & Environment 2021).

The Sri Lankan electricity sector also has experience with market-based mechanisms. One such mechanism, the Sri Lanka Carbon Crediting Scheme (SLCCS) is a national offset scheme established to support local clean projects to benefit from climate finance, and was established through the Sri Lanka Climate Fund, a government owned company that functions under the MMDE. Sri Lanka also has experience with designing feed-in tariffs for the electricity sector, as well as the Clean Development Mechanism. The country currently hosts 20 registered renewable

power CDM projects, totalling 183 MW in potential capacity. One of these, Broadlands Hydropower, is a large-scale hydropower project, while the others are all small-scale hydropower or other renewable energy projects. Twelve of these projects have issued CERs and are operational. The remaining have not issued any credits, and there has been no communication with the UNFCCC Secretariat regarding their status (PMR 2019).

The Climate Change Commission of Sri Lanka has been tasked with implementing Sri Lanka's NDC in coordination with relevant ministries. The NDC (Ministry of Mahaweli Development and Environment of Sri Lanka 2016) also outlines the importance of developing institutional mechanisms and capacity to ensure climate change is mainstreamed into the country's economic development process. It also proposes establishing an independent institutional mechanism and operationalisation mechanism under the purview of the Climate Change Act (NDC (Ministry of Mahaweli Development and Environment of Sri Lanka 2016).

5. Multilateral dimension

As an island economy situated between South Asia and ASEAN, Sri Lanka relies on economic relationships with countries in the region. Economic integration has improved due to trade liberalisation over the past decades, though despite significant improvements in energy and transportation infrastructure that connects Sri Lanka with surrounding countries, Sri Lanka has made only limited headway in strengthening its trade and investment links with the rest of the region (Weerakoon & Perera 2014). Sri Lanka has been a WTO member since the organisation came into being in 1995, was a signatory country for the South Asian Preferential Trade Agreement (SAPTA) and was a signatory of the Asia Pacific Trade Agreement (APTA), both of which came into effect in 2006. It has established trade relations with several surrounding countries, signing bi-lateral and regional trade agreements with its South Asian neighbours including Bangladesh, Bhutan, India, the Maldives, Nepal, and Pakistan. Sri Lanka has also established multiple bi-lateral trade agreements with key international partners including the EU, US, UK, China and India (WTO 2019) with a majority share of exports going to India. Greater economic integration in the Southeast Asian region has also contributed to Sri Lanka's growth. SAARC (the South Asian Association for Regional Cooperation) has emerged as a key trading platform for Sri Lanka in recent years and participating in SAFTA (the South Asian Free Trade Area) agreement has expanded Sri Lanka's trade with its neighbours, giving the island nation much greater access to South Asia's 1.6 billion consumer market (Fernando 2021). The most notable economic progress in the region has been made in the sphere of small and medium enterprises. However, the lack of significant foreign direct investment in some South Asian countries is slowing down economic growth. In this regard, Sri Lanka leverages regional trading platforms like SAFTA, ASEAN, and RCEP to access Asia-Pacific consumer markets.

Due to proximity, India is Sri Lanka's main trade partner and is a key supplier of Sri Lanka's fuel imports, specifically petroleum and oil (World Bank 2021d). However, India is much more than a trade partner. It has taken steps to deepen economic cooperation with Sri Lanka, extending a USD 400 million line of credit to Sri Lanka for infrastructure development and a concessional USD 100 million line of credit for developing rooftop solar projects (Press Information Bureau, Government of India, 2019). The projects are to be for low-income families (USD 50 million) and the deployment of rooftop solar in government schools, colleges, hospitals, and other establishments (USD 50 million) (Reuters 2019). There is currently no bilateral power exchange between the two countries, however both have explored an India-Sri Lanka grid interconnection through conducting a joint feasibility study assessing the technical and commercial aspects of such a project (ADB 2019). Other key trade partners that have taken a more active role in Sri Lanka's energy sector include China, which has previously financed rural electrification project components as well as Sri Lanka's 900 MW coal-fired power plant and a hydropower power

plant currently under construction (ADB 2019). Sri Lanka's path to carbon pricing will likely be shaped by the country's relationship with these partners, amongst others.

6. Carbon pricing readiness and options

Sri Lanka's updated NDC commits the island nation to reducing emissions across sectors but makes no explicit mention of carbon pricing. The country's electricity market design is currently not conducive to the introduction of a fully effective carbon price because the sector is largely state owned, and the tariffs are heavily regulated due to slow implementation of approved reforms. Sri Lanka has favourable conditions for a low-carbon power mix, as much utility-scale solar and wind capacity remains untapped, and could augment existing hydropower and biofuel, and replace the some of the fossil fuel fired generation. Growing reliance on expensive, imported oil-fired generation to supply increasing electricity demand and make-up for cancelled coal investments is not sustainable. Introducing a carbon price could help to make additional domestic, low-carbon, particularly renewable energy sources more competitive. Properly unbundling the electricity sector and implementing updated tariff methodologies would create a more stable environment for renewable energy investors and attract more foreign direct investment for such projects, ultimately improving readiness for and effectiveness of carbon pricing.

Given that effective oversight and enforcement are key for the efficacy of a carbon pricing mechanism, Sri Lanka's lack of a registry and MRV system is an impeding factor for establishing such a mechanism. However, the Sri Lanka government is working with the PMR to develop better capacity to measure and report emissions, specifically through beginning to develop an MRV and registry system. What's more, the Sri Lankan Climate Fund does conduct organisation and project level GHG verification in accordance with ISO 14064-3 standards, meaning that the MMDE has some experience with organisational and project level GHG quantification, monitoring and reporting (Ministry of Mahaweli Development and Environment 2021). Finally, Sri Lanka's experience with market-based mechanisms in the energy sector and carbon crediting indicates there is some in-country technical capacity that could be developed further should Sri Lanka opt to pursue a carbon pricing mechanism.

A carbon price could in principle be bolstered by growing support for climate policy within the national government, as the recent establishment of a Climate Change Secretariat, a National Advisory Committee on Climate Change, and the Sri Lanka NEXT – A Blue Green Era' programme demonstrate Sri Lanka's commitment to climate policy. Sri Lanka also has a developed green lobby that is already supporting low-carbon development across small and medium enterprises. The development and speed of climate policy and potential carbon pricing mechanisms could be met by resistance from the fossil fuel importing and using sectors, particularly the power sector.

Sri Lanka's energy partners and established trade relationships offer opportunities for multilateral cooperation. China and India have both been supportive of Sri Lanka's energy infrastructure development and could offer Sri Lanka lessons learned on establishing an MRV system and developing a carbon pricing mechanism. Other potential lessons could come from regional trade partners such as Pakistan, who is exploring options to introduce an ETS and has introduced electricity market design reforms conducive to internalising a carbon price.

With respect to the choice of carbon pricing instrument, Sri Lanka's efforts to establish an MRV system in the context of experiences with carbon crediting may favour an ETS over a tax. Regardless of the instrument, the way forward for Sri Lanka in introducing carbon pricing is to continue building on work to develop a fully operational MRV system while simultaneously advancing energy market reforms.

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A.12 Taiwan Factsheet

Taiwan*			
Overall		**Political**	
		Electricity from fossil fuels	90% of total generation (2015)
Govt structure	Semi-presidential democratic constitutional republic	**Brown lobby**	Chinese Petroleum Corporation; China National Offshore Oil Corporation
GDP **GDP per capita**	USD 612.5 billion (2019) USD 25,763 (2019)	**Green lobby**	Taiwan Institute for Sustainable Energy; Taiwan Environmental Information Association
Population	23.8 million (2019)	**Perceived corruption**	Score=65 (2019) Min=9; Mean=43; Max=87; Germany=80
Legal		**Economic**	
Key government departments	Environmental Protection Administration; Office of Energy and Carbon Reduction	**Income group**	High income
Key legal instruments	Greenhouse Gas Reduction and Management Act (2015); Electricity Act (2017); Renewable Energy Development Act (2009)	**Gini index**	33.9 (2019) Perfect equality/inequality=0/100; Germany=31.9 (2016)
Related policies		**Importance of industry**	Value-added: n/a Employment: n/a CO2 emissions: n/a
FDI	1.9% of GDP (2019)	**Fossil subsidies**	31.6% of GDP (2017)
		Electricity market	Partially liberalised

* The World Bank and several other data providers do not include information for Taiwan. Consequently, this factsheet relies on UNCTAD for GDP and GDP per capita (both in current US$); population; FDI and openness statistics. The share of fossil fuels is from the US EIA and the value of the Gini index is from Statista.

Taiwan			
Technical		**Multilateral**	
MRV status	MRV regulation in place; established MRV infrastructure with 290+ entities required to report	**Openness**	116 % of GDP (2020)
UNFCCC reporting	No UNFCCC reporting obligations	**International agreements**	WTO (2002); Asia Pacific Economic Cooperation (1991)
Experience with carbon markets	Indirect involvement in CDM	**NDC**	20% reduction in GHG emissions by 2030 compared to 2005 levels; 50% reduction by 2050 compared to BAU levels
Participation in WB initiatives	Not a CPLC partner; Not a PMR implementing jurisdiction	**NDC assessment**	Report comparable to INDC submitted in 2015 despite non-membership to UNFCCC Ambition not assessed by CAT

Carbon pricing readiness and options

- Taiwan's geopolitical standing poses certain limitations on participation in regional and international carbon pricing discussions and capacity-building activities, but the jurisdiction's active engagement holds promise for carbon pricing.
- Legal, institutional, and technical infrastructure is relatively advanced and could arguably smoothly support the implementation of a carbon tax. Small market size and insufficient liquidity could be a challenge if an ETS were introduced.
- Solid MRV infrastructure and experience with environmental fees and offset systems such as the CDM hold promise for carbon pricing.
- A heavily regulated electricity sector and the dominance of state-own utility Taipower could impede cost pass through. The isolated nature of the electricity grid makes alternatives to fossil fuels challenging.

1. Political dimension

As an island off the south-eastern coast of Asia, Taiwan has an independent energy system, which is heavily dependent on fossil fuel imports predominantly from Qatar, Malaysia, Indonesia, and Australia (Feigenbaum and Hou 2020). With limited domestic energy resources, it imported more than 98% of its energy (mostly stemming from oil and coal) in 2019 (Bureau of Energy, Ministry of Economic Affairs, 2021). Taiwan also has a "large footprint" in several energy-intensive industries like steel, petrochemicals, and semiconductors, resulting in high per capita emissions (Biedermann 2017). In 2015, 90% of electricity generation in Taiwan stemmed from fossil fuels (U.S. Energy Information Administration 2020), with one of the largest coal-fired power plants in the world located in Taichung in the west of the jurisdiction. Taiwan also has small deposits of oil reserves (2.4 million barrels in 2016), but oil refineries are aging and face competition with those in the People's Republic of China (PRC) (U.S. Energy Information Administration 2020). The main players in the sector are Taiwan's Chinese Petroleum Corporation, the core of the jurisdiction's petrochemicals industry, and the PRC's state-owned China National Offshore Oil Corporation (CNOOC). The two corporations are working together to explore for oil and natural gas in the Strait of Taiwan (U.S. Energy Information Administration 2020). This heavy reliance on fossil fuels and the extensive infrastructure associated with it may impede plans to introduce a carbon price.

The weight of carbon-intensive industries in resisting carbon pricing can be counteracted by green industries, however. Green NGOs in Taiwan have been active since the 1980s, leading projects, protests and watchdog activities that have helped drive pollution and conservation policies. These organisations have also "clashed openly" with government and industry, whose views are often more widely reported in the media than green groups' (Wilson Center 2020). Some of these include the Taiwan Institute for Sustainable Energy, which works to provide policy recommendations to government agencies, support sustainable energy infrastructure, raise public awareness on the climate crisis, and liaise internationally (Taiwan Institute for Sustainable Energy 2021), and the Taiwan Environmental Information Association, which disseminates information on environmental issues (Taiwan Environmental Information Association 2021). The Green Party Taiwan, established in 1996, is the oldest Asian green party. It is active in the regional Asia Pacific Greens Federation and the international Global Greens, and many of its 400 members are affiliated with the NGO sector. The party is allied with the Social Democratic Party and averages 3% of total votes in metropolitan urban areas (up to 35% in rural areas) (Fell and Peng 2016).

In addition, the recent political push for renewables have been backed by public investment. The incumbent administration has invested over USD 50 billion for 20 GW of installed solar photovoltaic and 5.5 GW of offshore wind by 2025 (Yang and Wang 2020). The financial sector can also have an interest in the development of carbon markets (Paterson 2012). To keep up with the international trend toward green finance, the government also introduced the 'Green Finance Action Plan' in 2017, with the aim to boost credit, investment, fundraising in capital markets, development of capacity, data transparency, and green financial products and services. Version 2.0 of the plan was implemented in 2020, further leveraging the influence of the financial markets to encourage the sector's prioritisation of environmental issues (Financial Supervisory Commission 11/2/2020). One of the plan's three core strategies is to exploit market mechanisms to steer the economy toward sustainable development, an element that bodes well for carbon pricing in Taiwan (ibid). The plan also includes a measure to assist the Taiwanese

Environmental Protection Administration (EPA) in the establishment of a GHG emissions trading platform system (Executive Yuan 2017). However, the relatively small size of the market and insufficient liquidity if an ETS were to be introduced could impede price discovery.

The public acceptability of carbon pricing also depends in part on trust in the government and the population's attitude to green issues. As a subtropical island, Taiwan is highly vulnerable to the impacts of climate change (Biedermann 2017) and in recent years is increasingly affected by typhoons, heavy rainfall, flooding, and extended dry seasons (Winglee 2015); this could spur public support for and help push climate action up the political agenda. The EPA is making efforts to encourage citizen participation and raising information transparency to improve the public's knowledge of climate change (Department of Information Services, Executive Yuan 6/16/2016). A 2020 survey showed that 88% of participants supported a carbon levy on large emitters (Risk Society and Policy Research Centre 2020). Taiwan does not suffer particularly from corruption and scores highly on Transparency International's perceived corruption index, ranking 28th in the world out of 180 countries (Transparency International 2020). In addition, Taiwan is now the highest ranked democracy in Asia (surpassing Japan and South Korea) on the Economist Intelligence Unit (EIU)'s most recent Democracy Index. In 2020, the EIU also upgraded Taiwan from "flawed democracy" to "full democracy" status for the first time (Li 2021). Given Taiwan's overall prosperity and classification as "high income", as well as low income inequality that is comparable to Germany, the introduction of a carbon price may face less resistance from the population. These elements of stability and trust in Taiwan's institutional environment hold promise for the introduction of a top-down policy as carbon pricing.

However, the broader political context of Taiwan is complex and bleeds into the jurisdiction's climate change response. Political tensions between separatists and reunificationists in Taiwan make reaching policy consensus difficult, and frequent elections and party turnover have been known to make political accountability challenging (Santander 2021). This has negatively affected domestic political will regarding the issue, as being involved "forces the government and different departments to think deeper about climate change" (Winglee 2015). Moreover, climate change has in the past often been trumped by other environmental issues. Success in implementing environmental policies such as those tackling air and water pollution was largely domestically driven and tied to Taiwan's process of democratization. Some have argued that politically, "climate does not provide the same momentum for change" (ibid), and the lack of political consensus over the role of a carbon price has also impeded progress regarding its introduction over the last several years (Burke et al. 2020).

2. Legal dimension

Taiwan has a well-established climate governance and policy framework, which composes targets and strategies of GHG reduction at four levels: top-level guidance, central government-level targets, ministerial-level measures, and city-level actions. At the top level, in July 2015, Taiwan enacted the 'Greenhouse Gas Reduction and Management Act' (the Act) which legislates a 50% emissions reduction target for 2050 compared to 2005 GHG levels.[73] The Act also mandates the setting of regulatory mitigation goals in stages. In this context, the Act stipulates that the EPA will implement a domestic cap-and-trade scheme by considering the UNFCCC and

[73] The Taiwan government already began developing top-level energy and climate policies in the 2000s. For example, it published the "Frameworks for Sustainable Energy Policy--An Energy-Saving and Carbon-Reduction Action Plan" in June 2008.

its agreements, or relevant decisions by international conventions (Wu et al. 2019). The EPA is also currently in the process of revising the Act which will be renamed the 'Climate Change Response Act' (Clara and Shih 2021). The revisions will likely include mandatory energy efficiency (EE) standards, a GHG management fee, and the establishment of an ETS, and are expected to be submitted to the Legislative Yuan in June 2021. The GHG fee is set to be implemented first and the ETS considered later. This could pose challenges for the ETS, including coordination challenges and potential interactions with the GHG fee. Moreover, the phased introduction approach also brings about a time lag and further uncertainty regarding a future ETS.

Following the 2015 Act, the central government then developed the 'Climate Change Action Guideline' in 2017 and the 'GHG Reduction Action Plan' (the 'Action Plan') in 2018. The Action Plan outlines details on how to implement the mitigation policies. It includes five-year regulatory goals for both national and sectoral GHG emissions, as well as implementation strategies in the form of eight policy packages. A ministerial climate policy master plan was then developed on the basis of the Action Plan; the central industry competent authorities of major sectors including energy, manufacturing, transportation, and residential and commercial buildings, approved the 'GHG Emissions Control Action Programs' in October 2018, outlining sectoral goals and measures. Region-specific measures are then outlined in city-level GHG Control Implementation Plans. In terms of coordination, the Office of Energy and Carbon Reduction established in 2016 works to enhance policy integration between different government agencies and implement concrete measures for the low-carbon energy transition (Department of Information Services, Executive Yuan 6/16/2016).

At the global level, however, Taiwan is constrained in its participation in international climate regimes such as under the UNFCCC and Paris Agreement framework. However, it submitted a voluntary Intended Nationally Determined Contribution (INDC) in the lead up to the Paris talks, which now underpins its broader climate policy agenda. Most recently, Taiwan announced during the April 2021 Leaders' Summit on Climate that it has started to plan for net zero emissions by 2050 (美国之音 2021). This is expected to inject momentum into its climate policy and carbon pricing plans.

Carbon pricing cannot operate in isolation. Other key laws include the 2017 Amended Electricity Act, which promotes renewable energy (RE) and EE, the better management of national power resources, regulating electricity supply, reducing carbon emissions, diversifying energy supply, fair competition, and welfare improvement. Under this Act, the electricity sector is to be gradually liberalised. Power generators will no longer be considered public utilities, whose emissions are currently excluded from carbon pricing plans, which would potentially increase coverage of the carbon price (Burke et al. 2020). The 2009 Renewable Energy Development Act similarly encourages RE use, promotes the diversification of energy, and improving environmental quality (Grantham Research Institute on Climate Change and the Environment 2021).

Judicial independence also plays an essential role for the success of carbon pricing—particularly for an ETS—as it provides market players with confidence and protection (Bogojevic 2013; UBA 2021). In this respect, Taiwan's score of 4.5 on the World Economic Forum's judicial independence index in 2018 which places it within the top quartile of assessed countries worldwide holds promise for a market-based mechanism as carbon pricing (World Economic

Forum 2018). On the other hand, the threat of investment arbitration challenges could inhibit carbon pricing developments in Taiwan, with FDI making up 1.9% of GDP in 2019.[74] The PCR (27.2%), the Netherlands (15%), the British Virgin Islands (20.4%) and Japan (8.1%) were the largest investors in 2019, with almost 40% of this financing going to the emissions-intensive manufacturing sector (Investment Commission 2019).

3. Economic dimension

Taiwan is a very open economy with an international trade-to-GDP ratio of 104% in 2020. Taiwan's CO_2 emissions amounted to 285 million tonnes in 2017 and have more than doubled since 1990, driven by increasing electricity demand and road transport (Ritchie and Roser 2020). The distribution of emissions in 2016 spanned energy, buildings and transport (90.3%), industrial processes (7.4%), agriculture (1%), and waste (1.3%) (International Carbon Action Partnership 2021). Electricity is sourced largely from oil (48%), coal (29%), and natural gas (13%), with nuclear and other renewables making up the remainder (U.S. Energy Information Administration 2020). Taiwan's main exports include electrical equipment, machinery, computers, plastics, medical equipment, mineral fuels, and vehicles. Its main export partners in 2019 were the PRC (24.3% of all exports in 2019), the United States (13.2%), the EU, and Japan. Imports were mostly acquired from the PRC (20.1% of all imports in 2019), Japan, the U.S. (12.2%), the EU, and its main economic competitor South Korea (Santander 2021). Almost all manufacturing industries in Taiwan are trade exposed. Energy intensive and trade exposed (EITE) industries also employ 970,000 people (Burke et al. 2020). Taiwan's population has high purchasing power, but although unemployment has been low historically, COVID-19 and geopolitical tensions could change this in the future (ibid).

Taiwan is seen as a leader in 'green exports' and is supported by the Ministry of Economic Affairs' 'Green Trade Promotion Program'. For example, Taiwan's solar cell exports made up 10% of global production in 2018 (Yuksel 2018). The jurisdiction has received research and development awards for carbon capture and storage technologies, and also has very efficient (particularly municipal) recycling systems.

According to the Taiwan Bureau of Energy's statistics, RE made up 5.6% of produced electricity and 13.93% of installed generating capacity in 2019 (Bureau of Energy, Ministry of Economic Affairs, 2020). Taiwan's energy policy priorities include increasing the share of RE generation to 20% by 2025, with a further '10-year 10-GW' RE development policy in place for 2026-2035; increasing the use of natural gas; and reducing the reliance on coal (Environmental Protection Administration R.O.C. 2020). Taiwan's first commercial-scale offshore wind farm, Formosa 1, officially began operating in 2019 and is capable of generating electricity for 128,000 households annually (Power Technology 2021).

Due to political constraints and as an island almost entirely dependent on energy imports, Taiwan has an isolated electricity grid. Attempts to liberalize the electricity market have been ongoing since the 1990s following the example of other countries, but progress has been slow, with limited public consensus in support of such reform (Yang and Wang 2020). In addition, the Taiwanese government has in the past committed to not allowing electricity price increases. In fact, the price for power for households in Taiwan was second lowest in the world in 2017 (International Energy Agency 2019). The backdrop of these circumstances is formed by state-

[74] According to UNCTAD, Taiwan has 16 bilateral investment treaties in force with another seven signed and expected to be in force soon (UNCTAD 2021).

owned, vertically integrated Taipower, which had a monopoly over electricity sales in Taiwan for over 70 years. Responsible for the operation of all electricity grid and related transmission and distribution networks, it also generates approximately 80% of electricity. Retail electricity prices are set by the government, and the heavy subsidization of electricity prices is shouldered by Taipower, who suffered a USD 500 million deficit in 2018 alone (Feigenbaum and Hou 2020) – resources which could have otherwise gone to much needed grid updates. Introducing a carbon price without the ability to pass costs down the value chain would exacerbate these losses (Burke et al. 2020). However, the rationalization of electricity prices is starting to receive some support with a 2017 survey indicating that on average, respondents were prepared to accept an increase in electricity prices of 13.2% (Line Today 2018). The 2017 Electricity Act serves as the most recent and concrete attempt at market liberalization and has significant implications for Taipower. Priorities of the Act include phasing out nuclear, increasing the share of RE in generation and retailing, and examining open market mechanisms, with the view al so to increase attractiveness to foreign investors.

The Act lays out market reform in two stages. The first stage spanned 2017-2020 and focused on opening up the market to green energy. This entailed allowing RE producers to sell directly to customers, whether via their own transmission and distribution lines or existing Taipower networks. The second phase, under a plan put forward by the Taiwan Bureau of Energy, began in 2019 and will last until 2025. This stage includes the restructuring of Taipower into a holding company with two major operation divisions: the first, power generation; the second, electricity transmission, distribution, and sale. This means that other suppliers are able to sell electricity directly, and generation will be further opened up for private investment although both entities under Taipower would still be run and regulated by the state. To protect citizens' purchasing power and retain broader support against the backdrop of historically cheap power, amendments to the Electricity Act include a fund to stabilize electricity prices and a clause that guarantees annual net profits for generators (Takasoccies 2017). However, observers have questioned whether it would indeed be possible to maintain such low electricity prices (Tsay and Chen 2019). The whole reform process is set to take up to nine years but definitively lays the foundations for future reforms and holds promise for a carbon pricing policy as costs could better be passed down to incentivise downstream abatement (Li 2016). However, such political considerations regarding electricity prices already being discussed even *without* carbon pricing suggests that significant resistance should be expected if carbon costs caused price increases down the value chain.

To add, the government no longer discloses the value of fossil fuel subsidies, but estimates suggest up to USD 400 million was handed out in 2017 (Asia-Pacific Economic Cooperation 2017). These subsidies are expressed either as the aforementioned electricity price setting or fuel cost reduction for certain sectors such as offshore island freight and petroleum products. Although the new regulations from Taipower means that people can choose their electricity suppliers, without complementary subsidy reform, renewables will continue playing on an "uneven field" (Maynard 2017), and the incentives provided by a carbon price would be muted. To add, there are only a few private players in the Taiwanese electricity market, naturally limiting the extent of competition. The geography of Taiwan also poses challenges for abatement even with a carbon price, as the deployment of variable RE on the island is difficult due to the isolated electricity grid (Burke et al. 2020).

4. Technical dimension

A robust MRV infrastructure and government knowledge and capacity are critical to the success of carbon pricing. Since 2016, GHG reporting is mandatory under the 'GHG Accounting and Registration Regulations'. Currently, 293 entities in Taiwan are required to report their annual GHG emissions with third-party verification (Clara and Shih 2021). This means that there are already accredited service providers in place to audit and verify reported emissions. A carbon pricing instrument is likely to focus on these entities, at least initially. However, this could result in insufficient secondary market liquidity should Taiwan opt for emissions trading (Burke et al. 2020). Taiwan does not have reporting obligations under the UNFCCC framework but has had a GHG inventory in place since 2009 (Environmental Protection Administration 2010), and the Office of Energy and Carbon Reduction coordinates inter-ministerial work, promotes inventory work and aims to expand international participation (Department of Information Services, Executive Yuan 6/16/2016). Although the Taiwanese Government does not produce long-run emissions projections, 2021-2025 emission targets are being developed to reflect the estimated mitigation potential in each sector, which would provide a clearer view of where abatement may be possible and how this could be achieved cost-effectively.

Capacity for a carbon tax in Taiwan is arguably already in place. The EPA has experience with fees for water and air pollution (Environmental Protection Administration), and the relevant stakeholders are also familiar with the similar regulatory landscape in this regard. A domestic offset system which entails voluntary reduction projects as part of the 2010 "CDM-like" 'Principles for Promoting GHG Early Action Project and Offset Project' as well as an early action crediting program have prepared the ground for market-based mechanisms. Taiwan's indirect participation in the CDM itself is also important experience int this respect (Mehling et al. 2013). The supporting MRV system, established in 2016, for major emitters in the energy and industrial sectors based on international standards and best practices provide firm foundations for emissions trading. Also adding to Taiwan's carbon pricing readiness is its robust and credible GHG reduction target. Remaining gaps in capacity include market oversight, as the EPA has not yet conducted consultations with the financial authority and would need to execute significant coordination; trading infrastructure (there is currently no market exchange for environmental financial products); and a decision regarding a method for allowance allocation and cap setting.

As for the private sector, Taiwan has promoted voluntary GHG accounting since 2005 (Chien 6/3/2014). The business community has also been open to the potential introduction of carbon pricing (Burke et al. 2020). Although some firms have expressed a preference for a carbon tax over an ETS given their prior knowledge of existing environmental levies, a well-designed stakeholder engagement strategy and gradual familiarity-building with an ETS could successfully mitigate many concerns.

5. Multilateral dimension

Taiwan's position on the international stage is intricate. It has not been a member of the UN since 1971. Taiwan acceded to the WTO in 2002 as the "Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu" and has benefited greatly from reduced tariffs. However, it has signed only four free trade agreements.[75] Being partially excluded from certain global exchange fora in this way poses challenges also in the domestic sphere: wage stagnation, limited economic growth, disadvantaged exports compared to those of countries *with* FTAs in place, and obstacles

[75] With Panama (2003), Guatemala (2005), Bicaragua (2006), and El Salvador and Honduras (2007).

for domestic reform that could increase competitiveness and investment. These hurdles may well impede the success of a future carbon pricing instrument, particularly regarding international carbon market exchanges, if any. On the other hand, Taiwan has also established several relationships and various channels for exchange with external partners despite these challenges, which help to counterbalance such diplomatic limitations. The aforementioned reliance of Taiwan's manufacturing industry on international markets could also expose the country to disruption should border carbon adjustments be introduced in other jurisdictions.

In 2013, Taiwan announced its interest in joining the Trans-Pacific Partnership deal. Although it has not yet done so, recent talks suggest that Taiwan will submit an application once informal consultations have concluded as it seeks greater access to multilateral platforms (Reuters 2020). Other international agreements to which Taiwan is part include the Cross-Strait Economic Cooperation Framework Agreement (ECFA) with China since June 2010 that aims to reduce commercial barriers between the two sides (although it was also speculated that this may be terminated in 2020), and five additional economic cooperation agreements with New Zealand, Singapore, Paraguay, Eswatini, and the Marshall Islands (International Trade Administration 2020).

Despite these issues, Taiwan is an eager participant when and where it can engage in broader climate cooperation and dialogue. The jurisdiction is not a member of the UNFCCC nor a signatory of the Paris Agreement even though its voluntary submission of an INDC in 2015 signaled its commitment to tackling climate change. The INDC target is equivalent to a 50% reduction from 2030 BAU levels and has been noted by commentators as being "ambitious compared to its economic competitor South Korea's goal of a 37% cut compared to BAU" (Winglee 2015). In fact, during COP25 in 2019, 13 countries[76] with diplomatic ties with Taiwan voiced the opinion that it should *not* be excluded from the UNFCCC events, where currently it can only take part as an observer (Environmental Protection Administration 2020). Overall, Taiwan has an active interest in engaging in climate diplomacy, which may favour an ETS over a carbon tax as ETSs can be linked.

Moreover, the Environmental Protection Agency of the United States has a close partnership with the Taiwanese EPA since 1993 through which they share experience and expertise, and work together to assist other environmental agencies and partners both in the Asia Pacific and further afield such as in Latin America and Africa. In 2014, the two bodies launched the International Environmental Partnership, which works to strengthen capacity for environmental challenges (U.S. Environmental Protection Agency 2014). However, compared to its neighbours, Taiwan lacks a place in an established regional organisational framework such as ASEAN to advance (environmental) collaboration further. Its diplomatic constraints also limit its participation in international carbon pricing platforms such as the International Carbon Action Partnership, the UNFCCC's CiACA, and the Asian Development Bank's activities.

6. Carbon pricing readiness and options

Taiwan's geopolitical standing and position on the world stage is unique. Despite its relatively small economy, the steps that it has regarding its climate policy and carbon pricing plans are

[76] Belize, Eswatini, Guatemala, Haiti, Honduras, Marshall Islands, Nauru, Palau, Paraguay, Saint Christopher and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Tuvalu

significant. Demonstrated for example by the submission of its voluntary report comparable to an INDC, Taiwan's increasing and active engagement in the international arena hold promise for a carbon price in the jurisdiction.

In fact, the technical infrastructure for a carbon tax in Taiwan is arguably already in place, with relevant agencies and stakeholders already familiar with the regulatory landscape of an environmental levy. Despite the legal foundation and policy plans in place for a cap-and-trade system, the outlook for an ETS is more complex. Potential obstacles to emissions trading include concentrated market power (especially the dominance of state-owned Taipower) of a few big emitters, and potentially insufficient liquidity due to the small size of the market, which could impede effective price discovery. Although its relatively established MRV system would certainly facilitate the introduction of an ETS, current broader capacity constraints and the inability of the jurisdiction to participate in regional and international carbon pricing capacity-building initiatives also point to a carbon tax.

Without subsidy and market reform, the question of the ability to pass through carbon costs also arises, due to heavy government involvement in the electricity sector. Any carbon pricing instrument in Taiwan would have to be carefully designed to function smoothly alongside existing electricity price regulation in a way that does not jeopardize the financial viability of the power sector, retains the incentive for downstream abatement, and in view of potential interactions with other policies such as energy efficiency standards.

Taiwan's main regional competitors are also its key trade partners. However, the PRC, South Korea, and Japan all already employ carbon pricing, which raises potential concerns of carbon leakage and industrial competitiveness in the future. One possible path forward for Taiwan is to start with a carbon tax for large emitters in the manufacturing and electricity generation sectors and then transition to an ETS after capacity is built up and the relevant industry and regulatory stakeholders are more familiar with carbon pricing. Starting with an ETS alongside a carbon tax, with each instrument covering different sectors, is another potential carbon pricing path. The emissions cap inherent to the ETS would provide Taiwan with more certainty in reaching its ambitious emissions reduction targets. An ETS would also open doors for the jurisdiction to engage in international carbon pricing cooperation further down the line. Regardless of the choice of the instrument, Taiwan is well on its way to achieving its national climate goals using carbon pricing.

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A.13 Thailand Factsheet

Thailand			
Overall		**Political**	
Capital	Bangkok	**Electricity from fossil fuels**	82.8% of total generation (2019)
Govt structure	Constitutional monarchy (legislative branch modelled on Westminster)	**Brown lobby**	EGAT
GDP **GDP per capita**	USD 1,342.2 billion (2019) USD 19,276.9 (2019)	**Green lobby**	Thai Climate Justice Network; tourism industry
Population	69.6 million (2019)	**Perceived corruption**	Score=36 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	National Committee on Climate Change Policy; Min. of Nat. Resources and Environment; Office of Nat. Resource and Env. Policy and Planning; TGO	**Income group**	Upper-middle income
Key legal instruments	Nat. Econ. & Social Development Plans, Energy Conservation Promotion Act; Energy Industry Act; Strategic Plan on Climate Change	**Gini index**	36.4 (2018) Perfect equality/inequality=0/100; Germany=31.9 (2016)
Related policies	Nat. Reform Plan; Nat. Climate Change Master Plan (2015-2050); Plans for power development, EE & alternative energy (2015-2036); Climate Change Act (under development); Long-term Low GHG Emission Development Strategy (under dev.)	**Importance of industry**	Value-added: 33.4% of GDP (2019) Employment: 23% of total (2020) CO2 emissions: 61.8% of total (2018)
FDI	1.1% of GDP (2019)	**Fossil subsidies**	9.5% of GDP (2017)
		Electricity market	Partial unbundling with regulated tariff structures and a single buyer model

Thailand			
Technical		**Multilateral**	
MRV status	Under development since 2013 for voluntary ETS	**Openness**	110% of GDP (2019)
UNFCCC reporting	3 BURs (2020)	**International agreements**	WTO (1995); RCEP (2020); ASEAN (2009)
Experience with carbon markets	Thailand Voluntary ETS; T-VER; JCM; CDM; NAMAs	**NDC**	(Un)Conditional: (20%) 25% reduction in GHG emissions by 2030 compared to projected BAU level
Participation in WB initiatives	Not a CPLC partner; PMR implementing country	**NDC assessment**	Ambition not assessed by CAT; Reference to bilateral, regional, multilateral market-based cooperation and Article 6

Carbon pricing readiness and options

- Through the establishment of the Greenhouse Gas Management Organisation (TGO), pilot ETS, and experience with international market mechanisms, Thailand has accumulated substantial institutional, regulatory, and technical experience and expertise, which provide a solid foundation for the successful introduction of an ETS.
- Vested interests of carbon-intensive industries, reliance on fossil fuels, and highly regulated power sector and reluctance to impose carbon pricing on this sector (even in the pilot ETS) may still impede the development of an ETS. Also challenging is the coordination of 30+ climate and energy policies designed and implemented by some 25 public agencies.
- Thailand's struggle with corruption, flaws in democracy, and political turbulence (including military intervention in governance) pose challenges for a sustained political environment for any carbon pricing instrument.
- Climate Change Act currently under development could provide solid legal basis for carbon pricing.
- Its comprehensive climate policy and institutional framework; relatively established MRV system; growing awareness and acknowledgement of climate changes risks in the country and its effect on the economy (e.g., tourism industry, investment environment); and Thailand's history of incentivizing renewable energy development is conducive to carbon pricing.
- Considering the strides Thailand has already made, an ETS is likelier than a carbon tax, at least for industrial emitters. In the short term, additional market regulations could be introduced to ensure carbon costs are reflected in tariff structures and dispatch decisions, while incorporating flexible provisions in existing long-term contracts to be phased out as much-needed electricity sector reforms progress and start bearing fruit.

1. Political dimension

The vested interests of carbon-intensive industries can pose significant challenges for the introduction of a carbon price as powerful actors resist the transition to a low-carbon economy. In 2018, 80% of Thailand's total primary energy supply and over 82% of its electricity generation stemmed from coal, natural gas, and oil sources, illustrating the country's continued heavy reliance on fossil fuels (IEA 2018). There is marked resistance to phasing out coal. 19 plants are currently in operation with another announced recently (Global Energy Monitor 2021), which increases the likelihood of stranded assets and therefore opposition to a carbon price. Key actors such as the Electricity Generating Authority of Thailand (EGAT) hold sway over energy development. Publicly owned enterprises like EGAT are encouraged to promote energy conservation but generally do not, due to the likely negative impact on electricity sales and profits from existing plants. This can pose a significant barrier to the continued development of carbon pricing in Thailand (Boyland 2018).

Despite this, the green lobby in Thailand has also been active in recent years, pushing back particularly against the continued development of coal plants. Prominent anti-coal movements in the Krabi and Thepha districts in 2018 led to the (at least temporary) suspension of a planned coal power plant, despite attempted influence from EGAT (Boyland 2018).[77] Civil society's role in carbon pricing policy specifically is more complicated. For example, the Thai Climate Justice Network, consisting of around ten Thai civil society groups, was set up in 2008 to work on mitigation in the agriculture, energy, and forestry sectors. It, however, generally sees market-based instruments as "false solutions" (Smits 2017).

Another key group supporting climate change action is the tourism industry, which plays a significant role in Thailand's economy. On average from 1998 to 2005, tourism directly and indirectly accounted for 13% of GDP, employed 10% of the labour force, and attracted 12% of investment (Wattanakuljarus and Coxhead 2008). Its weight in the economy has since then increased, reaching 18% of GDP in 2015 (MoNRE 2018). Facing huge negative impacts from climate change, the tourist industry has expressed strong support for efforts to both mitigate and adapt to climate change and has adopted a number of green initiatives, such as developing green tourism options (Tourism Authority of Thailand 2008). Separately, lobby groups that support dam-building and nuclear energy have pushed for the government to adopt policies to mitigate emissions (Marks 2011).

More broadly, Thailand is a country that is highly vulnerable to the risks of climate change, which helps to drive the issue up the political agenda (Nachmany et al. 2015). Climate impacts in Thailand—prolonged droughts, decreased agricultural and fishery yields, extreme flooding, sea level rise and health-related issues—are already serious and will likely create more, or exacerbate existing, problems in the coming decades (Marks 2011). Thai politicians are increasingly under pressure from civil society organisations, firms, and foreign investors to protect their investments against climate risks (Lange and Jensen 2013).

Against this backdrop, the government has made efforts to improve the renewable energy (RE) investment environment by providing capital grants for RE equipment, various feed-in tariffs since 2007, and tax exemptions for RE equipment imports since 2007 (Beerepoot et al. 2013). Between 2006-2018, Thailand drew in over USD 10.7 billion of RE investment and made up over 60% of ASEAN's total RE capacity in 2019 (Vakulchuk et al. 2020). Since then, its attractiveness for RE investments has stagnated somewhat, due to the increasing attractiveness of investment in other countries in the region (e.g., Vietnam), investor caution regarding new projects in the expectation of more proactive energy sector reforms in Thailand, and limited capacity for renewables governance. However, progress made thus far and latent RE potential hold promise for Thailand's carbon pricing outlook (ibid; IEA 2020).

The public acceptability of a carbon price is also critical for its success and is in part shaped by the population's attitude to environmental issues and trust in public institutions. In a UNDP survey conducted in 2021, fewer than three quarters of respondents in Thailand with post-secondary education stated they believed in the climate emergency; 52% of over-60s and 64% of under-18s answered similarly (UNDP 2021). To the further detriment of carbon pricing's success, corruption in Thailand is a national problem (Vanijaka 2018). In 2020, Transparency International ranked the country 104th of 180 countries for perceived corruption.[78] UBA (2021)

[77] NGOs began to campaign for environment protection already in the 1970s and 1980s. Since then, they have focused on issues such as enforcing illegal logging bans, opposing the privatisation of state-owned energy companies and most recently campaigning for "climate justice". However, their impact on policy changes especially on the climate mitigation front are considered limited (Marks, 2011).

[78] Higher values of the index indicate lower perceived corruption. For reference, the value of the index in Germany is 80 in 2019. For details see https://www.transparency.org/en/cpi/2020/index/nzl.

points to how this can undermine the government's ability to implement a successful carbon pricing policy. The Economist Intelligence Unit ranked Thailand 73rd of 167 countries in the world for its level of ("flawed") democracy (EUI 2020). Its authoritarian responses to public protest seen also prominently on the world stage throughout 2020 has led some to argue that it has obstructed the green agenda and may do so again in the context of a carbon price (Simpson 2015).

Thailand is a constitutional monarchy. The King is the Chief of State, and the monarchy is hereditary. Traditionally, the monarch has little direct power but wields considerable moral suasion.[79] The country emerged as a modern state after the founding of the Chakri Dynasty in 1782, with the constitutional monarchy replacing the absolute monarchy after the Revolution of 1932. Its legislative branch (National Assembly) is modelled after the Westminster System and consists of a lower house (House of Representatives) and an upper house (Senate) (Nachmany et al. 2015). Thailand has experienced a lot of political turmoil in recent years and has had 20 constitutions since 1932, with the most recent taking effect in April 2017 after the 2014 coup d'état that installed coup leader General Prayut Chan-o-cha as prime minister (Tonsakulrungruang 2018; Constitute Project 2017).[80] Thailand sees strong influence of the military in its governance; the military has been as much a political actor as an instrument of policy. Its culture of factionalism, army dominance and royalism have repeatedly propelled it towards coups and other subtler interventions in politics (Raymond 2018). The 2019 Thai general election was the first election held in accordance with the 2017 Constitution. In July 2019, the junta chief Prayuth Chan-o-choa ordered an end to the military rule but kept the power as Prime Minister. The new civil government has focused on addressing the slow economic growth and an ageing workforce, but the aftermath of the election has been characterised by increasing disputes in parliament and social media. Thailand's recent political crisis, which may continue or repeat itself in the future has the strong potential to divert decisionmakers' attention away from climate change issue (Marks 2011). Also fighting for a say in this context is the Thai Forest Conservation (TFC) Party, the country's green party that won two parliamentary seats in the 2019 general elections (Election Commission 2019). However, disagreements on responsibility over the environmental portfolio as part of its coalition with civil-military state-sponsored party Phalang Pracharath have rooted uncertainty in the party's cause, and in 2019 the TFC threatened to form its own independent opposition (Bangkok Post 2019).

2. Legal dimension

Thailand is a parliamentary democracy. However, the aforementioned recent political developments have led some to question its level of democracy (Tonsakulrungruang 2018). It is also argued that space for civil society and media is more restricted since the 2014 military coup (Smits 2017). This leads to further questions of the country's future ability to implement effective and sustained long-term climate policies (Marks 2011) and is particularly relevant for carbon pricing because it requires broader policy coordination and more sophisticated government capacities, as compared to command-and-control measures (UBA 2021). Thailand is also a unitary government, with a relatively powerful central government and 77 provincial governments. Its environmental and climate change polices are very centralised (Japanese Ministry of the Environment 1999) and the lack of capacity of subnational public and private

[79] However, recent political movements, in particular the continuous student-led movement demands curbs on the king's powers.

[80] This constitution was drafted under the ruling military junta and the 2017 Constitution itself is criticised for weakening and complicating the electoral politics while empowering the judiciary and watchdog agencies.

actors is considered a significant barrier to implementing MRV and climate policy (MONRE 2020; GGGI 2019).

The basis for environmental policy in Thailand lies in Article 58 of the 2017 Constitution. The National Environment Board supervises environmental policy, and the Ministry of Natural Resources and Environment (MoNRE) manages environmental matters. Under the MoNRE, the Office of Natural Resources and Environmental Policy and Planning (ONEP) oversees the development of environmental, climate and natural resource conservation policies and plans and supports their effective implementation (Action for Climate Empowerment Thailand n.d.). In 2007, Thailand established the National Committee on Climate Change Policy (NCCC), with the mandate of defining national climate policies. The NCCC is chaired by the Prime Minister with two vice chairpersons (from the MoNRE and the Ministry of Foreign Affairs), and is made up of members of the public and private sectors and academic institutions.[81] An Office of Climate Change Co-ordination (OCCC) was also established under MoNRE (MoNRE 2018). Another important institution under the MoNRE is the Greenhouse Gas Management Organisation (TGO). Established in 2007 by royal decree, the TGO serves as the Designated National Authority (DNA) for Clean Development Mechanism (CDM) projects.[82] It also plays an important role in the development of market-based mechanisms (MBMs) in Thailand.

At the macro level, the 20-year National Development Plan (2017-2036) indicates that green growth will promote sustainable development (MoNRE 2018). Thailand periodically releases National Economic and Social Development Plans (NESDP). Its 10th NESDP (2007-2011) for the first time defined objectives and targets to mitigate the impacts of climate change and developed a policy framework to increase energy efficiency and reduce GHG emissions. The Strategic Plan on Climate Change was developed by the ONEP and approved by the Cabinet in 2008. It provided a framework for national responses to climate change, with mitigation one of the six strategies outlined.[83] The country's Climate Change Master Plan (2012-2050), approved in 2016, refers to a carbon market as a potential mechanism to achieve targeted emission reductions in key industries and promote energy efficiency more widely (MoNRE 2014). Thailand is also in the process of drafting its first Climate Change Act (German Cooperation 2018). This upcoming Act is expected to outline specific instruments to prepare for a national ETS, with a cabinet decision due in 2022 (IEA 2020). This makes Thailand one of the most advanced countries in the Southeast Asia region in terms of legal preparedness for a carbon market.[84]

Under its 2015 INDC, Thailand has committed to reducing GHG emissions by 20% by 2030 compared to projected BAU levels with 2005 as the reference year (MoNRE 2015). It has also set up a conditional target, of up to a 25% reduction compared to BAU levels, subject to adequate and enhanced access to technology development and transfer, financial resources, and capacity building support (ibid). It further endorses MBMs in its NDC, stating that "Thailand recognizes the important role of MBMs to enhance the cost effectiveness of mitigation actions, and therefore will continue to explore the potentials of bilateral, regional and international market mechanisms" (ibid) Thailand submitted its updated NDC in 2020, in which its unconditional and

[81] There are four subcommittees under the NCCC: the Subcommittee on Climate Change Policy and Planning Integration, the Subcommittee on Climate Change Knowledge and Database, the Subcommittee on Climate Change Negotiation and International Cooperation, and the Subcommittee on Action for Climate Empowerment and Public Relations.

[82] This body reviews CDM projects for approval, provides technical assistance, plays an important the role in development of a GHG database, engages in capacity building, and promotes low carbon activities.

[83] Some have argued that the document contains numerous shortcomings: it is mostly a collection of plans from other agencies; it does not develop greenhouse gas reduction targets based on scientific knowledge and the country's current greenhouse gas inventory; and does not create space for public participation (Marks, 2011). Accordingly, NGOs have lambasted the plan and in January 2011 Prime Minister Abhisit Vejajiva responded to their criticisms by demanding the revise it such that all stakeholders be involved.

[84] See section titled "Technical dimension' for more details of the country's experience related to carbon markets.

conditional 2030 targets remained the same. It also stated that the country is formulating its first long-term low emissions development strategy (LT-LEDS) (MoNRE 2020). Thailand has also published a series of policy documents that work to lead to its NDC, including Thailand's NDC Roadmap on Mitigation 2021-2030 and Thailand's NDC Action Plan for the Energy Sector 2021-2030 (GGGI 2019). Other key regulations and government strategies include the Energy Conservation Promotion Act, Energy Industry Act (2007), National Strategies on Climate Change (2013-2017), Power Development Plan (2015-2036), Energy Efficiency Plan (2015-2036), Alternative Energy Development Plan (2015-2036), Smart Grid Master Plan (2015-36), Master Plan for Sustainable Transport System (2013-2017), Environmentally Sustainable Transport System Plan (2013-2030), Strategy for Climate Change in Agriculture (2017-2021)[85] (MoNRE 2018; Nachmany et al. 2015). Such a comprehensive policy framework on the one hand indicates Thailand's political commitment to climate action and hence is an enabling factor for carbon pricing; on the other hand, it raises challenges related to integrating effective carbon pricing into its already complex policy landscape.[86]

3. Economic dimension

Following Indonesia, Thailand is the second largest economy and GHG emitter in Southeast Asia (UNFCCC 2019). The industrial and service sectors have been the main drivers of recent GDP growth in Thailand. The country's total GHG emissions (excluding LULUCF) in 2016 amounted to 397.27MtCO_2e, with energy the largest sector (almost 50%), followed by transport (17%), agriculture (16%), industrial processes (12%) and waste (3%) (ICAP 2021). Thailand produces oil and natural gas but increasingly imports hydrocarbon to meet rising fuel demand. Reserves of crude oil and natural gas peaked in 2005 and 2006, respectively. Due also to high demand growth and access to imports, Thailand is now a net importer of both (US EIA 2017). As for CO_2 emissions from fuel combustion, electricity production accounted for the largest share in 2017 (36%), followed by the transport (31%) and industrial sectors (20%) (IEA 2020). Against this backdrop, the energy, industry, and transport sectors are key to achieving the country's mitigation targets. Give the size of its economy and the volume and composition of its emissions achieving these mitigation targets using carbon pricing could lead to substantial cost savings. Compared to much smaller ASEAN economies like Laos or Brunei, Thailand also would face fewer challenges relating to market power and liquidity under an ETS.

Traditionally, Thai policymakers have relied on the practice of giving higher priority to economic growth over environmental protection with its high economic growth occurring at the expense of environmental degradation, particularly deforestation (Marks 2011).[87] Its climate policy framework that has been built up over more than a decade shows a shift from this tradition, but the transformation is still only in its beginning stages. As such, effective multi-ministry coordination and stakeholder engagement are important for any carbon pricing policy.

A key obstacle for implementing an effective carbon pricing policy is the highly regulated power sector. The Thai power market is organised along the so-called enhanced single buyer model, where EGAT is both the largest supplier and sole buyer of electricity. EGAT is also responsible for generation (44% of total), transmission, and wholesaling, as well as overseeing the supply-demand balance. IPPs make up 29% of installed capacity, 12% is imported, and small and very small power producers make up the remaining 38%. Though legally other bodies have been allowed to obtain a transmission licence since 2011, only one has done so thus far. The state-

[85] The Strategy for Climate Change in Agriculture focuses mainly on adaptation. In addition, the country also has developed its first national adaptation plan.

[86] See section titled "Technical dimension' for more details of the on such policy interactions.

[87] In the post-war period, Thailand experienced one of the fastest rates of deforestation in the world: its forest cover declined from 54% in 1961 to around 25% in 2005 (ibid). Such rapid deforestation has also contributed to Thailand's GHGs.

owned Metropolitan Electricity Authority (27%) and Provincial Electricity Authority (72%) are responsible for the majority of retail distribution. Energy industry operations in Thailand are regulated by the Energy Regulatory Commission (ERC) (IEA 2021).

Electricity generation in Thailand spans natural gas (56%), coal (18%), and renewable energy (13%) (IEA 2021). Thailand leads ASEAN members on variable renewable energy (VRE) (EPPO 2020), and its Alternative Energy Development Plan aims to have a 30% share of RE (mostly solar and biomass) in final energy consumption by 2037 (DEDE 2020). Given that the power sector produces almost 40% of total CO_2 emissions from fuel combustion, it would be important to include it in the scope of a carbon pricing instrument. However, power operators have little scope to reduce emissions in response to a carbon price signal given that fuel mixes are determined by the Power Development Plan, and each power plant's output and fuel consumption are determined by power and fuel purchase agreements. Although the power sector participated in the first year of Thailand's voluntary emissions trading pilot, regulated electricity rates made the purchase of allowances difficult as power producers were unable to generate excess allowances to then sell. As a result, the power sector is not anymore included in the country's voluntary ETS pilot (IEA 2020).

While challenges evidently remain regarding the design of a policy that is compatible with the heavily regulated power sector, these hurdles are certainly not insurmountable. Modelling from the IEA has shown that even a modest carbon price in Thailand would drive fuel-switching and a coal-to-VRE shift (IEA 2021). In the long term, there is need for continued power sector reform to ensure that a carbon price signal would be effective (IEA 2020). But despite attempts to liberalise since the 1990s, the current uncompetitive structure of the power market under the control of state-owned enterprises poses challenges for carbon pricing (Wisuttisak 2012; Dodge, 2020). Against this backdrop, Thailand may consider a carbon pricing instrument that specifically considers the country's power sector context. In the short term, additional market regulations could be introduced to ensure carbon costs are reflected in tariff structures and dispatch decisions, while incorporating flexible provisions in existing long-term contracts to be phased out as liberalisation continues. Alternatively, a "shadow" carbon price in dispatch decisions could support the phase-in of an explicit carbon price and would drive generation shift and structural transformation of the electricity sector without suddenly significantly increasing operation costs (IEA 2021).

4. Technical dimension

Thailand has substantial experience with domestic carbon markets which date back to 2007 when the government established TGO to implement and manage GHG emissions projects. TGO launched two programs in 2013: first, the Thailand Voluntary Emission Reduction (T-VER) scheme, a baseline and credit program; and second, the Thailand Carbon Offsetting Programme (T-COP), which encourages public and private organisations to calculate their carbon footprint and buy carbon credits to offset their unavoidable emissions. By 2020 the T-VER programme had 191 registered projects that are due to reduce emissions by 5.28Mt CO_2e annually (IEA 2020). Most significantly, TGO launched the Thailand Voluntary Emission Trading Scheme (Thailand V-ETS) in 2015, after six years of preparation. It is designed to serve as a pilot ETS, establishing the infrastructure to develop a national ETS. The first phase (2015-2017) tested the MRV system across four industrial sectors, including cement, pulp and paper, iron and steel, and petrochemicals; set up a cap for facilities' scope 1 and 2 emissions; and allocated allowances for covered facilities. The second pilot phase (2018-2020) further tested the MRV system and the registry and trading platform, with five additional industrial sectors (petroleum refinery, glass, plastics, food and feed, and ceramics). It also continued testing allocation and trading. In 2020, MRV was developed for another three sectors (beverages and sugar, textiles, and flat glass) and

additional sector-specific guidelines were developed and improved. As such, currently Thailand is the most advanced country in Southeast Asia in terms of technical readiness for introducing a domestic carbon market.[88]

In addition, Thailand also has substantial experience in project-based market mechanisms such as the CDM and the Joint Crediting Mechanism (JCM).[89] Such experiences can be valuable in facilitating the adoption of carbon trading, as it creates regulatory expertise and vested interests in such a policy (Paterson, 2012; UBA, 2021). In addition, Thailand has a clear institutional structure and process for preparing its GHG inventories, National Communications (NCs) and Biannual Update Reports (BURs) (MoNRE 2018). One of the subcommittees under the NCCC is the Subcommittee on Climate Change Knowledge and Database. Under this, five sectoral working groups (energy, industrial processes, agriculture, LULUCF, and waste) have been set up to review the GHG inventory and provide recommendations. ONEP plays a central coordination role in this process. Data collection and quality control are both institutionalized, and inventory is a regular process that does not rely on external finance (UNFCCC 2019). A web-based reporting system is also in place. Thailand's MRV capacity has likely benefited from extensive experience with NAMAs. Furthermore, Thailand is one of only four ASEAN countries that has a facility level MRV system (ibid). However, it has not yet established a mandatory GHG reporting system, and there remains significant space for improvement regarding its MRV system (GGGI 2019).

Institutional capacity can be a constraint for effective carbon pricing policy. As the focal point of climate change, ONEP is considered to not have enough authority or influence to command other agencies to implement climate change policies (Marks 2011; Smits 2017).[90] It also suffers from a lack of manpower (ibid). In addition, as the main driver for carbon pricing policy in Thailand, TGO is a sub-ministry level body under the MoNRE. As such, its institutional profile is relatively low, compared to other ministries like the Ministry of Energy or Ministry of Industry; its ability to mobilise political support from other ministries and coordinate the policy-making process is therefore limited.

Policy coordination more broadly is indeed another key obstacle. The country currently has over 30 national and regional energy and climate policies in effect. Almost as many government ministries and agencies oversee them: 25 public bodies are responsible for drafting, implementing, and enforcing the policies (IEA 2020). Climate and environmental policies are scattered across many different agencies – besides the MoNRE, other key ministries include the Ministry of Energy, Ministry of Industry, Ministry of Transport, Ministry of Interior and Ministry of Finance. The energy policy-making process is slightly more straightforward: energy policies are drafted and implemented by the Ministry of Energy and the National Energy Policy Council, with contributions from other relevant government stakeholders. The NCCC could potentially play the role of coordinating climate with other policies especially energy, as the relevant ministries are involved.[91] ONEP acts as the secretariat of the NCCC, with TGO providing technical support and services to the carbon market actors. The MoNRE and higher political leadership must increase their involvement in the carbon pricing policy-making process to improve coordination between these various bodies.

[88] In the context of the PMR program, Thailand is also piloting an energy performance certificate (EPC) scheme.

[89] For more information, see https://www.jcm.go.jp/th-jp

[90] For example, the Ministry of Agriculture and Cooperatives and the Ministry of Industry have not given much priority to climate change policies.

[91] There is limited integration of the Power Development Plan with the Climate Change Master Plan and other mitigation activities (Smits 2017).

International donors and institutions such as the World Bank,[92] German Environment Ministry, the German GIZ, and the International Energy Agency have been working closely with Thailand in support of its climate policy, MRV system and carbon pricing instrument development (PMR 2019; adelphi 2018; GIZ 2014; GIZ 2018; IEA 2020). Such international cooperation will continue to help the country enhance its readiness for a carbon pricing.

5. Multilateral dimension

Thailand has held membership to the WTO since 1995, and in 2020 it signed on to the Regional Comprehensive Economic Partnership and became part of the world's biggest free trade bloc. The country has 14 FTAs in force, with East and Southeast Asian countries (including China), India, Australia, and New Zealand, and with Chile and Peru. Ten additional FTAs are currently under negotiation (ADB 2020). Its biggest trading partners are Japan, China, and the United States, with the US as its most important export market. Its most valuable exports are electrical machinery and equipment, and vehicles (UN Comtrade 2021).

Thailand's ties with jurisdictions that are already involved in developing or operating carbon pricing are important to the success of its own instrument. Japan, although a non-ASEAN country, is most proactive in the ASEAN region including in Thailand, through its JCM and capacity-building projects (Smits 2017). China has been piloting ETSs in eight regions and just launched the operation of its national ETS (ICAP 2021). Thailand has followed the Chinese carbon market development closely, motivated by the potential opportunity for Thai companies to generate certified emission reductions for the Chinese market—a domestic project-based offset mechanism—which may be used in the voluntary market and for compliance in China's national ETS in the future (Liu et al. 2015).[93] Similarly, South Korea's national ETS started its third phase in 2021, and there is a gradual loosening of the eligibility criteria that limit the offsets allowed on this market to only those that are generated domestically (ICAP 2021). As for the US, the Biden administration's interest in exploring carbon border adjustment measures (CBAM) could provide another impetus for Thailand to speed up and strengthen its ongoing work to introduce a carbon pricing instrument.

Thailand is also one of the original five members of ASEAN and is involved in climate and energy related initiatives under this regional setting. Established in 2009, the ASEAN Working Groups on Climate Change (AWGCC) works on five main areas: adaptation, mitigation, finance, technical transfer, and other cross-cutting issues (AWGCC 2021). Since 2017, the AWGCC has been working in carbon trading as one key topic; collaboration so far has been concentrated on MRV. In 2015, the ASEAN states also collectively agreed to pursue a 20% reduction in emissions by 2025 (Fadzell 2015). Thailand is also involved in the ASEAN Center for Energy, which represents the Member States' interests in the energy sector. Furthermore, it participates in the ASEAN Climate Change and Energy Project (ACCEPT), a regional climate and energy policy integration initiative funded by the Norwegian Government (ACCEPT 2018). The influence on a carbon pricing policy in Thailand from these various regional initiatives is so far limited. However, as an active member of ASEAN and a major economy in the region, Thailand could assume a leading role and become a reference point for its neighbouring countries by advancing its own domestic carbon pricing agenda and working closely with other regional advocates for carbon pricing such as Singapore (GIZ 2014).

[92] Besides the PMR, Thailand is also part of the World Bank's Networked Carbon Market initiative.

[93] Chinese media has also reported TGO delegation led by its president visited some Chinese carbon market related institutions in 2019, to explore collaboration opportunities (SinoCarbon, 2019).

6. Carbon pricing readiness and options

As the second largest economy and GHG emitter in Southeast Asia, Thailand's plans to implement a carbon pricing mechanism are already well underway – a dedicated institution, the TGO, was set up in 2007 whose mandate has gradually involved from managing GHG emissions projects such as the CDM to developing domestic carbon markets. Since then, and in particularly since the TGO launched the T-VER and T-COP in 2013 and started piloting an ETS in 2015, Thailand has accumulated substantial institutional, regulatory, and technical experience, which provide solid foundation for the introduction of carbon pricing. It has also a comprehensive climate policy and institutional framework and a relatively established MRV system. In addition, experience with international carbon market instruments such as the CDM and JCM can also prove beneficial for the country's carbon pricing potential. Thailand has participated in several capacity-building programs with the World Bank and Germany's GIZ. However, without concerted political and administrative effort to build on past initiatives and existing expertise, the lack of (in)formal and streamlined policy coordination processes may impede the introduction of carbon pricing.

Other barriers to carbon pricing include the influence of the carbon-intensive vested interests with country's power sector still dominated by fossil fuels and its electricity market heavily regulated. However, the green movement, particularly with the help of the tourism industry and growing acknowledgement from all sides of Thailand's vulnerability to the detrimental consequences of climate change and its impact on the economy, may well counteract these barriers. In this regard, it is becoming increasingly clear how the cost savings from a carbon pricing instrument could be substantial in Thailand. More broadly, the volatility of the current political landscape, questions regarding the level of democracy, and trust in the government could hinder Thailand's progress towards carbon pricing. A solid legal basis for carbon pricing to counter this could be provided by the country's first Climate Change Act that is currently under development – a mandate for carbon pricing via this Act would provide long term stability for carbon pricing.

Many of Thailand's key trade and investment partners already have (sub)national carbon pricing in place or upcoming, so learning from their experiences through bilateral forums and multilateral ones such as those provided by ASEAN and RCEP will be valuable.

When viewed through the lens of the analysis in UBA (2021), and considering the strides Thailand has already made, an ETS is the likelier route for the country over a carbon tax. A key obstacle to effective carbon pricing in Thailand remains the highly regulated (and high emitting) power sector, which for instance is not included in the current voluntary pilot ETS. A reluctance to include this sector in an ETS may be problematic and undermine effectiveness of the carbon pricing instrument. Furthermore, without market reform it will be difficult for entities to pass a carbon price down the value chain to consumers and thus the carbon price signal may be limited. In this context, Thailand may consider imposing a carbon tax in the sector. Alternatively, it may introduce additional market regulations in the short term to ensure carbon costs are reflected in tariff structures and dispatch decisions, while incorporating flexible provisions in existing long-term contracts to be phased out as power sector reforms start bearing fruit.

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A.14 Uzbekistan Factsheet

Uzbekistan			
Overall		**Political**	
Capital	Tashkent	**Electricity from fossil fuels**	90.6% of total generation (2019)
Govt structure	Republic	**Brown lobby**	Uzbekneftegaz; JSC "Thermal Power Plants"; Lukoil; GazpromNeft
GDP **GDP per capita**	USD 57.92 billion (2019) USD 7,288.80 (2019)	**Green lobby**	EcoForum of NGOs of Uzbekistan; Centre for Economic Development; Ecological Party of Uzbekistan
Population	33.58 million (2019)	**Perceived corruption**	Score=25 (2019) Min=9; Mean=43; Max=87 Germany=80
Legal		**Economic**	
Key government departments	Min. of Energy; Min. of Finance; Uzhydromet; Min. of Economy & Industry; Interdepartmental tariff commission; Commission on EE & development of RE sources	**Income group**	Upper-middle income
Key legal instruments	Electricity Law; Renewable Energy Law; Energy Efficiency Law; Law on Air Protection	**Gini index**	41.0 (2015) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	Green Economy Strategy; Programme of measures for the further development of renewable energy, energy efficiency in the economic and social sectors for 2017-2021	**Importance of industry**	Value-added: 33 % of GDP (2019) Employment: 23 % of total (2019) CO2 emissions: 59 % of total (2018)
FDI	4.1% of GDP (2019)	**Fossil subsidies**	7.31% of GDP (2019)
		Electricity market	Partial (i.e., legally) unbundled and single buyer model. Monopoly structure. Undergoing reform

Uzbekistan			
Technical		**Multilateral**	
MRV status	Preparation of primary roadmap (SGP support)	**Openness**	73% of GDP (2019)
UNFCCC reporting	1990-2012 National Inventory Report (2016), Third national Communication under the UNFCCC (2016)	**International agreements**	Commonwealth of Independent States, Shanghai Cooperation Organisation
Experience with carbon markets	CDM	**NDC**	Conditional: To decrease specific emissions of greenhouse gases per unit of GDP by 10% by 2030 from level of 2010 ("Achievement of the INDC long-term objective envisages [international] support")
Participation in WB initiatives	Not a CPLC partner Not a PMR partner	**NDC assessment**	Ambition not assessed by CAT; No refence to carbon pricing
Carbon pricing readiness and options			

- Reference to payments for GHG emission reductions in Uzbekistan's Green Economy Strategy, the centralisation of power in Uzbekistan and the high potential and urgency of energy efficiency improvements provide the foundation for the introduction of a carbon price in Uzbekistan.
- However, low energy prices, and the political and social sensitivity of energy price reforms, as well as the lack of transparency and a weak institutional and administrative framework, and high fossil energy dependency, are likely to be important limiting factors.

1. Political dimension

Vested interests of carbon-intensive industries can present significant challenges for carbon pricing. In 2018, the share of fossil fuel in Uzbekistan's total primary energy supply amounted to over 98% (IEA 2018). In 2019, around 3% of its electricity generation came from coal and over 85% from natural gas (IEA 2019). The Uzbek electricity sector is highly energy intensive, and the infrastructure is in dire need of modernization, as a result of insufficient investments in the post-Soviet period (World Bank 2013). Most power generation assets are between 40-50 years old, with an average efficiency of around 33%, and thus require urgent replacement (ADB 2017). With the exception of hydropower plants, power generation is controlled by the state-owned Joint Stock Company Thermal Power Plants. To improve the efficiency of electricity generation and ensure the security of electricity supply, new gas power plants are being built and new coal fired power plants are envisaged (President of Uzbekistan 2018; IEA 2019). These new fossil-based investments increase the risk of stranded assets and therefore opposition towards a carbon price, in particular by Joint Stock Company Thermal Power Plants and the potential investors that the Uzbek government seeks to attract in the power generation sector (Ministry of Energy of Uzbekistan 2020).

Uzbekistan has substantial gas reserves and is an important gas producer (BP 2020) but the production rate is declining. The high energy intensity of the Uzbek economy, and in particular the electricity production sector together with the declining production rate of natural gas puts pressure on Uzbekistan to ensure supply-demand adequacy in the gas sector and at the same time honour export commitments (mainly to China) (Pirani 2019). The Russian oil and gas company Lukoil is an important player in the Uzbek oil and gas production sector, besides the

state-owned oil and gas production company Uzbekneftegaz. These upstream energy companies are likely to oppose the full decarbonisation of the Uzbek economy, and in particular pricing measures that increase the cost of gas production and consumption. However, they could welcome the promotion of alternative energy sources (e.g., solar heating) in Uzbekistan, if this contributed to freeing natural gas for export, as domestic gas prices remain well below netback export parity. The promotion of solar energy is part of the Uzbek strategy to reduce pressure on the gas supply-demand adequacy (President of Uzbekistan 2019).

The weight of carbon-intensive industries in resisting carbon pricing can be counteracted by a green lobby. Different companies are active in low-carbon energy production in Uzbekistan. JSC Uzbekhydroenergo is the state-owned company charged with hydropower generation in Uzbekistan. Furthermore, several private enterprises are realising investments in solar energy, based on power purchase agreements with the single buyer. A number of environmental NGOs are also active in Uzbekistan, including Ecoforum of NGOs of Uzbekistan, the Centre for Economic Development that aims to promote the sustainable economic development of Uzbekistan, and the Association of "Enterprises of alternative fuels and energy". However, the influence of NGOs is limited by different institutional barriers, including concerning registration, funding and the organisation of activities (Yusupov 2020). The International Solar Energy Institute was established to promote the use of solar technology.

Uzbekistan has pursued a relatively ambitious clean energy policy in comparison to some of its neighbours in Central Asia (Shadrina 2019). Energy policy has focused on creating a dedicated hydropower company (Uzbekhydroenergo) and attracting investors in solar energy based on tenders and bilateral power purchase agreements. With the 2019 Green Economy Strategy (President of Uzbekistan 2019b), the government adopted long-term renewable energy and carbon intensity targets. The government has also implemented clean energy support mechanisms, providing an important signal to clean energy investors that in turn are likely to support an increasing level of ambition in low-carbon policy. The 2019 Green Economy Strategy refers to the "introduction of payment mechanisms for the reduction of GHG emissions", i.e., carbon pricing, to facilitate the clean energy transition.

The public acceptability of carbon pricing depends in part on trust in the government and the population's attitude to green issues. Electricity and natural gas prices in Uzbekistan remain heavily subsidised. The government subsidises thermal electricity production with direct budgetary transfers. More importantly, power plants, and gas consumers more generally, benefit from the supply of natural gas at price levels that are below export parity and even below cost recovery levels (World Bank 2013). With low energy prices, the government aims to ensure the affordability of energy supply. There are no budgetary transfers to vulnerable consumers. By keeping prices low for all, the government indirectly incentivises inefficiency in energy consumption and high energy dependence. In turn, high energy inefficiency and dependence increases the resistance against price reform measures, including the introduction of carbon pricing measures (Boute 2019). Energy price reform is an issue of high political and social sensitivity, as low energy prices are perceived as a vested right for the population, a common Soviet legacy in the region (Lampietti and Junge 2006). Popular resistance against price reforms in the energy sector can also be explained by the perception of mismanagement within the electricity sector (Boute 2019). In 2019, Uzbekistan was ranked 153rd among 198 countries assessed by Transparency International for its perceived levels of public sector corruption. The lack of transparent management of the energy utilities, and more generally the perception of corruption, undermines the reform of energy prices based on the principles of cost recovery and the internalisation of the carbon externality, and thus the introduction of carbon pricing.

2. Legal dimension

Uzbekistan is a unitary constitutional republic. The President of Uzbekistan is head of the state and head of the executive branch. The constitution recognises the people as the sole source of state power. Presidential and parliamentary elections are held, but under tight control (EIU 2019). The Ecological Party is represented in Parliament but also considered as a "pro-government creation" (EIU 2019). Strong centralisation of power facilitates the adoption and implementation by the President of Uzbekistan of ambitious reforms. The adoption and implementation of the 2019 Green Economy Strategy (President of Uzbekistan 2019b) illustrates that clean energy is on the agenda of the President. The President and Cabinet of Ministers are hereby assisted by the Commission on Energy Efficiency and Development of Renewable Energy Sources and the State Committee of The Republic of Uzbekistan For Ecology and Environmental Protection. The reference to payment mechanisms for the reduction of GHG emissions in the 2019 Green Economy Strategy indicates that the use of carbon pricing as an instrument to facilitate the green transition is envisaged.

Uzbekistan has not adopted a flagship climate law and, with the exception of methane, GHG emissions remain largely unregulated. The Law on Atmospheric Air Protection (adopted in 1996 and later amended) applies to methane, among other pollutants, but not to carbon dioxide or other GHGs. The law combines a system of normative limits and taxes per type of emission and polluting facilities. Entities that exceed the regulatory limits can be forced to close their installations. The implementing Decree on Economic Mechanisms for Ensuring Nature Protection (2018) creates a system of "compensation payments" for emissions. Given the obsolete state of the gas distribution system and resulting leaks, the application of compensation payments to methane could in theory drive modernisation efforts of the gas infrastructure. However, the low level of these payments alongside regulated gas prices limit the effectiveness of this mechanism. If the level of "compensation payments" were to be increased and payment effectively enforced, and the scope of the law were amended to include CO_2, the Law on Atmospheric Air Protection and its implementing Decree could potentially provide the basis for the introduction of carbon pricing in Uzbekistan.

The electricity sector is governed by the Law on Electric Power (2009) and the Natural Monopoly Law (1999), and the gas sector by the Subsoil Law (1994), the Law on Production Sharing Agreements (2001) and the Concession Law. These legal acts do not include any reference to sustainability and decarbonisation. The focus is on security of supply and, in the case of electricity, affordability. Uzbekistan's Law on the Use of Renewable Energy Sources (2019) specifically focuses on clean energy, creating the legal framework for the promotion of renewable energy in the electricity sector (Dentons 2019b). In addition, the Law on the Rational Use of Energy Sources (1997) creates the legal framework governing energy efficiency improvements. However, both legal acts remain relatively vague and broadly formulated. Renewable energy targets, support mechanisms (in particular auctioning, tax benefits and consumer subsidies), the regime governing the access of clean energy installations to the network, as well as mechanisms to promote energy efficiency improvements, are set by Presidential Decree (e.g., the Green Economy Strategy, the 2017 Presidential Decree Energy Efficient and Energy Saving Technologies, and the 2019 Presidential Decree On Accelerated Measures to Increase Energy Efficiency in Economic and Social Sectors).

Uzbekistan signed the Paris Agreement on Climate Change in April 2017 and ratified it in September 2018. Uzbekistan's NDC includes the objective of decreasing GHG emissions per unit of GDP by 10% by 2030 compared to 2010. To achieve this objective, Uzbekistan aims to strengthen its legal framework to promote renewable energy and energy efficiency, and promote investments in energy efficiency and renewable energy sources, with the objective of

increasing the share of solar energy in the total energy fuel mix to 6% by 2030. According to Uzbekistan's Green Economy Strategy, Uzbekistan aims to achieve 25% of total electricity production from renewable energy by 2030. The President of Uzbekistan (2017) also set an intermediate target of 19.7% electricity production from renewable energy sources by 2025, including 15.8% hydropower, 2.3% solar power and 1.6% wind power.

Uzbekistan aims to attract foreign investments in the electricity production sector and in the oil and gas sector to increase production (President of Uzbekistan 2019). In particular, foreign investors are sought for the construction of new coal-fired power plants (President of Uzbekistan 2018; IEA 2019). As contracting party to the Energy Charter Treaty and to many bilateral investment treaties, Uzbekistan could face investment treaty arbitration claims in the instance foreign investors in carbon intensive assets decided to challenge the legality of decarbonisation measures interfering with their investments before international arbitration. The threat of such proceedings, and Uzbekistan's experience as respondent in different investment arbitration proceedings in the energy sector, could potentially dissuade the government to introduce an ambitious carbon pricing scheme, following the theory on the "regulatory chill" effect of investor-state dispute settlement (Tienhaara 2018).

3. Economic dimension

Uzbekistan is a growing low-income country, with significant natural gas reserves (BP 2020) but high energy intensity and growing domestic energy needs. Uzbekistan's CO_2 emissions amounted to 108 million tonnes in 2018 and have decreased 8% since 1990. The distribution of emissions spans electricity and heat production (34.26%), transport (13.89%) and industry (10.18%), with buildings, agriculture, making up the rest. Taking into account the energy and carbon intensity of the Uzbek industry, and the fact that it amounted to 23% of national employment in 2019, decarbonisation has important economic and social implications in a country where, according to the World Bank (2020), "the number of people living in poverty (USD 3.2 a day, 2011 purchasing power parity adjusted) has increased during the pandemic to 9% of the population (well above the pre-crisis projection of 7.4% in 2020), as the pandemic led to job losses, income reductions, and declining remittances".

In December 2020, Uzbekistan announced cuts to its exports of gas to China in order to maintain domestic supply despite the economic impact of the COVID-19 crisis (Reuters 2020). It is expected that by 2025 the country will no longer export natural gas (Tashkent Times 2020). For instance, Uzbekistan is developing petrochemical capacity using gas as feedstock (Pirani 2019). Uzbekistan thereby aims to obtain higher value from the country's gas resources, but this development is likely to result in higher domestic GHG emissions.

The difficulty to maintain the domestic gas supply-demand adequacy and continue to export gas to more lucrative foreign markets, is at least partly related to Uzbekistan energy pricing policy. By keeping domestic gas prices low (below export parity levels), the government incentivises irrational consumption, and wastes budgetary income from export transactions (World Bank 2013). Fossil fuel consumption subsidies amounted to USD 1.9 billion in the electricity sector and USD 4.5 billion in the gas sector in 2018 (IEA 2018). In addition, direct subsidies to the power generation sector amounted to approximately USD 33 million in 2018 (President of Uzbekistan 2018b). Tariff reforms towards cost recovery levels of gas prices were announced in 2019 (President of Uzbekistan 2019), but these fall short of transitioning towards export levels.

The Uzbek state-owned electricity utility Uzbekenergo has been unbundled in to different joint stock companies in charge of production (JSC Thermal Power Plants and JSC UzbekHydroEnergo), transmission (JSC National Electric Grids) and distribution (JSC Regional Electric Grids) (President of Uzbekistan 2019c; Dentons 2019). The objective is to organise the

sector on a market basis, but significant further reform is needed to move from the existing (quasi-)monopoly and single buyer model to a fully liberalised market (Boute 2019). Based on the supply-demand forecast of the Ministry of Energy, investments in electricity production are determined by the President of Uzbekistan, and electricity prices are set by the Inter-Ministerial Tariff Commission chaired by the Minister of Finance (Cabinet of Ministers of Uzbekistan 2019). The Antimonopoly Committee monitors and controls the application of electricity tariffs by the regulated entities. In principle, the network company shall ensure that all market participants benefit from non-discriminatory access to the network (Cabinet of Ministers of Uzbekistan 2019b). However, state-ownership over production, transmission and distribution negatively affects the integrity of the network access and dispatch regime. The regulation of electricity prices, and the high sensitivity of tariff increases in a context of poverty, as well as obstacles to economic dispatch, could undermine the introduction of carbon pricing in the Uzbek electricity sector. The electricity market reform process is still ongoing. In 2020, the government announced the creation of a competitive wholesale market by 2023, together with the establishment of an independent energy market regulator and electricity market operator (Dentons 2020). At least in theory, these reform measures follow the reform textbook and, if adequately implemented, could facilitate the introduction of carbon pricing. Given high levels of poverty, electricity price increases resulting from the introduction of carbon pricing are likely to be unacceptable without proper protection of vulnerable segments of the population.

Pending the adoption and implementation of further reform measures, the President of Uzbekistan seeks to attract private and foreign investments in electricity production based on Public Private Partnerships (e.g., Independent Power Plants and management contracts). Public Private Partnerships are also envisaged in the downstream gas sector. Similarly, in the renewable energy sector, investments are made based on bilateral agreements with the government, based on auctioning. Uzbekistan's first renewable energy auction, organised in 2019, was a success, as it attracted investor interest at 2.7 cents per kilowatt hour, at the time "one of the lowest tariffs seen in emerging markets" (IFC 2019).

4. Technical dimension

A key hurdle for the implementation of both carbon taxes and ETS is the difficulty to develop and operate a robust MRV system in Uzbekistan. Uzbekistan's 2019 Green Economy Strategy refers to the establishment of a system of MRV for GHG emissions, and the Concept of Integrated Socio-Economic Development of Uzbekistan until 2030 sets out the objective of continuous and effective monitoring of CO_2 emissions. A primary road map for the creation of a national MRV system was prepared with SGP support (Mustaeva 2020). Furthermore, MRV in the Uzbek energy sector is likely to benefit from the initiative to establish a Unified Information System for the production and consumption of fuel and energy resources (President of Uzbekistan 2020) that is expected to include the automatic collection, systematisation and analysis of metering data for the electricity produced in Uzbekistan. However, these measures are still limited to policy objectives, with limited implementation measures undertaken so far. Uzbekistan has some MRV experience due to involvement in CDM projects, e.g., in the gas distribution sector. The CDM experience, together with experience gained from the implementation of emission limits and charges under the Law on Atmospheric Air Protection and Decree Economic Mechanisms for Ensuring Nature Protection, could facilitate the introduction of carbon pricing.

Uzhydromet, or the Centre of Hydrometeorological Service of the Republic of Uzbekistan, is responsible for the implementation of the Paris Agreement in Uzbekistan, and more generally for the coordination of climate change related activities (Cabinet of Ministers 2017). The General Director of Uzhydromet is the national Focal Point under the UNFCCC. The State Committee for Ecology and Environment Protection of Uzbekistan is responsible for environmental protection.

It is charged with monitoring compliance with environmental legislation and, in this capacity, could play a role with the verification of emission monitoring, in cooperation with the Ministry of Energy that was charged by presidential decree (2020) with the Unified Information System for the production and consumption of fuel and energy resources. However, institutional overlap and the lack of clarity on the responsible entity for MRV is likely to complicate the development and operation of a robust MRV system in Uzbekistan.

5. Multilateral dimension

Uzbekistan is not a member of the WTO. Membership negotiations were initiated in 1994 and then interrupted until their recent resumption in 2020 (WTO 2020). Uzbekistan is a member of the Commonwealth of Independent States and recently became an observer in the Eurasian Economic Union, the economic union of Russia, Belarus, Kazakhstan, Kyrgyzstan and Armenia (Grata 2020). Potential accession to the Eurasian Economic Union would contribute to the integration of the Uzbek energy market with its neighbours (in particular Russia, Kazakhstan and Kyrgyzstan), as the Eurasian Economic Union aims to create an integrated electricity and natural gas market (Shadrina 2018; Kembayev 2019). Uzbekistan is a contracting party to the Energy Charter Treaty and is thus bound by its investment protection, transit and trade regime, the latter serving as a "steppingstone" to the WTO (Energy Charter Secretariat 2004; Boute 2016).

The Central Asian energy infrastructure was originally developed as a unified system (the Central Asia Power System) during Soviet times. Electricity and gas networks remain interconnected, but cross-border exchanges have suffered from the objective of energy independence pursued by the Central Asian states, including Uzbekistan, following the collapse of the Soviet Union (Boute 2019; Boute 2016b). International initiatives promoted by the World Bank and the Asian Development Bank have sought to restore a certain degree of cooperation, taking into account the efficiency gains that are characterised with the integrated approach to electricity supply in the region (World Bank 2015). Geopolitical tensions in the region have long blocked attempts at regional energy market integration involving Uzbekistan. Under the administration of President Mirziyoyev, who succeeded President Karimov in 2016, cooperation has been reinitiated and new agreements on energy exchanges signed (Boute 2019).

Uzbekistan's neighbour Kazakhstan has adopted an ETS, covering amongst other sectors electricity production. Integration of Uzbekistan with the regional energy market, and in particular electricity cooperation with Kazakhstan, could be a driver for the adoption of a carbon pricing mechanism in Uzbekistan. The Regional Dialogue on Carbon Pricing in Central Asia, co-organised by the Regional Environmental Centre for Central Asia (2021), UN ESCAP, UNDP, UNEP and the ADB, aims to facilitate this transfer of experience at the regional level. The possible adoption of an ETS in Russia (see Russian Factsheet) could influence Uzbekistan to adopt a carbon pricing mechanism. However, the difficulties Kazakhstan has faced with the implementation of its ETS could contribute to a negative perception of this instrument in Uzbekistan.

The adoption of carbon pricing could also be facilitated by the intense cooperation of Uzbekistan with multilateral development banks, in the context of the recent reform efforts initiated by the new presidential administration. For instance, the European Bank for Reconstruction and Development (EBRD) assisted Uzbekistan with the development of a Low-carbon Roadmap for the Electricity Sector (EBRD 2019) that demonstrated the cost-effectiveness of carbon neutrality by 2050 and recommended the introduction of carbon pricing to achieve this objective (Ministry of Energy of Uzbekistan 2021). In February 2021, both parties signed a memorandum of

understanding on long-term collaboration toward reaching carbon neutrality by 2050 (Kawase 2021).

6. Carbon pricing readiness and options

Uzbekistan's Green Economy Strategy, adopted by Presidential Decree in 2019, mentions carbon pricing as an instrument of national climate policy. Given the high centralisation of power in Uzbekistan, endorsement by the President provides a strong signal for the future adoption of carbon pricing. However, low energy prices, and the political and social sensitivity of energy price reforms, as well as the lack of transparency and a weak institutional and administrative framework, are likely to be important limiting factors.

Uzbekistan is an important producer of natural gas but, as a result of inefficient consumption and the high energy intensity of the economy, the supply-demand adequacy is under great pressure. Interruptions to gas exports, in favor of domestic supply at artificially low prices, negatively affects the public budget and the attractiveness of the Uzbek gas sector for investors. Although vested interests in thermal power generation are likely to oppose carbon pricing, gas companies could welcome initiatives aiming at transitioning the Uzbek economy to alternative energy sources, freeing gas resources for exports in significantly more lucrative conditions. The initiative of the President to attract foreign investments in coal-fired and gas-fired power generation could undermine carbon pricing if the investors threaten to challenge this measure before international arbitration, e.g., based on the Energy Charter Treaty.

The electricity market is undergoing reform, with the objective of creating a competitive wholesale market by 2023. Although this objective is likely too ambitious given deep-rooted institutional constraints to liberalisation, the reform of the electricity market provides an opportunity to integrate carbon pricing into the electricity market architecture, and decarbonisation as an objective of electricity market regulation. Simultaneous reform of the gas market could add pressure on end-user prices if the gas reform results in netback export parity. This could exacerbate popular resistance to higher energy prices, in particular if the energy market reform fails to improve management transparency and popular perception of the sector.

Uzbekistan has started to promote the development of renewable energy sources and energy efficiency improvement. A legal framework is in place, but it remains relatively vague. Policy initiatives, in particular the auctioning of renewable energy projects, have been successful in attracting investor interest in the country's low carbon energy resources at competitive prices. Investors in the green economic transition announced by the President could lobby for further ambition, including the introduction of carbon pricing to level the playing field with thermal power plants in the reformed electricity market.

Besides the Renewable Energy and Energy Efficiency law, the low-carbon transition is governed by the Green Economy Strategy. Uzbekistan has not yet adopted a flagship climate law. The Law on Air Protection could provide a potential legal basis for the introduction of carbon pricing. The Green Economy Strategy recognises the importance of MRV. The realisation of CDM projects in Uzbekistan provides a limited degree of experience with MRV. However, the adoption and operation of a robust MRV system suffer from institutional overlap.

In recent years, Uzbekistan has renewed its cooperation in the energy sector with neighbours. Integration with the Kazakh electricity market, e.g., on a bilateral basis or following Uzbekistan's possible accession to the Eurasian Economic Union, could drive the adoption by Uzbekistan of carbon pricing, following the ETS in Kazakhstan. However, the importance of energy independence for Uzbekistan and Kazakhstan's difficulties with the ETS could be used against the adoption of carbon pricing.

When viewed through the lens of the analysis in UBA (2021), Uzbekistan is more likely to adopt a carbon tax than an ETS, starting out as energy subsidy removal in an energy price rationalisation drive which could later evolve into a carbon tax using existing laws. Low technical capacity, the current legal framework and inadequate experience to support the design and operation of an ETS are important obstacles to the adoption of an ETS. A carbon tax could be integrated into the existing Law on Air Protection that already covers methane emissions. At the same time, limited transparency could work against the introduction of a carbon tax, which is also likely to face heavy resistance from JSC Thermal Power Plants and potential foreign investors in fossil-based electricity production.

A.14.1 Uzbekistan Bibliography

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A.15 Vietnam Factsheet

Vietnam			
Overall		**Political**	
Capital	Hanoi	**Electricity from fossil fuels**	65% of total generation (2018)
Govt structure	Socialist republic	**Brown lobby**	PetroVietnam; ExxonMobil; Chevron; BP; Zarubezhneft
GDP **GDP per capita**	USD 810.0 billion (2019) USD 8,397.0 (2019)	**Green lobby**	VBCSD; VGCB; VCEA; GreenID
Population	96.5 million (2019)	**Perceived corruption**	Score=37 (2019) Min=9; Mean=43; Max=87 Germany=0
Legal		**Economic**	
Key government departments	Min. of Natural Resources & Environment; Min. of Finance; Min. of Planning & Investment; National Climate Change Committee	**Income group**	Lower-middle income
Key legal instruments	Revised Law on Environmental Protection; Green Growth Strategy; Decision 1775/QD-TTg	**Gini index**	35.7 (2018) Perfect equality/inequality=0/100 Germany=31.9 (2016)
Related policies	National Energy Development Strategy of Vietnam to 2030, with a vision to 2045 (Resolution No. 55)	**Importance of industry**	Value-added: 34.5% of GDP (2019) Employment: 28% of total (2020) CO2 emissions: 76.5% of total (2018)
FDI	6.2% of GDP (2019)	**Fossil subsidies**	9.9% of GDP (2017)
		Electricity market	Vertical monopoly with limited private participation in electricity generation

Vietnam			
Technical		**Multilateral**	
MRV status	National and sectoral systems under development	**Openness**	210% of GDP (2019)
UNFCCC reporting	2nd biennial update submitted	**International agreements**	ASEAN (1995); US-BTA (2000); APEC (2008); WTO (2007); RCEP (2020)
Experience with carbon markets	JCM, CDM	**NDC**	(Un)Conditional: (9%) 27% below BAU (incl. LULUCF) by 2030
Participation in WB initiatives	PMR implementing country participant; Not a CPLC partner	**NDC assessment**	CAT: Critically Insufficient; NDC refers to market-based instruments and trading carbon credits under Article 6 of the Paris Agreement

Carbon pricing readiness and options

- Legal mandate to establish an ETS. It adopted the Law on Environmental Protection in November 2020, which will enter into force on 1 January 2022. MOF and MONRE are considering a timeline for ETS implementation; a pilot system is expected to start by 2025 and to become fully operational by 2027.
- The government has established a clear institutional infrastructure for implementing climate policy with the authority to issue direction to all relevant ministries and the People's Committees of all 63 provinces.
- Given the culmination of long-awaited power market reforms, government policies and commitments supporting renewable generation, and increased foreign direct investment, renewable energy generation is growing substantially despite continued reliance in coal.
- Support for low-carbon development is tempered by FDI in coal power and the government's commitment to using coal power to address security of supply challenges.
- The government is currently developing an MRV with support from the PMR and has piloted the MRV system in the steel and waste-to-power sectors through a NAMA.
- Vietnam can pursue multilateral cooperation on several fronts given existing trade relationships with jurisdictions with established or emerging ETSs including China, New Zealand, and Indonesia.

1. Political dimension

Thanks to thirty years of socio-economic reforms, Vietnam's GDP per capita has increased dramatically, growing 2.7 times between 2002 and 2018 and reaching over US$8,397 in 2019. The country has lifted more than 45 million people out of poverty (World Bank 2020a). At the same, Vietnam's per-capita greenhouse gas emissions grew at the fastest rate in the world reflecting the energy demands of the developing nation (World Bank 2020a). Growing energy demand has been primarily met through increasing coal-fired generation, and as a result in 2018 fossil fuels contributed 80% to the country's TPES, and 65% of electricity generation (IEA 2021).

The government has worked to address shortages in capacity by expanding the country's coal fleet with 15 new coal power projects, diminishing coal exports, increasing coal imports, and welcoming investments from more developed Asian economies including China, South Korea, and Japan (Tatarski 2020). Vietnam's Deputy National Assembly Chairman has made it clear that the country will continue to rely on coal-fired power generation as it is major energy source in the following decades to ensure energy security. Though rapid growth in renewables drove some abandonment of new coal-fired projects, these cancellations arguably contributed to energy shortages and drove the decision to maintain coal as a main source of energy (IEA Clean Coal Center 2020). Additionally, government has also worked to establish a defined institutional structure to implement climate change policy, with MONRE acting as the national focal point to

the UNFCCC and the lead climate change agency, as well as formulating all national climate change policy and coordinating the implementation of climate actions across sectors and sub-national governments (Nguyen Sy 2017). Vietnam is a socialist country led by the Vietnam Communist Party, which holds a national congress every five years to outline the country's overall direction. The National Assembly is the highest organ of the people and State power, and appoints the President (the Head of State, responsible for representing Vietnam internally and externally), and the Prime Minister (the head of the government and deputy leader of the National Assembly) (Embassy of the Socialist Republic of Vietnam in the USA 2021). Under the Prime Minister, the National Committee for Climate Change (NCCC), an inter-ministerial committee established in 2012 to formulate and implement climate policies following the National Climate Change Strategy, is the highest-level institutional body responsible for climate change policy (Strauch et al. 2018). Chaired by the Prime Minister and two vice chairmen (the Deputy Prime Minister and the Minister of MONRE), the committee coordinates the development and implementation of the country's climate policies and has authority to issue directions to all relevant line ministries and the People's Committees of all 63 provinces (Nachmany et al. 2015; McKinley et al. 2015).

The Department of Climate Change in MONRE hosts the Standing of Office of the NCCC. MONRE is also responsible for reviewing and planning climate budgets in conjunction with the MPI and the Ministry of Finance (MOF). MPI coordinates the country's development strategies, planning, and national investments, including mobilising and managing ODA and climate finance. The MPI is also responsible for the National Green Growth Strategy and oversees related policy development and implementation. Other ministries are responsible for mainstreaming climate change issues and Vietnam's climate policy framework into their strategies and plans, including the Ministry of Agriculture and Rural Development (MARD), the Ministry of Industry and Trade, the Ministry of Construction, the Ministry of Transport (MOT), the Ministry of Foreign Affairs, the Ministry of Science and Technology (MOST), and the Ministry of Education and Training (Strauch et al. 2018).

The government's efforts have been buttressed by a strong push for clean energy programs from Vietnam's green lobby, including the Vietnamese Business Council for Sustainable Development (VBCSD), Vietnam Green Building Council (VGCB), and the Vietnam Clean Energy Association (VCEA). Some key players, such as the environmental NGO Green Innovation and Development Centre (GreenID) are known internationally for their work. Conferences such as the Vietnamese Sustainability Forum have also generated attention and, in conjunction with government policies, resulted in substantial renewable energy investments. Throughout 2020 rooftop solar installations in Vietnam grew significantly, rising from a 2019 base of 378MWp to 9.583GWp, spread across almost 102,000 systems (Gunther 2021).

Given Vietnam's structure as a one-party socialist republic, the majority of policy efforts are government driven, emphasizing the importance of transparent and effective government institutions to effectively implement climate policy and carbon pricing. Vietnam ranked 96 th out of 198 countries on perceived corruption in 2019 with a score of 37 (Transparency International 2021), indicating moderate trust in the government. Its performance in regulatory quality and government effectiveness as measured on a scale from -2.5 to + 2.5 were moderate as well, with scores of -0.26 and 0.04 respectively (World Bank 2019b). These indicators emphasize that a carbon pricing mechanism will need to be well-designed and go through a robust stakeholder process to ensure compatibility with Vietnam's international goals and socioeconomic development plans.

2. Legal dimension

Domestically, Vietnam has several laws and policy developments that have contributed to the momentum for carbon pricing mechanisms. In November 2020, Vietnam's National Assembly adopted the revised Law on Environmental Protection, which establishes a mandate for the MONRE and the MOF to design a domestic emissions trading scheme and a crediting mechanism. The framework legislation gives MONRE a legal mandate to establish an emissions trading scheme, set a cap, and determine the method of allowance allocation, and allows for the inclusion of domestic and international offsets. The Law on Environmental Protection will enter into force on 1 January 2022. MOF and MONRE are considering a timeline for ETS implementation; a pilot system is expected to start by 2025 and to become fully operational by 2027 (ICAP 2021).

Policy developments have been guided by Vietnam's 'Green Growth Strategy' (2012), which sets the objective of a low-carbon economy and cites the use of market-based instruments as an avenue to achieving the strategy. In line with the strategy, 'National Appropriate Mitigation Actions' (NAMAs) are being implemented in the agriculture, forestry, waste, industry (steel, cement, chemical), and power sectors. Issuance of policy guidance, such as Decision 1775/QD-TTg in 2012, which approved the management of GHG emissions and carbon credit business activities in the world market, have also been key to the development of a carbon pricing mechanisms (Prime Minister of the Socialist Republic of Vietnam 2012).

These developments are further supported by renewable energy and energy efficiency laws. In 2015 Vietnam adopted the Renewable Energy Development Strategy 2016 – 2030 with an outlook to 2050. The strategy outlines a plan to reduce coal and oil imports and increase the number of renewable energy sources and renewable energy-based grid-connected power plants, including hydropower, wind power solar power, biomass, and solar power (Thucm 2016). Renewable energy development is supported by power sector policies designed to guarantee investment in renewable technologies. These include feed-in-tariffs applicable to renewable energy projects, prioritizing connecting renewable energy project to the national power system, and a net-metering mechanism (Thucm 2016). Renewable energy sector development was further supported by the 2016 revision of the Vietnam Power Development Plan VII for 2011 - 2020 Period with the Vision to 2030 (PDP VII). The plan highlighted specific renewable energy targets to increase the share of electricity produced from renewable sources (excluding large and medium scale hydropower) to over 10% in 2030 and outlines a specific goal of 6 GW of total wind power capacity by 2030, and 12 GW of total solar power capacity by 2030 (Prime Minister of the Socialist Republic of Vietnam 2016). In the recently released Vietnam Power Development Plan VIII for 2021 – 2030 with a vision to 2045 (PDP VIII), MOIT establishes a more substantial renewable energy target and highlights a more diminished role for coal. The plan increases the renewable energy target to almost 30% by 2030, excluding hydropower, and outlines a specific goal of developing an additional 9 GW of near-shore wind power, 2-3 GW of offshore wind power, and 7 GW of solar power (Sawayama & Tran 2021).

Energy efficiency targets are supported by the National Energy Efficiency Programme 2019 – 2030. This programme specifically sets an objective to achieve an efficiency rate of 8-10% of total national commercial energy consumption for 2019-2030 based on the energy demand forecasted in the PDP VII. The objective is to be realized through energy efficiency technical standards for the design, retrofit or construction of new buildings; promoting and advancing energy efficient vehicles and equipment for use across sectors; developing energy conservation standards and procedures for the transport and fisheries sector; training and developing personnel; and establishing a National Foundation for Energy Efficiency and Conservation Promotion (Ministry of Construction 2017; Ministry of Industry and Trade 2018).

Vietnam's climate efforts have been noticed by foreign enterprises as foreign investment companies have shown particular interest in renewable energy sector development and the country's developing carbon market after Vietnam implemented the VNPMR project in the steel and waste-to-power sectors with support from the PMR (Vietnam Investment Review 2020). However, these developments are tempered by the share of FDI in Vietnam's carbon-intensive industries, as approximately 6.2% of the country's GDP is generated by foreign investments, a portion of which is attributed to investments from China, Japan, and South Korea in 15 planned Vietnamese coal plants (Tatarski 2020).

All of Vietnam's actions to mitigate emissions are captured in the country's updated Nationally Determined Contribution (NDC), which makes specific reference to carbon markets. Released in 2020, the document highlights an increase in its unconditional emission reduction target to 9% by 2030 relative to 2014 emissions. The NDC also includes a conditional target whereby Vietnam commits to reducing emissions by 27% by 2030 relative to 2014 emissions with international support through bi-lateral, multilateral cooperation as well as through the implementation of market and non-market mechanisms under Article 6 of the Paris Agreement (Socialist Republic of Vietnam 2020). International engagement efforts are further supported by an International Cooperation Department at the MONRE.

3. Economic dimension

In the past three decades, socio-economic reforms under the 'Doi Moi' (Renovation) have gradually transformed the centrally planned economy into a socialist-oriented market economy, enabling the country to successfully transition to lower middle-income country status in 2009. As of 2019, GDP amounted to USD 810 billion and GDP per capita was USD 8,397 when measured in current PPP units using World Bank data. Vietnam scores well on the Global Competitiveness Index, demonstrating strong macro-economic stability (World Economic Forum 2019). The country's labour market flexibility could be improved, especially by upgrading the skills of the workforce. That said, internal labour market mobility is high, demonstrating that Vietnamese workers and firms are well equipped to respond to market changes (ibid). Vietnam has also improved its trade costs in recent years, though has untapped potential in leveraging international goods exchange, as well as regional value chain trade (Shepherd 2017). The economy would benefit from additional transportation and connectivity infrastructure (World Bank 2020b). The measures adopted to confront the COVID-19 pandemic in Vietnam and across the world are currently affecting Vietnam's economic performance, as limited use of domestic goods and services, stalled production in countries that serve Vietnam's production processes, and diminished consumption of imported goods in Asia, the U.S. and the EU have all taken a toll on Vietnam's economic performance (ILO 2020).

Rapid economic growth has made Vietnam increasingly dependent on fossil fuels, as the country's energy system "carbonised" even faster than China's (Zimmer at al. 2015). Vietnam's industry, which includes construction, utilities and mining as per World Bank definition of sector, generated approximately 76.5% of the country's CO_2 emissions in 2018 (IEA 2021); contributed 34.5% of GDP in 2019 and provided 28% of total employment in 2020 (World Bank, 2021a; 2021b, 2020a). Electricity consumption in Vietnam has tripled over the past decade, and the power sector itself accounts for nearly two-thirds of the country's greenhouse gas emissions (IEA 2021). This is due to a rapidly growing population, increased speed of development, and the government's decision to rely on coal as a primary energy source for Vietnam in the PDP VII (Dang & Taghizadeh-Hesary 2019). Fossil fuels make up 65% of Vietnam's electricity supply in 2018 (IEA 2021) and are heavily subsidised, which the IMF estimates to amount to 9.9% of GDP (IMF 2021).

In recent years, the country has emerged as an important oil and gas producer in Southeast Asia, producing around 375 billion cubic feet (BcF) of dry natural gas in 2016 (IEA), thanks to foreign investment and cooperation in the oil and gas sectors, (EIA, 2017). PetroVietnam is the key company in the oil and natural gas sectors and serves as the primary operator and regulator of the industry. Oil and natural gas production are either undertaken by PetroVietnam's upstream subsidiary or through PetroVietnam's joint venture with other companies, including international oil companies such as ExxonMobil, Chevron, BP, and Zarubezhneft, as well as several Asian national oil companies that have formed partnerships with PetroVietnam. All of the country's production is consumed domestically, and Vietnam does not import or export natural gas (EIA 2017).

The Vietnamese government is currently developing two liquified natural gas (LNG) terminals in the south of the country to help satisfy growing demand, with both terminals expected to come online in 2023. However, many of the country's remaining natural gas reserves are costly to develop due to their location. Vietnam also produces and exports coal, though exports have diminished in recent years as coal-fired generation has been used as the least expensive way to address power shortages and volatility in the country's hydroelectricity supply (EIA 2017). As of 2015 Vietnam became a net coal importer, receiving 45% of Southeast Asia's thermal coal imports in 2019. With more coal-fired power plant projects in the pipeline, its low domestic coal production will continue to make it reliant on imports, predominately from Indonesia and Australia (Wang & Hui Tan 2020).

Vietnam's heavy reliance on coal stems from difficulties in meeting a soaring energy demand as well as a non-competitive energy market. These issues are reflected in Vietnam's updated NDC, which commits the country to developing hydro-power, co-generated biomass, and gas power to address these challenges, as well as prioritizing wind and solar development in line with the ability to ensure system safety at reasonable prices (Socialist Republic of Vietnam 2020). The NDC also anticipates the development of coal-fired power at an appropriate level with large-capacity and high-efficiency turbines using advanced technologies (ibid). Vietnam's NDC is reflective of Resolution No. 55 NQ/TW, which was released by the Politburo in February 2020, and outlines the National Development Strategy of Vietnam to 2030, with a vision to 2045. The resolution gives direction to reduce the proportion of coal power in a reasonable way, in order to give priority to wind and solar energy over fossil fuels (MDI 2020). The recently released Power Development Plan VIII aligns with this resolution, articulating a higher renewable energy target for solar and wind power, only allowing ongoing coal projects currently under construction to continue to be developed, and decreasing the percentage of coal-fired generation capacity from 43% in PDP VII to 27% (Sawayama & Tran 2021).

Given that the government has identified the importance of both coal and renewable generation in the next 10 years, Vietnam's electricity sector regulations and policies are key to establishing an effective carbon price. Vietnam's power sector has developed around stable state-centric institutions and companies implementing the government's sector reform agenda gradually. Since 2004 and the passage of Vietnam's Electricity Law, competition and new market structures have been introduced in stages. To date, state owned entities dominate the electricity sector, but the private sector participates in some power generation. However, most private sector generation and all entities involved in transmission, system operation and distribution are affiliated with the state-owned corporate group, Electricity Vietnam (EVN) (Lee & Gerner 2020). Though the Prime Minister has set principles for unbundling generation with EVN by 2014, financial stress due to the 2008 financial crisis slowed the implementation of the plans, leaving the sector largely unchanged by 2018 when EVN's power plants accounted for 59% of total installed generation capacity (Lee & Gerner 2020). To date EVN, has maintained low electricity

prices that have led to insufficient investment in new power plants, straining the generation capacity as the country grew (EIA 2017). Phasing out indirect subsidies in the power sector and adjusting EVN's electricity tariffs to increase revenues would attract greater investment and help improve the generation capacity.

A Vietnamese Wholesale Electricity Market (VWEM), designed for publicly owned distribution companies to negotiate and contract directly with public and private generators to stimulate competition, has been running in pilot phase since 2016 and is expected to be fully operational in 2023 (Lee & Gerner 2020). Moreover, the government plans to establish an independent System and Market Operator (SMO), and competitive bidding for new generation capacity, though distribution companies will remain under full public ownership. The Prime Minister has also instructed EVN to review private sector participation opportunities in network infrastructure development (Lee & Gerner 2020) and in February 2021 the Politburo issued Resolution 55, recommending amendments to the electricity Law to allow for private sector investment in power infrastructure (Ha 2021). These steps towards more liberalised and competitive electricity markets will enhance the effectiveness of the ETS Vietnam is developing not least by helping renewable generation to become cost competitive.

The introduction of feed-in tariffs for solar power in 2017 in addition to those already existing for onshore wind projects since 2011 altered the renewable generation landscape in Vietnam significantly (Prime Minister of the Socialist Republic of Vietnam 2017; Prime Minister of the Socialist Republic of Vietnam 2011). The country overachieved its solar generation targets, as it went from negligible installed capacity in 2017 to 4.5 GW installed in 2019, meeting the revised Power Development Plan VI solar targets five years early (Climate Action Tracker 2020a). The revised Power Development Plan VII aimed for an additional 850 MW of solar in 2020 and 12 GW by 2030, (Prime Minister of the Socialist Republic of Vietnam 2016), and larger targets have since been announced in the recently released Power Draft Development Plan VIII. The plan articulates an additional 9 GW of near-shore wind power, 2-3 GW of offshore wind power, and 7 GW of solar power (Sawayama & Tran 2021). These new targets have been augmented by adjustments to the feed-in-tariffs which originally expired in 2019 but was then extended in 2020 following a 10-month period without a replacement policy. A solar auctioning pilot programme supported by the World Bank began in November 2020 and runs through May 2021. The programme will offer 1 GW of solar PV for auctioning in 2021, with half offered under auctions for projects at pre-selected sites and the other half will be capacity earmarked for specific substations, to ensure locations with grid space are prioritised (Martin 2020). There is a possibility that another 103 solar projects with an additional 10 GW capacity will be approved for the pilot programme (Reve 2020). Steps towards full auctioning continue, as in early 2021, the Electricity and Renewable Energy Authority of Vietnam (EREA) submitted a report requestion MOIT's internal approval of the selection mechanism for project bidders (Nguyen and Burke 2021).New proposed feed-in-tariff extensions and adjustments for onshore and intertidal wind are under consideration and would apply to projects commissioned from November 2021 to December 2023 in order to compensate for permitting and COVID-19 related delays (Reve 2020).

There is significant potential for a carbon pricing mechanism to drive abatement in Vietnam. It could reduce the emissions of the fossil fuel fired plants directly. Carbon pricing would also level the playing field, given coal projects have long benefited from attractive contract terms relative to the high cost of equity for renewable power projects (Breu et al. 2019). The government's commitment to developing renewable energy resources and recent action to extend feed-in-tariffs has generated substantial foreign direct investment in the sector and would help to develop the low carbon alternatives to coal (Socialist Republic of Vietnam 2020). The

government's legal mandate to establish an ETS therefore constitutes an important and welcome step.

4. Technical dimension

Vietnam has demonstrated its ability to report and measure emissions through efforts to meet its Paris Agreement commitments. Vietnam submitted its second biannual updated report (BUR) to the UNFCCC in 2017 and is expected to submit the third updated report in early 2021 (Socialist Republic of Vietnam 2020). The second BUR highlights the arrangements made for the 2013 National GHG Inventory and outlines the Department of Climate Change's role in establishing and executing a plan to create the inventory. In its 2016 Plan to Implement the Paris Agreement, Vietnam identifies its commitment to establishing an MRV system for national and sectoral emissions (Socialist Republic of Vietnam 2016). With the support of the PMR, Vietnam has been developing an MRV in conjunction with policy proposals for national carbon pricing and market-based instruments since 2013. Additionally, the PMR has also supported Vietnam in developing feasibility studies for credited NAMAs focused on proposing carbon pricing instruments and a roadmap for applications of market-based instruments for the solid waste and steel production industry sectors (PMR 2019). These actions underpin the further development of the national ETS. In its revised NDC of 2020, the Vietnamese government identifies the lack of an MRV as an important challenge in its effort to reduce GHG emissions (Socialist Republic of Vietnam 2020). The revised Law on Environmental Protection, adopted by Vietnam's National Assembly on November 17, 2020, establishes a responsibility for covered entities (to be determined by the MONRE) to report their emissions every two years, as well as produce annual greenhouse gas reduction plans, and for the MONRE to design an MRV system (ICAP 2020b). Vietnam has also made strides in reporting emissions through National GHG Inventory updates, the first of which was completed in 2013 (MONRE 2017).

Vietnam has demonstrated knowledge and capacity with environmental pricing mechanisms, as the National Assembly of Vietnam passed an Environmental Protection Tax (EPT) that entered into force in 2012 to tax the production and importation of certain goods deemed detrimental to the environment. The EPT Law imposes a tax on petrol, diesel, grease, coal, HCFCS, plastic bags, and restricted use chemicals (PWC 2019). With the introduction of the new law on environmental protection EPT rates are expected to be maintained (PWC 2019). Vietnam also has experience with other carbon pricing systems, including current and past projects through the Clean Development Mechanism and Joint Crediting Mechanism (Amarjagal et. al. 2020). Moreover, in line with the updated NDC, 'National Appropriate Mitigation Actions' (NAMAs) are being implemented in the agriculture, forestry, waste, industry (steel, cement, chemical), and power sectors. Additional capacity has also been built through strategic initiatives, such as the participation of employees from the NGO sector in Vietnam in emissions trading courses led and taught by the International Carbon Action Partnership.

Finally, Vietnam has also demonstrated substantial institutional capacity as inter-ministerial coordination and stakeholder engagement effort are interwoven throughout various UNFCCC outputs. Vietnam's second BUR to the UNFCCC designates the Department of Climate Change at MONRE as the entity responsible for cooperating with related agencies in developing the National GHG Inventory System and associated technical reports. It also articulates the respective ministries responsible for developing sectoral MRV systems. In reviewing and updating Vietnam's NDC in 2020, MONRE established an inter-sectoral working group consisting of representatives from the Advisory Council of NCCC and various relevant ministries and sectors and is further supported by an expert group and additional key stakeholders who participate in working sessions and consultation workshops (Socialist Republic of Vietnam 2020). Accountability and transparency across Vietnamese ministries and private stakeholders

will be key for implementation. The second BUR articulates that for each type of project, an MRV system at project level will be developed by project stakeholders in accordance with CDM projects. The government of Vietnam has also created the Support Programme to Respond to Climate Change (SP-RCC) initiative to spur policy exchange between government agencies and international development partners on climate change-related issues in Vietnam. In aggregate these efforts indicate Vietnam's technical preparedness to implement a carbon pricing mechanism.

5. Multilateral dimension

As a rapidly growing and open lower-middle income country, trade made up 210% of Vietnam's GDP in 2019 (World Bank 2021c). Vietnam has achieved this economic openness through removing tariff and non-tariff barriers and participating in several international trade agreements. These include the Association of South-East Asian Nationals (ASEAN), which it became a member of in 1995 and was chair of in 2020; the Bilateral Trade Agreement between the United States and Vietnam (US-BTA) in 2000; the Asia Pacific Economic Cooperation (APEC) starting in 2008; the World Trade Organisation (WTO) starting in 2007; and most recently the Regional Economic Partnership in 2020. (Strauch et al. 2018). Major trade partners are located mostly in East Asia, North America and Europe, where Vietnam recently signed the EU-Vietnam trade agreement which eliminates duties on 99% of goods traded between the two jurisdictions and sets high standards for labour, environmental and consumer protection, commits to effectively implementing the Paris Agreement and other international environmental agreements, and acting in favour of conservation and sustainable wildlife management (European Commission 2020). Trade with bordering neighbours is limited except for China, as trade between the two nations has increased in recent years (World Bank 2019a).

Many of the countries Vietnam engages with through trade agreements, including Indonesia, Thailand, and the Philippines, and Japan are currently considering or developing carbon pricing mechanisms, and several others, including New Zealand, the EU, China, and South Korea have established carbon markets (ICAP 2020a). Vietnam's trade relations and participation in a number of regional institutions, paired with its economic openness can serve as a key entry point for multilateral cooperation on climate change. One potential avenue may be linking an eventual Vietnamese carbon market to one of the aforementioned trade partners' systems, as several have indicated an interest in pursuing international linking agreements. China, now the world's largest carbon market, shares a border with Vietnam. Further regional carbon pricing efforts have been facilitated by the Collaborative Instruments for Ambitious Climate Action (CI-ACA) UNFCCC project, which focused on assessing the status of MRV systems in ASEAN member states, reviewing carbon pricing instrument adoption, and identifying commonalities and differences between countries' respective approaches to carbon pricing (Aleluia 2019). Lessons learned through CI-ACA were presented at a UNFCCC Regional Dialogue on Carbon Pricing (RediCAP) in 2020 as part of the Plan of Action of the AWGCC (ASEAN Working Group on Climate Change) and the ASEAN-UN Plan of Action (2016-2020) (UNFCCC 2020).

The Ministry of Environment (MONRE) has also been working with the World Bank's Partnership for Market Readiness (PMR) to develop an MRV system in conjunction with policy proposals for national carbon pricing and market-based instruments since 2013. The government has also enhanced its capacity for climate finance, appointing the Ministry of Planning and Investment (MPI) as the National Designated Authority for the Green Climate Fund, establishing a Climate Finance Task Force to guide the preparation of financing mechanisms, and signing a Memorandum of Understanding on Green Finance Cooperation between the Ministry of Finance (MOF) and the Global Green Growth Institute (GGGI) (Strauch

et al. 2018; GGGI 2020)., Vietnam has also engaged with a range of international consultants on emission reductions projects, including the World Bank, GIZ, BMU, UNDP, and others.

Additional multilateral cooperation on climate change took place through the planning and implementation phases of Vietnam's NAMA's. From 2014 – 2018, the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU), in conjunction with the German Society for International Cooperation (GIZ), implemented an International Climate Initiative (IKI) project in Vietnam. The project supported Vietnam in enhancing institutional and personnel capacities to develop and implement NAMAs, including setting up coordinated structures for NAMAs with MONRE, developing central elements of the MRV system, and advising MONRE on implementing the Paris Agreement and the review process of the Vietnamese NDC (Federal Ministry for the Environment of Germany 2021). Vietnam and the MONRE also received NAMA support from the Japanese International Cooperation Agency from 2015 - 2020 to build the capacity of MONRE to develop and implement NAMAs, and to develop the capacity of line ministries and local governments to plan and implement NAMAs by piloting the NAMA 'Low Carbon City' in selected Vietnamese municipalities (JICA 2014). Finally, additional opportunities for multilateral cooperation stem from established domestic and international think tanks, including the Vietnam Institute of Energy, the Vietnam Initiative for Energy Transition (VIET), the Vietnam Institute of Meteorology, Hydrology, and Climate Change (IMHEN), and the Asia Society Policy Institute (ASPI).

These efforts all contribute to Vietnam's climate mitigation goal and national contribution to achieving the Paris Agreement. Vietnam released its updated NDC in 2020, identifying economy-wide mitigation measures for the period 2021-2030 that spans the energy, agriculture, waste, land use, land use change and forestry, and industrial sectors. The plan changes Vietnam's base year from 2010 to 2014 and increases its unconditional emission reduction target to 9% by 2030. The NDC also outlines a conditional contribution in which Vietnam could reduce emissions by 27% by 2030 with international support received through bi-lateral, multilateral cooperation as well as through the implementation of market and non-market mechanisms under Article 6 of the Paris Agreement (Socialist Republic of Vietnam 2020). Though the updated NDC is 17 $MtCO_2$ stronger and transparency and sectoral coverage has improved, the Climate Action Tracker rates the NDC as 'critically insufficient' as the target does not drive enough climate action to align Vietnam with a 2°C goal, let alone the Paris Agreement's 1.5°C limit (Climate Action Tracker 2020b).

6. Carbon pricing readiness and options

Increasing climate ambition and a recently adopted legal mandate to establish a Vietnamese emissions trading scheme demonstrate that Vietnam is committed to carbon pricing. The country plans to implement a pilot system by 2025 that will in turn become fully operation by 2027. Paired with the government's clear institutional infrastructure to implement climate policy across federal and provincial governments show that the plans to implement a carbon pricing mechanism are well underway. Vietnam's readiness is also demonstrated through its work with the PMR to develop an MRV infrastructure for the ETS and its efforts to pilot the system in the steel and waste-to-power sectors through its declared NAMAs.

Development of the ETS could be impeded by the country's partially liberalised electricity market, as the state-owned utility EVN holds a virtual monopoly over transmission and distribution, as well as owning a substantial portion of generation entities. This could limit the carbon price being passed on to covered entities, which could in turn undermine the system's ability to incentivize abatement and low-carbon investment. However, long-awaited power market reforms, including the establishment of an independent System and Market Operator

(SMO) and a wholesale market, are expected to be developed along the same timeline as the emissions trading system.

These efforts are augmented by substantial growth in renewable generation due to improved government support policies and targets, notwithstanding the government's stated intention to continue to develop coal-fired generation. Foreign direct investment plays a key role in the development of both energy sources, however, a carbon price, in conjunction with existing renewable energy feed-in-tariffs and targets, has the potential to make renewable energy a more profitable generation choice in the long run. Security of supply arguments could be a key challenge; however these could be met by a concerted effort from the domestic and international green lobby to raise awareness that a commitment to coal generation can at best be transitional.

Vietnam can also build on multilateral cooperation on several fronts given existing trade relationships with jurisdictions around the world that have established or are developing ETSs including China, New Zealand, and Indonesia. Vietnam's participation in existing international carbon platforms, such as the International Carbon Action Partnership (ICAP) and the PMR, offer an opportunity to learn from good practices and to further align to pursue more ambitious climate policy.

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