INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

Economic Instruments for Climate Policymaking in Malaysia

14 March 2022

Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

Acknowledgements

This report is a collective endeavour and was prepared by a team led by Alizan Mahadi, Darshan Joshi and Ahmad Afandi of the Institute of Strategic and International Studies (ISIS) Malaysia. Other contributors included Calvin Cheng and Ahmad Syamil Hakimi Kamaruzaman.

This report has been commissioned by the South Asia Research Hub of the Foreign Commonwealth and Development Office (FCDO), Government of the United Kingdom. The views expressed in this report, however, do not necessarily reflect the policies or positions of the Government of the United Kingdom. Nevertheless, the study team is grateful for the helpful discussions and suggestions of the FCDO team, consisting of Dr Anirban Ganguly, Mr Muru Loganathan and Ms Charis Yeap. The financial and technical support of FCDO made this project a reality.

We are also grateful to the stakeholders listed in Appendix I for their inputs and guidance.

Table of Contents

List of Figures

List of Tables

Abbreviations

12MP	12th Malaysia Plan
BUR	Biennial update report
CBAM	Carbon border adjustment mechanism
CCS	Carbon capture-and-storage
CFA	Conservation Finance Alliance
CFS	Central forest spine
CO_2(-eq)	Carbon dioxide(-equivalent)
COP	Conference of Parties
CPI	Carbon pricing instrument
(D)ETS	(Domestic) emissions trading scheme
DOSM	Department of Statistics Malaysia
EC	Energy Commission
EE	Energy efficiency
EEV	Energy efficient vehicle
EFT	Ecological fiscal transfers
FCDO	Foreign, Commonwealth, and Development Office
EPU	Economic Planning Unit
(E)TOUT	(Enhanced) time-of-use tariff
FiT	Feed-in tariff
GET	Green electricity tariff
GHG	Greenhouse gas
GITA	Green investment tax allowance
GITE	Green investment tax exemption
GTFS	Green technology financing scheme
GW(h)	Giga-watt (hours)
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organisation of Standardisation
KASA	Ministry of Environment and Water
KeTSA	Ministry of Energy and Natural Resources
kW(h)	Kilo-watt (hours)
LCOE	Levelised cost of energy/electricity
LSS	Large-scale solar
LULUCF	Land-use, land-use change and forestry
MAFI	Ministry of Agriculture and Food Industries
MGTC	Malaysia Green Technology Corporation
MIDA	Malaysian Invesment Development Authority
MITI	Ministry of International Trade and Industry
MOF	Ministry of Finance

MOT	Ministry of Transport
MRV	Monitoring, reporting and verification
MW(h)	Mega-watt (hours)
NbS	Nature-based solutions
NDC	Nationally Determined Contribution
NEEAP	National Energy Efficiency Action Plan
NEEMP	National Energy Efficiency Master Plan
NEM	Net energy metering
NGTP	National Green Technology Policy
NPCC	National Policy on Climate Change
NREPAP	National Renewable Energy Policy and Action Plan
PES	Payments for ecosystem services
RE	Renewable energy
REDD+	Reduce emissions from deforestation and forest degradation
SCC	Social cost of carbon
SCFI	Sustainable sonservation financing instruments
SDGs	Sustainable Development Goals
SEDA	Sustainable Energy Development Authority
TNB	Tenaga Nasional Berhad
VCM	Voluntary carbon market
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organisation

Executive summary

Setting the Scene

This report has been produced by the Institute of Strategic and International Studies (ISIS) Malaysia for the South Asia Research Hub of the Foreign, Commonwealth and Development Office, Government of the United Kingdom.

The first report of its kind, it assesses the domestic landscape around the use of economic instruments to achieve climate and environmental objectives. It is comprised of three components: a mapping of economic instruments in Malaysia; a causal analysis to understand the factors driving their formulation and design; and an effectiveness analysis. The effectiveness analysis highlights the successes and shortcomings of existing instruments and assesses prospects for Malaysia's use of economic instruments moving forward.

Policy recommendations are developed on the basis of the findings from these three exercises. These are focused on enhancing Malaysia's existing instruments, and highlighting best practices for the adoption of prospective instruments as highlighted in the 12th Malaysia Plan and in line with developments in climate policy.

Economic instruments have the potential to act as powerful policy levers to influence behaviour and institute change towards the achievement of a desired outcome, most often by altering monetary incentives. These instruments come in various forms, each achieving economic efficiencies to varying degrees. It's effectiveness are dependent on its design and implementation.

In Malaysia, economic instruments identified for climate policy fall into several categories, including charge systems, and financial, fiscal, and technological support instruments. Of these, financial instruments have been found to be the most commonly-deployed, with the expressed intent of supporting the development and deployment of low-carbon technologies. These instruments have the common outcome of influencing behaviour through price signals and subsequent market effects.

A second defining feature of economic instruments is the distinction between 'first-' and 'second-best' instruments. First-best instruments address market failures by, for instance forcing the internalisation of the negative externality costs of greenhouse gas emissions, or by addressing the undervaluation of ecosystem services. Put simply, producers and consumers (i.e. polluters) must pay for the full costs of their actions, including any loss and damages. Second-best instruments do not address these market failures entirely, but nonetheless engender some degree of climate and environmental benefit.

The design and implementation of existing instruments in Malaysia

The mapping of economic instruments for climate policy in Malaysia found that there are no first-best instruments currently in place which explicitly seek the internalisation of externality costs. This includes the financial and technological support instruments, (GTFS, GITA, GITE, and FiT, LSS, and NEM); charge systems (TOUT; ETOUT; and GET); and fiscal instruments (transport fuel subsidies).

Most of the existing instruments are incentive-based, including financial and tax incentives for low-carbon technology deployment. The focus on incentives demonstrates a softer approach to instigating behavioural change, as opposed to 'hard' regulations that set prices (e.g. carbon tax) or limit quantities (e.g. cap-and-trade), or mandate such changes entirely (e.g. through the implementation of legal mechanisms).

This situation may change over the coming years; the 12th Malaysia Plan has indicated a focus on potentially first-best instruments, in the form of carbon pricing (i.e. carbon tax and/or cap-and-trade) for mitigation, **and options such as ecological fiscal transfers (EFTs) and payments for ecosystem services (PES)** for adaptation. Depending on their design and implementation, these can address the negative externality costs of emissions and assure the accurate and equitable valuation of ecosystems and ecosystem services.

Most existing instruments have been implemented for their potential economic benefits, focused on driving the growth of low-carbon industries. This is evident through the focus on green technology with the GTFS, GITA and GITE mechanisms, as well as the FiT, LSS, and NEM schemes which support technology deployment, in particular of renewable energy.

There is little to no evidence of ecological or science-based approaches to instrument design, formulation and implementation, and price- or quantity-setting exercises. This includes no instruments being based on social cost of carbon or valuation of ecosystem services (as first-best instrument) or a mechanism to achieve science-based target such as a specified emisisons reduction target (as a second-best instrument)

The existing instruments have succeeded to some degree in promoting technological change, increasing installed RE capacity by over 3.7GW between 2012 and 2020. This growth has benefitted greatly from the direct procurement of electricity through the FiT, LSS and NEM, complemented by enabling financing mechanisms such as the GTFS, GITA, and GITE.

These instruments could be made still more impactful through direct linkages to low-carbon indicators, such as the employment of targets around low-

carbon investment and job creation, and emissions avoidance, as well as by employing ecological or science-based approaches to their design as previously mentioned. **Another typical issue is project financing**; the potential of the FiT and NEM in particular have been curtailed by a lack of funding or applicable financing mechanisms, and their performance has on occasion failed to reach their targets.

Interest groups are key influencing forces in shaping the design and influencing the implementation of instruments. In particular, the role of states for natural resources with adaptation and co-benefit instruments such as state conservation financing instruments are influenced through a process of bargaining, across the state and federal levels.

Carbon Pricing Instruments (CPI)

Prospective instruments, such as the carbon tax and/or emissions trading scheme, will likely increase the effectiveness of existing instruments. Such first-best instruments can provide strong market signals and are likely to accelerate the use and effectiveness of second-best policies in achieving desired climate outcomes, as well as economic efficiencies.

When it comes to carbon pricing, instrument design is crucial. A well-designed CPI can be an impactful, first-best economic instrument that addresses market failures and drives the deployment of low-carbon technologies and growth of low-carbon industries. A poorly-planned CPI will have limited climate impacts and detrimental short-term economic consequences.

A greater understanding of carbon pricing and its impacts on socioeconomic variables of interest is another signfiicant gap. Conducting studies modelling these impacts under various CPI designs would allow for the formulation of instruments which account for the unique circumstances faced by Malaysia, an export-oriented, fossil fuel-intensive, oil and gas-producing nation.

CPIs must set accurate, long-term price signals (through a tax) or quantity limits (absolute emission caps for trading schemes). Decisions must be made on the choice of instrument; sectoral coverage; and the pricing of carbon itself, through the establishment of a country-level social cost of carbon. Should hybrid tax and ETS mechanisms be employed, thought must be put into determining which sectors are best regulated through each mechanism.

The re-use and re-distribution of revenue is an important aspect of the design of CPIs. 'Revenue-neutral' approaches to carbon pricing are increasingly common, with these ensuring the redistribution of proceeds to vulnerable households and industries. Many countries also use these revenues to further other climate change adaptation and mitigation measures.

At present, Malaysia lacks capacity for emissions reporting to support the implementation of CPIs. Steps must be taken to facilitate the development of MRV capacities across industries, particularly amongst SMEs, and for Scope 3 emissions of large and listed companies.

Adaptation and Co-benefit Instruments

Ecological fiscal transfers (EFTs), payments for ecosystem services (PES) and climate risk financing are prospective instruments to support adaptation, biodiversity, ecosystems, and even mitigation in Malaysia. These instruments are currently in development

There is a lack of information and data to allow for the accurate valuation of ecosystem services in Malaysia. This provides challenges for instrument design, exacerbated by a practice of undervaluation of natural resource prices. For example, low and subsidised water tariffs discourage water conservation and distorting market prices.

With regard to natural resources, economic instruments which promote conservation and sustainability will need to consider state-level interests. As natural resources are constitutionally a state matter, any instruments implicating these will be influenced by a bargaining process between state- and federal-levels of governance.

The rationale behind the formulation of instruments design requires a shift, from a focus on economic outcomes towards the adoption of evidence- and science-based targets and an ecological rationale. This includes developing establishing accurate valuations of ecosystem services and the social cost of carbon, prior to the implementation of CPIs, EFTs, and PES.

Recommendations

Moving forward, economic instruments need to graduate from being designed on the basis of their economic rationale for incentivising technology adoption towards having an ecological rationale. This would entail incrementally focusing on instruments that have significant market effects (i.e. CPIs, EFT and PES), and which assist in internalising externalities and achieving economic efficiency.

To maximise the potential of these prospective instruments, their design and implementation need to be holistic rather than addressing issues in a piecemeal manner. This includes addressing distortionary incentives and practices, such as subsidies for fossil fuels as well as issues of governance, such as corruption and rent-seeking practices.

First-best instruments can enhance and accelerate the effectiveness of existing instruments and support the achievement of Malaysia's climate goals in an economic efficient manner. Carbon pricing instruments and conservation financing

such as EFTs and PES are promising instruments that have the potential to have significant market effects and send clear price signals.

If appropriately designed, such tools can address the key market failures of climate change mitigation and address issues constraining further adaptation action. This would mark a shift in Malaysia's approach towards the use of economic instruments, which have historically been 'second-best' instruments aimed at meeting economic priorities while only indirectly benefitting mitigation action. On the side of adaptation, traditional economic instruments have been entirely absent; most instruments are aid-based, used to support post-disaster recovery efforts. It is critical that these instruments are designed with science-based (rather than economic) objectives in mind.

For carbon pricing to be effective, accurate and long-term price signals (through a tax) or quantity limits (absolute emission caps for trading schemes) must be set, and based primarily on scientific rationale. Additionally, revenues should be earmarked to support further climate-related initiatives and reducing additional cost burdens imposed on lower-income subgroups, as opposed to being used for discretionary government spending.

The implementation of ecological fiscal transfers and payments for ecosystem services will need to consider state-level interests. As natural resources are constitutionally a state matter, these instruments will be influenced by a bargaining process between state- and federal-levels of governance. To ensure such instruments are viable, their direct, tangible benefits needs to be equivalent to or greater than alternative, anti-conservational practices. This requires addressing leakages and market distortions through rent-seeking and corruption.

These and other policy recommendations are outlined in Chapter 8. These are split into three sections. The first is a set of broad recommendations drawn from the overall findings of the three assessments conducted for this study. The second set of recommendations dives deeper into the enhancement of existing economic instruments in place in Malaysia, with the aim of maximising their efficacy and efficiency. The third set of recommendations covers prospective instruments (i.e. CPIs, EFTs, PES, etc.) in detail, with the aim of ensuring 'first-best' policy design and implementation.

This study, the most extensive analysis of its type to date, aims to contribute to the general understanding of Malaysia's use of economic instruments to support climate and environmental objectives, as well as provide ways forward for their enhancement as tools to ensure the nation's low-carbon transition and the meeting of its long-term climate targets.

1

Introduction

Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

1 Introduction

Governments employ a range of policy instruments to meet environmental objectives, achieve emissions reductions and transition to low-carbon development pathways while enhancing the resilience and adaptive capacity of their citizens. Countries have employed economic, informational, political, regulatory and other policy tools to catalyse sustainable behavioural changes.

This was not always the case. Despite a long academic history[1], environmental policies were seen as a set of restrictions constraining economic activity in the bid to reduce environmental damage (Panayotou, 1994). This changed in the late 1980s with the Brundtland Report[2], which mainstreamed the concept of sustainable development and recommended the use of economic instruments to achieve environmental objectives, most prominently "global warming" (i.e. climate change). Their use proliferated, particularly among developed countries, in the form of environmental or green taxes, or other "first-best" policies designed to address the cost of pollution (Andersen, 1995; OECD, 1994).

Such instruments did not succeed or persist in developing countries. Studies assessing impacts of such instruments found mixed levels of success, with issues relating to design, implementation, and effectiveness most persistent (Rietbergen-Mcracken & Abaza, 2000; Blackman and Harrington, 1999). Conditions across developing and developed countries vary across cultural, economic and political structures, governance, and other factors. Early experiences in their use of regulatory and command-and-control environmental policy found adverse economic impacts and many, like Malaysia, have since the 1980s subsidised the use of fossil fuels for economic growth.

Yet Malaysia is increasingly coming to terms with the consequences of climate change in the form of rising temperatures and increasingly common extreme weather events. Since the late 2000s, Malaysia's use of economic instruments for climate policy has grown significantly in response to these pressures – though not in the form of taxes. This is changing: the 12th Malaysia Plan (12MP), the development road map for between 2021 and 2025, is focused on enhancing

[1] Beginning with Pigou (1922) and the concept of the externality tax.

[2] The Bruntland Report was published by the World Commission on Environment and Development, a now-dissolved suborganisation of the UN.

economic instruments for environmental policy, citing options such as payments for ecosystem services (PES), diversifications to conservation funding, continued promotion of low-carbon technology, fossil fuel subsidy rationalisation, and carbon pricing instruments (CPIs) (EPU, 2021). Given this fast-moving landscape, this paper discusses the history of Malaysia's use of economic instruments and assesses their prospects moving forward.

1.1 Economic instruments for environmental policymaking

Economic instruments were largely created to address market failures (Barde, 1994; Helm, 2004; Rietbergen-Mcracken & Abaza, 2000). In the context of climate change and the environment, two market failures stand out. First, negative externalities occur when private decisions lead to costs for third parties, such as air or noise pollution, or society at large, in the case of greenhouse gas (GHG) emissions. In the absence of regulation, these costs are not internalised by private actors and theorised as oversupplied. The second failure is that of public goods, which are overexploited when unregulated, with overuse creating negative societal costs. An example is the atmosphere: anyone can emit GHGs, adding to their atmospheric concentration and contributing to the exacerbation of climate change.

As a result, the optimal economic instruments for environmental policy seek to align the incentives of private firms and individuals with societal interests by bridging these benefits and costs. Such market-based instruments are typically designed through price- or quantity setting (Keohane & Olmstead, 2016). A contemporary example is a carbon tax, which if priced right serves to internalise the external costs of GHG emissions. To set the "right" price, efforts are directed at measuring the social cost of carbon (SCC), an estimate of the present-day economic costs or damages borne through climate change of each incremental tonne of CO_2 emitted. Instrument designs for quantity setting include cap-and-trade systems. Here, governments establish the total allowable quantity of emissions, or the emissions cap, and allocates or sells allowances for entities to emit up to that level. While both measures differ, they align the costs and benefits of abatement activities and are largely science- and evidence-based (this topic is discussed in later chapters).

Yet the implementation of these "first-best" policies enforcing the internalisation of externality costs was (and is) not always economically or politically feasible (Cocklin & Moon, 2009; Barde, 1994). This has given rise to a set of "second-best"

instruments, which aim to stimulate market shifts through incentives for behavioural change beneficial to the climate and environment. The taxonomy of climate and environmental economic instruments is broad. Table 1 defines first- and second-best policies, while table 2 provides an overview of the range of instruments to support climate and environmental objectives.

Table 1: Defining first- and second-best economic instruments (Cocklin & Moon, 2009 and Barde, 1994)

'First-best' economic instruments	'Second-best' economic instruments
Mechanisms to internalise negative environmental externalities	Instruments providing market signals in the form of modifications of relative prices and/or financial transfers

Table 2: Categories of economic instruments (adapted from Panayotou, 1994)

Instrument	Description	Example
Property rights	Securing property rights to resource commodities such as minerals, oils and timber can lead owners to value environmental assets and internalise depletion costs. Unsuitable in situations where resources generate significant externalities (e.g. forests in watersheds) and prone to rent-seeking and corruption if designed improperly.	• Land titles • Water rights • Mining rights • Licensing
Market creation	Market in which the right to use the environment is assigned, priced, and traded. For example, cap and trade schemes assign permits, result in market prices for carbon and allow tradeable permits to meet allowable emissions.	• Tradeable emission permits • Tradeable resource shares
Fiscal instruments	Taxes and subsidies to bridge social costs and benefits.	• Pollution taxes (i.e. emission and effluent taxes) • Import tariffs • Export taxes
Charge systems	Payments for use of resources, infrastructure and services based on a set price (i.e. not market price).	• Pollution charges • Use charges • Payment for ecosysem services
Financial instruments	Extra-budgetary and financed from private finance institutions, foreign aid, external borrowing, debt for nature swaps, etc. Funds are fungible and loans must be serviced and repaid.	• Soft loans • Grants • Subisidised interest

Liability systems	Establishment of legal liability for the loss and damage to resources, environment, property, human health of non-compliance to laws and regulations and/or through liability insurance by pooling and sharing of liability risks.	• Non-compliance charges • Liability insurance
Bonds & deposit refund systems	Environmental performance bonds and deposit refund systems aim to shift responsibility for controlling pollution, monitoring, and enforcement to individual producers and consumers.	• Environmental performance bonds • Land reclamation bonds • Environmental accident bonds

The first-best economic instruments for climate policy are defined as those which correct market failures by internalising external costs. Full internalisation occurs only when economic actors account for the full costs and benefits of their actions. Second-best policies provide market signals and stimulate beneficial behavioural changes through price effects. Yet they are not always implemented with solely climate objectives in mind: some are designed to support economic growth through measures to stimulate low-carbon industrial development. They must be assessed on both these bases.

Malaysia has implemented a range of second-best economic instruments to support sustainable development and its climate ambitions. These are in the form of financial instruments and technological support mechanisms, and charges. None address climate market failures but promotes the deployment of low-carbon technologies and achieve synergies between climate and economic objectives. This landscape is changing, however. The 12MP indicated a focus on the enhancement of economic instruments, with CPIs as policy options, marking a shift towards first-best responses to climate challenges.

Chapter 1.2 overviews the scope of this study. Chapter 2 lays out the methodology for the three assessments carried out in this study. Chapter 3 maps the economic instruments broadly supportive of climate objectives. Chapter 4 conducts a causal analysis of the formulation of these instruments, while chapter 5 looks at the effectiveness of economic instruments. Chapters 6 and 7 issue guidance for prospective economic instruments highlighted in the 12MP, split into mitigation and adaptation instruments. chapter 8 offers policy recommendations to enhance existing instruments and the optimal introduction of instruments for climate policy in Malaysia, and chapter 9 concludes.

1.2 Objectives of the study

The Foreign, Commonwealth and Development Office (FCDO) of the British High Commission of Malaysia commissioned the Institute of Strategic and International Studies (ISIS) to undertake a study to assess the use and effectiveness of economic instruments for climate policy in Malaysia. The assessment was undertaken between November 2021 and March 2022 to assess the economic instruments to address climate change, in terms of their design, ambitions and effectiveness.

The objectives include:

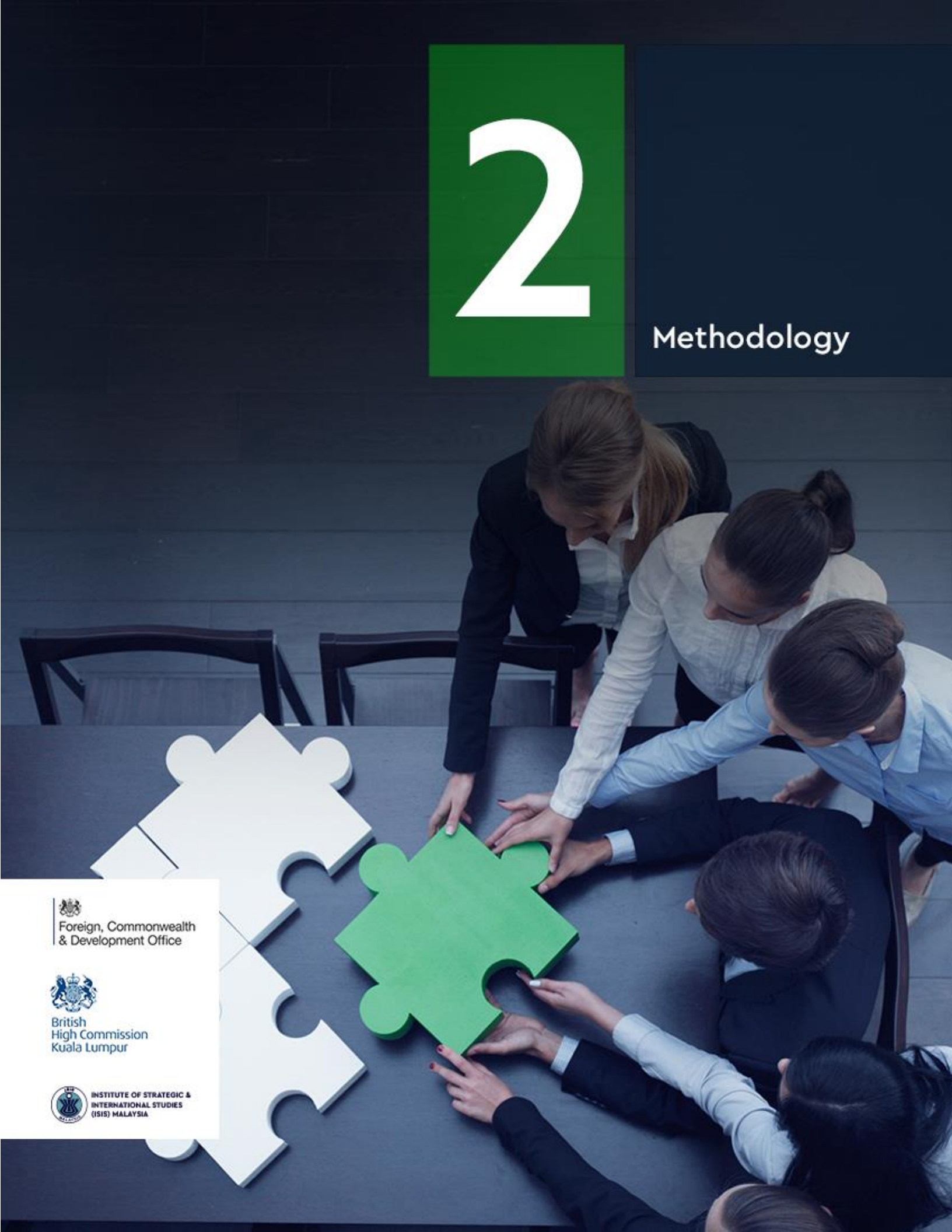
1. Mapping economic instruments adopted for climate change policy in Malaysia;
2. A causal analysis to understand the rationale and justification of the design and governance of economic instruments;
3. An assessment to understand the performance of economic instruments.

The scope entailed looking into activities designed to assess existing and proposed economic instruments in Malaysia and guided by four questions:

- What are the key economic instruments in place to account for climate costs? What forms do they take and which bodies govern them?
- What were the justification and sources of information behind the development and implementation of such instruments? Are they supported by evidence or research? Is there sufficient data underpinning the decision to use them?
- Have these instruments achieved their objectives – disaggregated by sector or type of pollution/carbon emission regulation? Are they intended for long-term effects and sustainability? What mechanisms are in place to ensure their accountability?
- What are the recommendations to account for climate costs through the use of economic instruments? Are there good examples? What support does Malaysia need to implement instruments effectively?

2

Methodology



Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

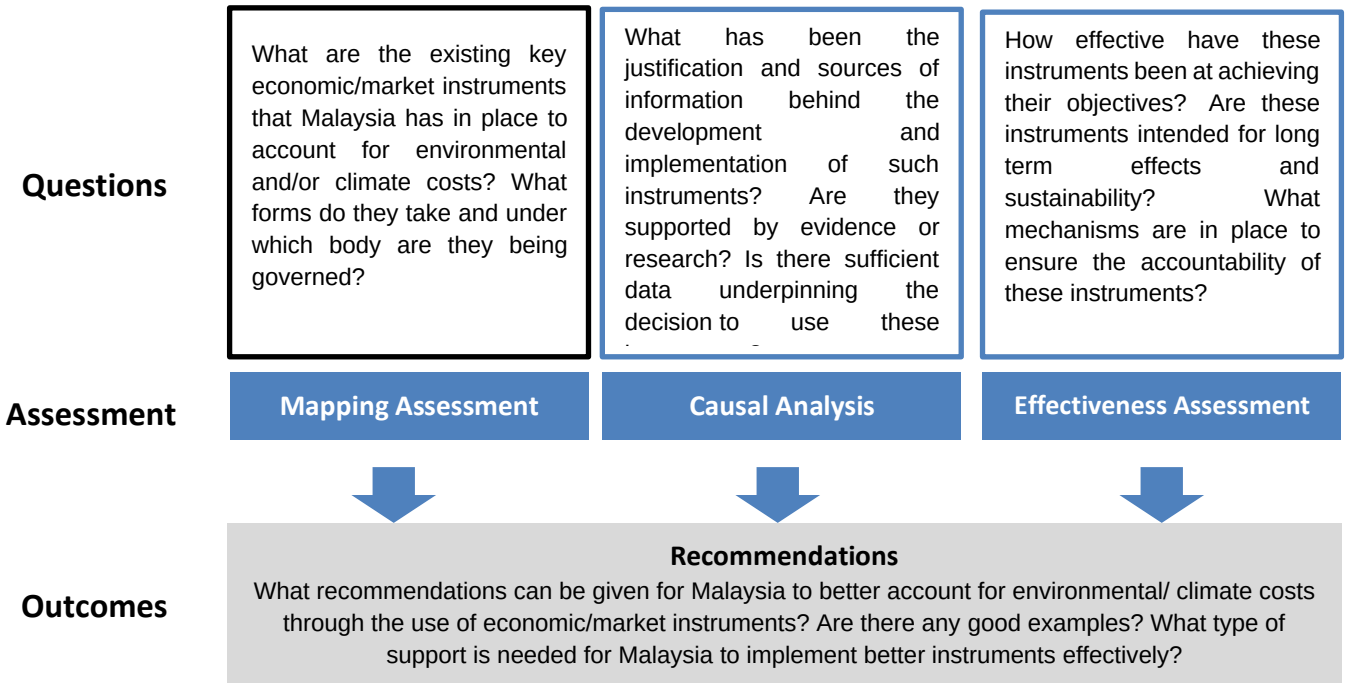
INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

2 Methodology

2.1 Study design

Three deliverables and approaches were designed to meet the objectives and scope of work, including a mapping assessment, causal analysis and effectiveness assessment. This study follows a a stepwise approach to answering the questions posed in chapter 1.2. First, it maps out the key economic instruments in place to advance the nation's climate change adaptation and mitigation agendas. We reviewed all major cross-sectoral and sectoral policy documents published since the passage of the NPCC, NGTP, and NREPAP to establish links to climate change adaptation and mitigation. This culminates in the identification of economic instruments used to support climate action. Second, a causal analysis was conducted to understand the processes and rationale behind instrument formulation, including the roles of various stakeholders. Third, this study considers the effectiveness of key instruments and highlights factors in the design of prospective economic instruments aimed at advancing the nation's climate change objectives. Finally, policy recommendations are put forward with the intent of furthering Malaysia's achievements.

Figure 1: Overview of study design



Each assessment follows a framework. The mapping exercise acts as a baseline assessment to take stock of climate and environmental-related legislation and economic instruments. The causal analysis utilises the mapping exercise to dive into the rationale and justifications behind the formulation of economic instruments through a process-tracing exercise. The process-tracing methodology is commonly used in the social sciences while causal analysis is based on a social-mechanism approach that seeks to identify and explain the cause-effect relationship of inputs (i.e. scientific evidence as knowledge, market factors, or stakeholder bargaining) and outputs (economic instruments). The effectiveness assessment contrasts the various instruments with intended outputs and outcomes. Finally, these findings form the basis of our policy recommendations.

We adopted a mixed methodology approach. This included undertaking literature reviews, conducting stakeholder interviews and triangulation with available data. Due to limited data, however, a strictly quantitative assessment was not undertaken. Extensive literature reviews was undertaken, including mapping economic instruments, specific instruments and their various elements. The effectiveness assessments were based on existing research and policy documents.

Expert interviews were undertaken to leverage on tacit knowledge of experts involved in the process of formulating the economic instruments in use in Malaysia. The interviews covered other assessments that require substantiation and triangulation. The interviews were largely conducted online, as a mitigating factor for Covid-19. In total, we interviewed 18 experts as listed in the appendix.

The approaches for the three deliverables are discussed in the following sub-sections.

2.2 Methodology and assessment approaches

2.2.1 Mapping climate and environmental policies and economic instruments

The assessment first identified and mapped existing, prospective and planned[3] climate polices, with a focus on economic instruments. This assessment identified climate-related elements of various cross-sectoral and sectoral policies, and the types of economic instrument these gave rise to. We looked into the extent to which each instrument can create market effects by evaluating its design. The mapping exercise was undertaken through a literature review and provides a detailed overview of the economic instruments used for climate policymaking in Malaysia, and the sectors and stakeholders involved in formulating these instruments.

2.2.2 Causal analysis of formulation of economic instruments

The second stage of the assessment looks at the formulation of climate economic instruments in Malaysia. This involved a process-tracing exercise to understand the rationale and justification for each instrument. Process-tracing was undertaken through stakeholder interviews, focused on three questions: how instruments were created; what was the rationale behind their formulation and design; and who designed and implemented them.

This approach identifies the formulation and shows whether the instruments are the outcome of a policy, regulatory instrument, scientific evidence, institutional arrangement and/or a process of bargaining between stakeholders (i.e. interest-based). This exercise aids the understanding of causal relationships between inception (idea of an economic instrument) and the output (establishment of an economic instrument). This enabled the identification of the rationale behind the implementation of the economic instruments, such as knowledge (e.g. scientific evidence), the market (e.g. economic rationale) and/or power (e.g. stakeholder bargaining processes).

2.2.3 Effectiveness analysis of economic instruments

An effectiveness assessment looked at whether the economic instruments achieved (or are likely to achieve) their objectives or targets. This included

[3] Prospective or planned policies include those proposed by the federal government, including the target of achieving carbon-neutrality by 2050, and the implementation of carbon tax and emissions trading schemes, the coal power plant moratorium, and others.

assessing instrument effectiveness at both the output and outcome levels. At the output level, we assessed the value of the economic instruments in terms of, for example, revenue (from tax schemes), tariff price comparisons and other information to demonstrate the scale of incentives or disincentives applied over time. This is followed by a qualitative analysis to understand the challenges in implementation of the economic instruments. At the outcome level, we assessed the contribution of the economic instruments to larger climate ambitions, such as CO_2 emission reductions or renewable energy (RE) generation capacity. However, the attribution between instrument and outcome levels is difficult to ascertain due to a lack of available data. Where assessment is not possible, we provide an overview of key aspects of the instruments' design and implementation.

The three assessments provide an understanding of the ecosystem of climate policies and economic instruments in Malaysia and their shortcomings. We also offer insights into prospective instruments, scrutinising the potential interactions between these mooted instruments and existing policies and targets. This forms the basis of policy recommendations to enhance the use of economic instruments for climate policymaking in Malaysia.

3

Mapping of Economic Instruments for Climate Policy in Malaysia

Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

3 Mapping of economic instruments for climate policy in Malaysia

Chapter summary

This chapter assesses Malaysia's use of economic instruments to support its climate ambitions. Links to climate change mitigation and adaptation were found across 45 policy documents, which gave rise to the creation of 11 economic instruments.

Economic instruments are defined as having direct price and market effects and in an ideal "first-best" state, force private actors to internalise any external costs arising from their activities and decisions. Financial instruments, such as low-interest loans and technology-based fiscal incentives, are considered a subset of economic instruments and "second-best" policy options.

Of the 11 economic instruments, seven are classified as financial. These include GTFS, GITA, and GITE schemes to support production and investment in low-carbon technologies, as well as RE incentives such as FiT, LSS, and NEM, which involve the direct procurement of low-carbon electricity. Three charge systems exist as TOUT, ETOUT, and GET, with one subsidy mechanism for transport fuels. **First-best economic instruments for climate change mitigation, in the form of carbon pricing instruments, are in the process of formulation** and discussed in chapter 6.

The dominance of incentive-based mechanisms demonstrates a "soft" approach to instigating behavioural change, in contrast to harder regulations which compel or issue a strong economic case for such changes.

Moving forward, there should be a shift towards "first-best" economic instruments, such as carbon pricing, which can induce significant direct market effects, supporting the success of the second-best instruments and broader decarbonisation efforts.

This chapter identifies and assesses the economic instruments deployed to support Malaysia's climate change agenda. We reviewed all sectoral and cross-sectoral policy documents enacted since 2009 and assessed on the basis of their relationship with climate change adaptation and/or mitigation objectives[4].

In the case of mitigation, the policy review encompassed sectors which either contribute significantly to total national emissions or have the potential for emission reductions through the adoption of low-carbon practices or technologies[5]. In the case of adaptation, the policy review included sectors and variables likely to be impacted by the effects of climate change[6].

There are 28 policy with some links to climate change mitigation with another 17 linked to climate change adaptation. These policies can be grouped into three categories: economic, informational, and regulatory instruments. These are defined in chapter 3.1, which serves as a summary of their use in the context of climate action.

3.1 Types of instruments

There are three major policy instruments used to support the national policy objectives in the context of climate change. This section defines and summarises the economic, informational and regulatory policies, setting the stage for a more detailed analysis of the economic instruments employed for climate policy.

3.1.1 Economic instruments

Compared to the "soft" approach of informational instruments (see chapter 3.1.2), economic (and regulatory) instruments are considered "hard" instruments – with tangible monetary impacts on household- and firm-level decisionmaking. Economic instruments here fall into two categories. First-best economic instruments serve to internalise the external costs of private actions. Second-best

[4] These objectives may be established at a cross-sectoral level, e.g. through the Malaysia Plans; a sectoral level, e.g. through policies such as the National Green Technology, and National Renewable Energy policies; or internationally, through Malaysia's NDCs to UNFCCC agreements and other climate and environmental commitments.

[5] This includes the energy and transport sectors.

[6] This includes policies relating to food and water security, cities, infrastructure, and the built environment, and ecological and human health.

instruments do not address these external costs, but provide market signals in the form of modifications to relative prices. Through price effects, these instruments have market impacts that affect actions, behaviours, and investments.

The most prominent examples of economic instruments for climate policymaking include subsidies or other monetary incentives and taxes. They can also take the form of charges or fees (for congestion, conservation, and water abstraction), tradeable permits (emission-trading schemes), and payments for ecosystem services. The most effective and efficient economic instruments tend to correct market failures, where the absence of implicitly recognised costs can create net societal losses.

Within the subset of second-best economic instruments are financial. Financial instruments have indirect market effects, loosening constraints towards achieving desired actions and behaviours, such as the deployment of low-carbon energy technologies and energy efficiency measures.

Typical examples include grants, green bonds, green sukuk, and the provision of low-interest financing options and tax allowances and/or exemptions. Malaysia has issued green sukuk to finance RE and other low-carbon projects (Davidson et al, 2021). Financing schemes and tax allowances and exemptions support low-carbon technological investment and production, particularly for renewable energy and energy efficiency (see chapters 3.2; 4; and 5). In the transport sector, soft loans and other incentives have financed the development of a charging infrastructure to support EV deployment and production of energy-efficient vehicles.

Table 2 of chapter 1.2 highlights the different categories of economic instruments.

3.1.2 Informational instruments

The most prominent instruments used for climate policy in Malaysia are informational. This category refers to the numerous action plans (e.g. National Renewable Energy Policy and Action Plan; National Energy Efficiency Action Plan), blueprints (Low-Carbon Mobility Blueprint; Low-Carbon Society Blueprint for Iskandar Malaysia), and road maps (Road map to zero single-use plastics) developed since 2009 to chart pathways towards a low-carbon economy. These instruments typically highlight strategies through which a variety of climate change

adaptation and mitigation objectives can be achieved, and provide information on the direction in which climate policies, and the climate-related elements of sectoral policies, will take over specified time frames.

Representing an almost “soft” approach to altering behaviour and instigating change, their effectiveness is limited relative to economic, financial, or regulatory instruments, which provide either direct or indirect monetary incentives for behavioural change, or mandate such changes entirely (Pal, 2014). In Malaysia, informational instruments supplement the “harder” instruments by providing the rationale for their establishment (see chapter 4). And if used effectively, can address informational asymmetries between public and private sectors that could hinder medium- to long-term decisionmaking and planning.

3.1.3 Regulatory instruments

Regulatory instruments do not seek to instigate price and market effects through the provision of incentives or by eradicating information asymmetries. In Malaysia, these have been used to enforce the establishment of the economic and financial instruments used to bring about behavioural shifts and policy directions.

For instance, the Renewable Energy (RE) and Sustainable Energy Development Authority (SEDA) Acts were the result of directives in the National Green Technology Policy and the National Renewable Energy Policy and Action Plan. The first of these related laws set the legal framework for the establishment of the feed-in tariff (FiT) programme and the RE Fund[7], aimed at supporting the production and development of RE technologies. The second SEDA, a statutory body, was tasked with administering the FiT programme and RE Fund, alongside other functions central to the national RE landscape. Legal instruments are an important component of the process of the formulation of some of the economic instruments used in Malaysia (see chapter 4).

3.2 Overview of economic instruments for climate policy

Table 3 provides an overview of the economic policy instruments identified during the policy mapping process. It establishes how each instrument meets the definition of economic instruments described in chapter 3.1, using a “traffic light”

[7] The RE Fund is comprised of a flat tax imposed on electricity bills, with proceeds used to fund the operations of SEDA as well as the FiT programme.

system to classify whether a particular instrument has direct (green) or indirect (yellow) price and market effects or signals. These classifications do not reflect the performance of each instrument (see chapter 5). Instead, table 3 illustrates how these influence market dynamics. For instance, the fuel subsidies originally introduced in the 1980s directly lowered consumer transport fuel costs, while the FiT, net energy metering (NEM), and large-scale solar (LSS) initiatives are direct procurement programmes offering monetary compensation for the deployment and production of RE. GTFS, meanwhile, offers opportunities for reductions in capital expenditure costs of RE and EE technologies, reflecting an indirect relationship between the instrument and price or market effects.

3.2.1 Economic instruments for climate change mitigation

Table 3: Overview of economic instruments for climate change mitigation

#	Instrument	Lead agencies	Type	Year	Directness of market effects	Comments
1	Fuel subsidies (petrol, diesel)	MOF, MDTCA	Fiscal	1983, 2009, 2013/4		Direct market effects. Lowers consumer transport fuel costs
2	Green technology financing scheme (GTFS) 1, 2, 3	KASA, MGTC, MOF	Second-best, financial	2010		Indirect market effects. Reduces capital expenditure costs for RE, EE
3	Feed-in tariff (FiT)	KeTSA, EC, SEDA	Second-best, financial	2011		Direct market effects. Direct procurement of RE. Funded by taxes on electricity consumption
4	Green income tax exemption (GITE)	MOF, MGTC, MIDA	Second-best, financial	2014		Indirect market effects. Provides tax exemptions for production of low-carbon services, technologies
5	Green Iinvestment tax allowance (GITA)	MOF, MGTC, MIDA	Second-best, financial	2014		Indirect market effects. Provides tax allowances for investment in low-carbon services, technologies
6	Energy efficient vehicle (EEV) policy	MITI, MOT	Second-best, financial	2014		Indirect market effects. Offers financial incentives for production of 'energy-efficient' vehicles
7	Time-of-use tariffs (TOUT, ETOUT)	EC, KeTSA, TNB	Second-best, charge system	2016		Direct market effects. Features variations in electricity tariffs across

						peak, off-peak, mid-peak time zones
8	Net energy metering (NEM) 1, 2, 3	KeTSA, EC, SEDA	Second-best, financial	2016		Direct market effects. Direct procurement of solar
9	*LSS 1, 2, 3, 4	EC, KeTSA	Second-best, financial	2016		Direct market effects. Direct procurement of solar
10	Green electricity tariff (GET)	TNB, KeTSA, EC	Second-best, financial	2021		Direct market effects. Imposes additional (voluntary) surcharge for consumption of RE. Additional revenue to support RE development, deployment
11	Carbon pricing instruments (VCM, DETS, CT)	EPU, KASA, MOF, Bursa Malaysia	First-best, market creation (ETS) or Fiscal (CT)	202x		Direct market effects and potentially a first-best economic instrument. Imposes taxes on fossil fuel use. Assessed in chapter 6

Indirect price and market effects

Direct price and market effects

The mapping exercise identified 11 economic instruments for climate change mitigation (table 3). Seven instruments are defined as financial instruments, two as charge systems, one as a fiscal instrument (albeit detrimental to climate outcomes) while carbon pricing can take the form of a market-creation or fiscal instrument, depending on design[8]. Seven of the instruments have direct market effects, while four have indirect market effects. These are analysed in greater depth throughout chapters 4 and 5.

The economic instruments in Malaysia can be grouped into three categories. The first is a fiscal instrument in the form of fuel subsidies to reduce the cost of living for Malaysian households by managing retail fuel prices and lowering prices for other goods and services where fuel is an input. The subsidy spurs the purchase of private vehicles and in alleviating transport costs, aids economic development. The direct price and market effects arising from this subsidy are clear.

[8] For carbon-pricing instruments, emission-trading schemes are categorised as market-creation instruments while carbon taxes are categorised as fiscal instruments

The second set are financial instruments designed to support the development and deployment of RE technologies. These include FiT (2011), the three iterations of NEM (2016) and LSS policy (2016). FiT comprises of long-run supply agreements between distribution licensees (or DLs, which in the peninsula is Tenaga Nasional Berhad) and feed-in approval holders (FIAHs), at rates higher than average electricity tariffs.

NEM allows consumers to sell excess RE generated through solar panels to the grid in exchange for electricity credits used to offset future bills for up to two years. The policy was enhanced in 2018, allowing consumers to sell excess electricity that is later offset against their bills on a one-for-one basis. These instruments offer direct monetary (or equivalent) incentives, and reduced the costs associated with the deployment and production of energy from solar PV, biofuels, and small-hydro.

The LSS policy involves the direct procurement of solar power generated by approved LSS operators. Four bidding exercises were held between 2016 and 2021, with each auction featuring significant reductions in the levelised cost of electricity (LCOE). These instruments have played a role in the development and deployment of RE nationally and have had direct market effects in RE markets.

The final group of economic instruments with direct price and market effects are charge systems, namely, the TOUT, ETOUT, and GET. ETOUT is an enhancement of the TOUT. The latter sets the differential pricing of electricity across peak and off-peak hours, while the former prices it across three time zones: peak, mid-peak, and off-peak. This variable pricing model serves to shift electricity consumption away from peak hours, and contribute to the smoothing out of demand. Mitigating the peaks of electricity demand can alleviate emissions by minimising the need to meet excess demand through the further use of fossil fuels.

GET is a subscription-based RE service which involves the issuance of “internationally recognised” Malaysian renewable energy certificates (mRECs). It involves the imposition of a surcharge on subscribers’ electricity bills to reduce their carbon footprints. It operates with a quota of 4,000GWh annually[9]. Additional revenues from the GET are used to support Malaysia’s RE agenda.

[9] For comparison, ST (2021b) reports total electricity consumption in Malaysia, in 2019, of roughly 176,000GWh.

The four policy instruments with indirect price and market effects are all financial instruments. They include the three iterations of GTFS; GITA and GITE tax incentive; and the EEV policy. GTFS, a financing scheme, was introduced in 2010 to support investment in the production and deployment of low-carbon products and technology. Initially allocated a funding capacity of RM3.5 billion, GTFS has been renewed or reinstated thrice, with additional allocations of RM2 billion each in 2016, 2019, and 2021. GITA and GITE provide tax allowances and exemptions for producers and investors in low-carbon technology, while the EEV policy offers a range of financial incentives for the production of low-carbon vehicles.

Finally, emerging areas of focus vis-à-vis economic instruments comprise of the current emphases on the development of carbon-pricing instruments (CPIs) and state-level conservation financing instruments. These are more nascent areas of focus for Malaysia; the focus on carbon pricing was the result of directives in the 12MP, influenced by COP26 and the European Union's announcement of the implementation of a carbon border adjustment mechanism (CBAM) for high-carbon imports into the EU from 2026 onwards – a move that will have implications for a trade-oriented, export-reliant, high-carbon economy such as Malaysia's.

CPIs are first-best market-based economic instruments capable of allowing for the internalisation of the external costs of GHG emissions, and increasing the costs associated with the use of high-carbon technologies can shift market dynamics in favour of the adoption of low-carbon technologies. Yet the design of CPIs must be well understood and it must fulfil prerequisites that would enable its implementation. This topic is discussed in depth in chapter 6.

The mapping exercise here informs the focus of chapters 4 and 5. Chapter 4 aims to understand the rationale behind the deployment of these instruments and shed some light on policy process(es) leading up to the formulation of each instrument. Chapter 5 considers the performance of each key instrument.

3.2.2 Economic instruments for climate change adaptation[10]

In contrast to mitigation, there are few instruments devoted towards raising Malaysia's adaptive capacity and resilience to climate change. Most instruments are informational, including databases and early warning systems, as well as action plans and guidelines. Even common financial instruments, such as insurance policies to cover disasters (e.g. floods) do not exist. Most developed countries have climate- or disaster-risk insurance in their overall disaster-risk management (see box 3.2.1-1), and even developing countries such as India[11], Bangladesh[12] and Sri Lanka[13], which are susceptible to rising sea levels and extreme weather events as a result of climate change, have robust climate-risk insurancemechanisms to protect farming communities. Other innovate financing mechanisms designed to abet climate resilience include resilience fees, taxes and surcharges to fund associated measures (Herst & Levy, 2018).

The mapping of adaptation policies and related instruments is a complicated process. Compared to climate change mitigation, where outcomes, such as GHG emission reductions, are tangible and measurable, adaptation measures aim to minimise losses and damages as a result of climate-related hazards and disasters. These outcomes may overlap with the priorities of other, sectorally focused government actions and may not be labelled as supportive towards climate change adaptation. For example, the strengthening of social-protection systems reduces poverty while increasing the ability of recipients to recover from natural disasters. Financing the conservation of natural ecosystems to achieve biodiversity objectives can reduce instances of and damages from floods and droughts.

In other words, there are "concrete" policies designed to cope with climate change impacts and "contributive" policies not designed for adaptation but which contribute

[10] The IPCC defines adaptation as *"the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects"*. In this study, 'adaptation', 'raising the adaptive capacity', 'enhancing resilience', and 'reducing vulnerabilities' are all used in reference to climate change adaptation. See footnotes 14 and 15.

[11] https://www.india.gov.in/national-agricultural-insurance-scheme-nais

[12] https://www.swissre.com/our-business/public-sector-solutions/thought-leadership/bangladesh-flood-victims-first-index-insurance-payout.html

[13] https://www.indexinsuranceforum.org/project/sanasa-insurance-sri-lanka

to vulnerability reduction anyway. In this study, economic instruments for adaptation are framed as maeasures which reduce vulnerability[14] to the impacts of climate change, and enhance adaptive capacity[15] to cope with its consequences. Stakeholder consultations reveal that these are also among the adaptation outcomes set by KASA.

In Malaysia, financial instruments are in the form of government aid to support post-disaster recovery. Other instruments include insurance schemes to protect against loss and damages from special peril, including natural disasters. In contrast to the economic and financial instruments used to support mitigation action (chapter 3.2.1), instruments for adaptation have no theorised or practical price and market effects.

Aid for post-disaster relief and recovery

Government aid initiatives are used to assist communities and businesses to recover from natural disasters, as compensation for losses and damages incurred from such events. Table 4 describes some of these initiatives.

Table 4: Examples of financial aid for post-disaster relief and recovery

Name	Custodian(s)	Year	Description
National Disaster Relief Trust Fund	NADMA	2006	Funds budgeted annually through the EPU. Financial assistance covers loss of income, damage/demolished house, agricultural damage. Contributing individuals and corporations to the fund eligible for tax deductions.
Emergency Waqf Fund (*Dana Wakaf Bencana*)	Kenanga Investors, Yayasan Wakaf Malaysia, MATCH Foundation	2021	Emergency relief fund established to channel resources to those affected by climate change-related disasters and future pandemics. US$3.5 million start-up funds. Corporates and the general public are encouraged to endow their property into this fund.
Bantuan Banjir Keluarga Malaysia	Bank Negara Malaysia, MOF	2021	Relief package of RM1.4 billion, interest-free loans to ease the burden of affected households, micro, small and medium enterprises, informal entrepreneurs and padi farmers

[14] The propensity or predisposition to be adversely affected by climate change. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

[15] The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.

Name	Custodian(s)	Year	Description
Padi Crop Disaster Fund (TBTP)	MAFI	2018	Financial assistance for padi farmers affected by declining yields due to external forces, such as diseases, outbreaks, natural disasters, dam breaks. Aid ranges from RM876-RM1,800 per hectare up to 3ha maximum claim.
Agro-Food Project Redevelopment Programme (PPSPA)	MAFI	2021	Focused on recovery of target groups post-disaster and not compensation for loss and damages. Provides support encompassing agriculture inputs, tools/machineries, business and others. Open to all target groups (e.g. padi farmers, livestock rearers, fishermen, operators, food growers)

Financial aid programme for natural disaster

Agriculture disaster aid

Special financing facility

The longest-standing instrument is the National Disaster Relief Trust Fund, established in 2006. It provides financial assistance to victims of all disasters. There are dedicated disaster relief financing facilities in response to specific events. For example, *Bantuan Banjir Keluarga Malaysia* was introduced after floods in late 2021 and early 2022, with RM2.03 billion allocated as cash aid, grants, and repairs. Another instrument gaining attention recently is waqf (*wakaf*) – trust funds for specific purposes. The government in the process of setting up the Emergency Waqf Fund for disaster relief.

As climate change increasingly affects crop yields and consequently, farmers' income, MAFI has set up initiatives such as the Agrofood Disaster Relief Fund, Padi Crop Disaster Fund and Agro-Food Project Redevelopment Programme to provide support for farmers and fishermen with post-disaster recovery.

In light of both increasing climate risks and associated financial burdens, the 12MP plans to promote disaster-risk financing to manage post-disaster liabilities. A feasibility study will explore flexible social protection systems such as disaster-risk insurance.

Under the National Agrofood Policy 2.0, MAFI plans to introduce a national agriculture insurance scheme, under development since 2017. Bank Pertanian Malaysia Berhad (Agrobank) is spearheading the effort. According to MAFI, several takaful options will be provided to contributors affected by natural disasters, uncertain and extreme weather, and even diseases.

Box 3.2.1-1: National Flood Insurance Programme in the United States

Flood insurance is a common element of flood-risk management in industrialised countries such as the US. The National Flood Insurance Programme (NFIP) was established in 1968. Despite some challenges, NFIP remains the longest standing government-run disaster insurance programme in the world, allowing communities to buy government-administered insurance to protect against losses incurred through flooding. All loans or other forms of credit obtained by existing buildings, prefabricated homes, or buildings under construction in a community that participates in the NFIP are subject to flood insurance requirements. Flood insurance is only available to municipalities that have undertaken suitable land management practices.

The Federal Emergency Management Agency (FEMA) utilises flood maps to identify high-risk flood areas, and makes flood insurance mandatory. Such insurance is not required for properties located in low- to moderate-risk areas, but claims from low-to-moderate risk locations account for roughly a quarter of all flood claims. As a result, people are strongly advised to purchase flood insurance. In addition, FEMA collaborates with communities to provide a comprehensive understanding of flood hazards and uses this as a springboard to encourage more flood-risk reduction strategies. The flood maps are updated regularly to account for changes in geospatial flood hazards from shifting weather patterns.

Private insurance

In Malaysia, private insurers provide micro-insurance schemes that offer disaster coverage, depending on a homeowner's policy. It is estimated that 74% of homeowners in Malaysia are not covered against flood risk[16]. Two out of 10 households living in flood-prone areas are also not insured. This low penetration rate indicates the underlying challenges of why flood insurance is not available broadly. While research on this topic in Malaysia is limited, some studies attributed this to low "perceived risk" of disaster, lack of affordable insurance products, "charity hazards" and insufficent marketing by insurance providers.

[16] https://www.zurich.com.my/-/media/project/zwp/malaysia/docs/about-zurich/zurich-in-the-news/2021/20211216_press-release_zurich-malaysia_2021_12_impact-of-pandemic-survey-on-home-protection_english.pdf

The uptake rates for disaster insurance for vehicles are even lower since these require additional premiums to protect against “special perils”, such as landslides, floods, and other natural disasters. According to PIAM, as of 2020, only 4% of vehicle owners have flood coverage, with cost cited as main reason for the low uptake. Allianz Bank indicates that only 11% of its 1.11 million customers purchased protection against “special perils” but in the aftermath of the 2021/22 floods, uptake increased to 22%[17].

3.3 Key findings and conclusions

The mapping exercise led to three major findings, which form the basis of the assessments in chapters 4 and 5.

Financial instruments the most commonly employed

The mapping exercise defines seven of the 11 mitigation instruments as financial instruments, while many of the adaptation instruments in development are likely to be financial too. While such instruments provide support for technology adoption, they are considered blunt, “second-best” policies to address environmental challenges as they do not include aims to internalise externalities and correct capital market imperfections (Panayotou, 1994).

Incentive-based instruments feature most prominently

All seven financial instruments were designed as incentive-based mechanisms to promote technology adoption. The FiT, LSS, and NEM schemes involved the direct procurement of electricity generated from RE. The fiscal instrument assessed was the fuel subsidy – another incentive rather than punitive tax[18]. Policy instruments are often categorised as “soft” to “hard”, with informational instruments being “softest” and regulations the “hardest” instruments in terms of behavior change. That a majority of instruments feature incentives suggest that Malaysia leans towards the softer approach of instigating behavioural change.

[17] https://www.nst.com.my/business/2022/02/770094/take-rate-special-risk-protection-malaysia-still-low-says-allianz-malaysia

[18] Fuel subsidies stimulate the further use of fossil fuels, contributing to adverse environmental outcomes and economic inefficiencies.

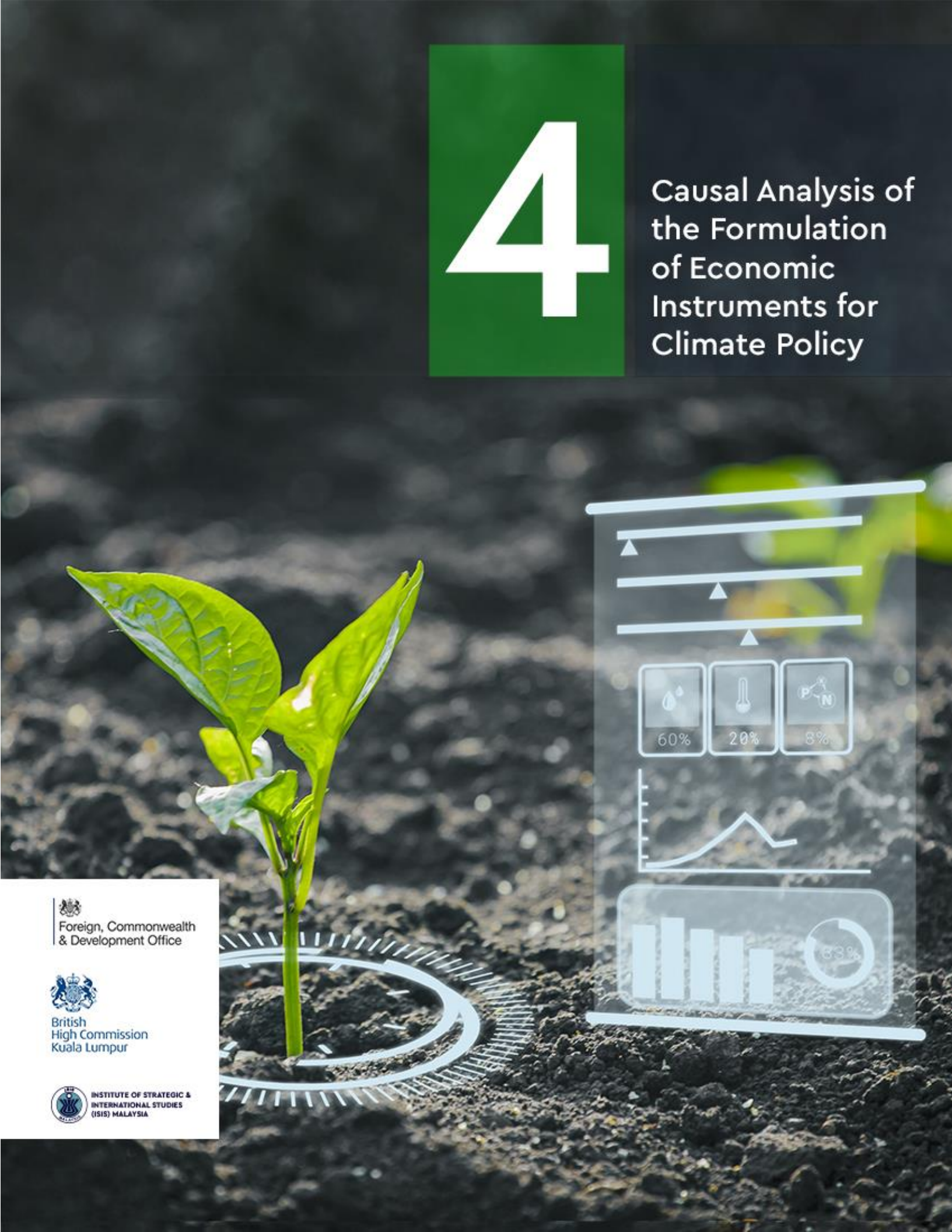
Lack of instruments with significant market effects

A few instruments had large market effects, either in a negative or positive way in the context of environmental protection. A fiscal instrument like fossil fuel subsidies can be harmful, while taxes can compel positive behavioural changes (e.g. through a carbon tax). Charge systems, such as time-of-use tariffs, can be impactful if designed properly. While incentives and financial instruments are beneficial and should continue as second-best policies or instruments serving specific purposes, there is a need for first-best policies that have both large market effects and clear climate objectives.

Chapter 4 details the formulation processes of each major economic instrument while chapter 5 gauges their effectiveness in establishing objectives and their effects, if any, on a host of low-carbon indicators. Chapters 6 and 7 provide guidance for the implementation of CPIs and SCFIs and the results of these analyses provide the foundations for the policy recommendations in chapter 8.

4

Causal Analysis of the Formulation of Economic Instruments for Climate Policy



Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

4 Causal analysis of the formulation of economic instruments for climate policy

Chapter summary

We assessed the process and rationale in the formulation of economic instruments. Instruments are attributed to policies, regulations and/or stakeholder bargaining and assessed on whether they are based on science, market or power (i.e. stakeholder interests).

All instruments were the result of policies. Political will and policy causation were the major influencing forces as evidenced by the raft of instruments created during the "green technology wave".

While studies contribute to the establishment of instruments, there is a lack of science-based targets and ecological-based rationale in their development. None of the instruments has quantified externalities (i.e. the social cost of carbon) and/or clear climate goals.

Economic objectives are prioritised for all nine mitigation instruments where the goal is job and wealth creation. Climate outcomes, such as reductions in the emissions intensity of GDP (previously 40%), are an objective. However, there are no climate targets or monitoring to achieve the outcomes.

Interest groups are key influencing forces shaping the design and influencing the implementation of instruments. Bargaining over state conservation financing instruments occurs across the state and federal levels.

Trade and financial risks are strong enabling factors for economic instruments. Support comes from powerful actors on the need for monitoring, disclosure and demonstrating actions that address climate change, including achieving net zero emissions by 2050.

While economic instruments designed to achieve environmental ends are aimed at correcting market failures, evidence from international case studies show that their uses stem from a variety of objectives, including meeting environmental goals (i.e. pollution control) to increasing efficiency and cost effectiveness of environmental action, to hasten technology adoption and mobilise finance, and as a source of revenue (Panayotou, 1994; Rietbergen-Mcracken & Abaza, 2000). However, their formulation is often influenced by stakeholder bargaining from interest groups, leading to suboptimal outcomes (Helm, 2004; Keohane & Olmstead, 2016).

This section assesses the formation of existing and prospective economic instruments. We look at the rationale behind the instruments based on interviews and literature review and process tracing (see chapter 2) to identify whether they are science-, market-, or power-based (Haas, 2004; Haas, 2004; Kanie & Haas, 2004). Science-based rationale are instruments created to achieve science-based targets.

The instruments are formed to achieve a certain climate goal or outcome. Economic instruments for climate change mitigation may be designed to achieve an outcome, such as the 45% emission intensity reduction as per Malaysia's NDCs. A market-based rationale is focused on achieving economic goals, such as cost effectiveness, hasten technology adoption or scaling up financing. It may or may not be linked to climate goals. Finally, power-based rationale is driven by interest groups that utilise its authority to benefit from the instrument. For example, assigning property rights, such as ownership rights to land, water or mining of ecosystem services to certain interest groups can create a market of management of environmental assets.

Table 5: Rationale and objectives in the formation of economic instruments

Rationale	Objectives	Examples
Science-based	• Environmental goals and outcomes	• Pollution control • Cap-and-trade • Environmental taxes (fiscal)
Market-based	• Economic goals and outcomes	• Incentives • Subsidies • Financial Instruments
Power-based	• Benefits interest groups	• Revenue generation (i.e. taxes, without distribution consideration) • Assigning of rights • Direct negotiation tender

The sub-sections assess the formation of existing economic instruments according to whether they are science-based, market-based or power-based. Second, a detailed causal analysis explains the establishment of prospective instruments. Prospective instruments, namely carbon pricing and state conservation financing, are also assessed.

4.1 Overview of economic instruments

4.1.1 Economic instruments for climate change mitigation

A brief analysis looked into the rationale of the 11 economic instruments identified in the previous section. The analysis was based on stakeholder interviews and literature review. The review highlighted that there were “waves” behind the instruments. These include the “green technology”, “demand-side management” and “carbon pricing”. The rationale behind the economic instruments is discussed below.

Table 6: Rationale of economic instruments for climate policy

Instrument	Lead agencies	Type of instrument	Year	Process of formulation	Major force(s)
Green technology financing scheme 1.0	KASA, MGTC, MOF	Financial	2010	Policy	Economic-based
Feed-in tariff (FiT)	KeTSA, EC, SEDA	Economic	2011	Policy, regulatory and institutional	Economic-based

Green income tax exemption (GITE)	MOF, MIDA, MITI	Financial	2014	Policy, regulatory and institutional	Economic-based
Green investment tax allowance (GITA)	MOF, MIDA, MITI	Financial	2014	Policy, regulatory and institutional	Economic-based
Large-scale solar (LSS)	EC, KeTSA	Economic	2014	Policy	Power-based, then economic-based
Net energy metering (NEM)	KeTSA, EC, SEDA	Economic	2016	Policy	Economic-based
Time-of-use tariff	TNB, KeTSA, EC	Economic	2016	Policy	Economic-based
Green electricity tariff	KeTSA, TNB	Economic	2021	Market	Economic-based
Carbon markets (VCM, DETS, tax)	EPU, KASA, MOF, Bursa	Economic	202x	Ongoing; TBC	Economic-based

Green technology wave

Malaysia focused on green technology to revive the economy following the 2008 recession. The focus on sustainability led to the establishment of the Ministry of Energy, Green Technology and Water (KeTTHA) in April 2009 and in its first 100 days of existence, the NGTP was formulated by July.

The NGTP paved the way for the development of economic instruments for the *"introduction and implementation of innovative economic instruments, […] to foster accelerated growth of green technology"*. This resulted in the establishment of various financial and economic instruments, notably GTFS (2010), FiT (2011), GITE, and GITA (both 2014).

GTFS was an outcome of both the NGTP and the NREPAP, also launched in 2009. NREPAP specifically highlighted the need for a *"conducive environment package"* that would *"encompass the provision of fiscal incentives, and indirect assistance in the form of reducing the transaction costs for financing, using GLCs and MNCs to lead the charge, and providing assistance to SMEs to participate in the RE business"*. It was introduced in Budget 2010.

FiT was the major focus of NREPAP. Beyond the mechanism, it highlighted the need for *"the introduction of an appropriate, robust and efficient regulatory framework which would address market failures and provides incentives for firms to enter into the RE generation market. The regulatory framework would be the primary vehicle for the introduction of the feed-in-tariff (FiT) mechanism"*. Driven by policy, the rationale led to the formation of a regulatory instrument (through the Renewable Energy Act 2011) and creation of an economic instrument (i.e. the FiT). It was institutionalised through the establishment of SEDA, a statutory body formed under the SEDA Act 2011 (Act 726). Its key role was to administer and manage the implementation of the feed-in tariff mechanism legislated in the RE Act 2011 (Act 725). Five years later, in 2016, NEM was added to the feed-in-tariff, focusing on solar PV.

The purchase and sale of green technology was also promoted through the use of economic instruments. The GITA (assets) and GITE (service providers) schemes were formulated as tax allowances for the production and purchase of green technology equipment or assets. These schemes were introduced in Budget 2014 and driven by market demand for incentives. MIDA was the focal agency as the chair of the National Committee on Investment.

To increase RE penetration and the installed capacity of RE, solar PV and LSS were identified as key options. Malaysia's first LSS project was the direct-award of a tender worth up to some 500MW, to 1MDB Solar in 2014[19]. After another direct-award in 2016, and upon pressure from opposition parties and civil society, the first open tenders were held for LSS. The LSS is administered by ST. This highlights that LSS projects were initially interest-driven, when contracts were negotiated directly. However, as competitive bidding took place, it became a competitive grant that led to reductions in the cost of deployment of solar and RE. The effects of LSS on the levelised costs of eletricity for solar are marked, as described in chapter 5. Four LSS auctions have been held since then. The LSS assesssment shows that while it was first interest- and power-driven, the rationale shifted to economics and need to ensure cost effectiveness.

[19] 1MDB Solar Sdn Bhd was a subsidiary of 1Malaysia Development Berhad, subject of one of the largest corruption scandals in the world and which contributed to the ouster of the Barisan Nasional government in the 2018 elections.

The “green technology wave” shows the strong policy causation in the development of economic instruments. The green technology agenda was part of a larger agenda under the New Economic Model, which included goals on inclusiveness, income, and sustainability. The focus during the initial stages was to increase the adoption of green technology. This was evident in the formation of economic instruments, such as GTFS, GITA an GITE which were incentives for adoption.

After the initial focus of adoption, the plan moved to production, with the aim of increasing the GDP contribution of “green business” (from 2% to 8% by 2020) and the creation of 500,000 green jobs from a baseline of 95,000 (Hezri, 2016). Success was also measured in terms of foreign direct investment (FDI). In 2014, KeTTHA announced US$4 billion worth of FDI for the solar photovaltaic industry, demonstrating the economic rationale of promoting green technology. Stakeholders corroborated that the focus was not on “nature-based solutions” but technological solutions driven by their economic potential.

There was little evidence of science-based approaches in the development of these instruments, with climate goals highlighted as overall outcomes. In 2009, at COP15, Malaysia announced its pledge to reduce the GHG emissions intensity of GDP by 40% by 2020. If implemented successfully, a 15% reduction of carbon emissions and 40% in the GHG emission intensity of GDP could be achieved by 2020 compared with 2005 levels (Hezri, 2016). However, there is no analysis or study to measure these goals. In terms of technology, no analysis could link the instruments (such as LSS, FiT and NEM) to the intended GHG intensity reductions.

Demand side management (DSM) through tariffs

Efficiency has long been a focus of energy and electricity policy in Malaysia. This is evidenced by the Energy Commission Act 2001, which aims *“to promote efficiency, economy and safety in the generation, production, transmission, distribution supply and use of electricity”*. From a policy perspective, two important DSM initiatives took place. First, NEEMP was published in 2010, and highlighted the various challenges and paths forward in enhancing EE. This led to the formulation of the NEEAP in 2015, which outlined the strategy for the implementation of EE measures across the industrial, commercial and residential sectors (MESTECC & UNDP, 2018).

Towards achieving the (then) target of 40% reduction in the emission intensity of GDP, the 11MP focused on DSM. It stated that *"the main goal of DSM is to encourage consumers to use less energy during peak hours and to move the time of energy use to off-peak hours"*. The time-of-use tariff, or TOUT, was introduced in 2016 to encourage end-users to be more energy efficient and to reduce consumer demand peaks. TOUT's pricing model shifted electricity consumption from peak to off-peak hours. The move towards DSM was largely driven by the need to be more efficient in terms of natural resource use.

More recently, KeTSA launched GET, which allows subscribers to use electricity generated from RE sources and receive the Malaysia renewable energy certificates (mRECs). Subscribers are charged an additional 3.7 sen per kWh of RE bought through the programme. As subscribers are charged a fee, the rationale behind GET is greater compliance to sustainability standards and requirements, and to support low-carbon initiatives.

The DSM instruments are largely economic-based. TOUT's goal is to increase energy efficiency and cost-effectivness but there are no analyses of its impact on emissions. GET is designed to serve economic interests, with the scheme geared towards firms requiring certification for the purpose of gaining access to funding (i.e. investment) and supply chain access. While the DSM policies and instruments are based on extensive studies, such as the NEEMP and the DSM preliminary study, there is no evidence of the instruments in line with climate outcomes.

4.1.2 Economic instruments for climate change adaptation

As described in chapter 3, there are no dedicated economic instruments for adaptation in Malaysia. Most of the economic instruments focus on achieving mitigation goals and the promotion of low-carbon development.

Existing instruments benefitting adaptation are in the form of financial aid during and after disasters. These instruments are largely electoral tools and with no evidence of links to broader goals, such as building climate resilience or loss-and damage-reduction. They are neither designed to meet the SDGs nor Sendai Disaster Risk Reduction Framework.

The government is exploring alternative financial instruments to raise revenue and find disaster risk-transfer mechanisms. Among the financial instruments expected

to come into fruition are the emergency waqf fund (for natural disasters) and national agriculture insurance scheme. Since they are in development, their effectiveness and outcomes will depend greatly on design considerations and implementation processes. Both instruments are likely to be market-based, since they are meant to reduce the government's financial burden from post-disaster liabilities.

The government has provided seed funding of US$3 million to the waqf fund. This amount will be scaled up through charitable endowments from corporates and individuals. The likely incentives to increase funding will be income tax deductions. Details are unclear on the national agricultural scheme but some form of government subsidies could be provided to lower the out-of-pocket costs for insurance premium and increase uptake.

Overall, the adaptation instruments are still at their early stages of development. There are no common financial instruments in place such as climate risk insurance or resilient charges or taxes that may form a part of an overall disaster risk management framework in Malaysia. These gaps serve as the basis for policy recommendations in chapters 7 and 8.

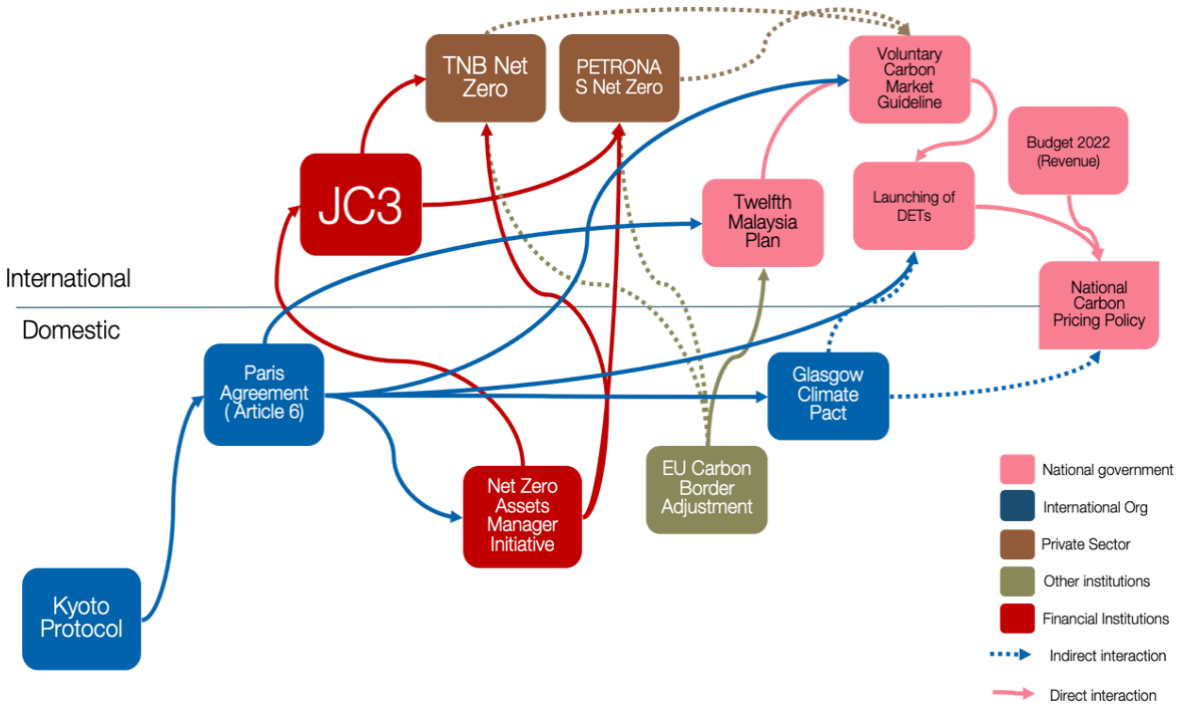
4.2 Causal analysis of prospective instruments for climate policy

Prospective instruments if designed and implemented properly can address mitigation and achieve the climate-related objectives of reducing the emissions intensity of GDP. Specifically, these instruments could cause a full internalisation of the emissions externality (described in greater depth in chapter 6). Similarly, state conservation financing instruments (SCFIs), while still not delivering at the scale required, have the potential to deliver co-benefits across both mitigation and adaptation.

4.2.1 Carbon pricing instruments (CPIs)

A causal analysis of the evolution of carbon pricing in Malaysia was conducted to understand its evolution. The analysis was based on stakeholder interviews and literature review. It focused on the different "forces" that influenced and interacted with domestic policy towards establishing a national carbon pricing policy (the outcome). Figure 2 provides a visual overview of how a national carbon pricing policy was established.

Figure 2: Causal analysis of carbon pricing



International compliance

The international carbon market was initiated in 1997 through the Kyoto Protocol. The protocol set a target to reduce emissions by 5% below 1990 levels by 2008-2012. It provided countries with mechanisms for trading, including certified emission reductions (CERs) generated from clean development mechanism (CDM) projects or activities under Article 12 of the Kyoto Protocol. As the target was set for Annexe I or industrialised nations, trading schemes were formulated in developed nations. The European Union's Emissions Trading Scheme (EU-ETS) was the first large-scale emissions trading scheme in the world.

The experience under Kyoto Protocol provided valuable experience for the international carbon market for the achievement of climate goals under the Paris Agreement. This was enshrined in Article 6, which states that *"cooperative approaches that involve the use of internationally transferred mitigation outcomes"* are allowed to achieve each country's NDCs. Since the Paris Agreement, many countries have established domestic or regional emissions trading schemes. Beyond emission trading, carbon taxes have emerged as an important mechanism for the achievement of climate goals.

The Glasgow Climate Pact further enhanced Article 6, with a focus on implementation. This includes ensuring that no double counting is allowed as "corresponding adjustments" ensure that any credit sold is transferred to the purchaser.

Trade risks

The rise in carbon pricing schemes ensured competitiveness of products and services and levelled the playing field. Many countries strived to implement extraterritorial measures by regulating the implementation of domestic taxes for imported products. For example, the EU, through the Carbon Border Adjustment Mechanism (CBAM), is planning to roll out tariffs on selected products based on their carbon content, as part of the EU ETS under the objective of avoiding carbon leakage.

Although the World Trade Organisation (WTO) is likely to challenge such an implementation, efforts and mechanisms to implement carbon taxes will likely continue[20]. Deputy director-general of WTO Jean-Marie Paugam has said that the adoption of environmental policies is not a trade barrier as long as they are not disguised as protectionism[21]. Focus will be on the details and design rather than the overall concept of CBAM and other climate-realted border adjustment mechanisms. For example, if CBAM does not benefit EU firms competitively, it will likely not fall foul of WTO rules. Carbon leakage is likely to be a feature of supranational policies in the future.

Financial risks

Another development is the role of financial institutions as a response to the Paris Agreement. The net zero asset managers' initiative was launched in December 2020 with aims of galvanising the asset management industry into committing to a goal of net-zero emissions. Its members consist of some of the leading asset managers in the world, including Blackrock and Vanguard, which manage more than US$15.2 trillion in assets and have the clout to steer investment and asset management towards net-zero emissions. Other initiatives, such as the

[20]https://www.allenovery.com/en-gb/global/blogs/countdown-to-cop/the-eus-carbon-border-adjustment-mechanism-and-a-wto-challenge; https://www.tradeexperettes.org/blog/articles/the-us-response-to-the-eu-cbam-past-responses-and-future-prospects;

[21] https://www.wto.org/english/news_e/news21_e/ddgjp_16sep21_e.htm

Institutional Investor Group on Climate Change, will accelerate the finance industry's move towards low-carbon development and strong climate action.

Domestic conditions, policies and interactions

Malaysia first participated in the carbon market through the Kyoto Protocol. While the creation of a domestic carbon market was not required due to its status as a Non-Annexe 1 party, Malaysia ratified the Kyoto Protocol in 2002 and participated as a seller of carbon credits to Annexe I parties with emission commitments. Malaysia has long participated in the carbon market as the host party under CDM.

The focus was on generating CERs rather than purchasing credits to offset domestic emissions. Lim et al (2013) found that 69% of the projects were related to renewable energy with the majority focused on wind (28%), hydro (26%) and biomass (26%) projects. Malaysia has also participated in REDD+ programmes, including the Sabah-EU REDD+ project, ITTO-REDDES in FRIM, and a National Readiness for Malaysia by UNDP. Nonetheless, many of these are pilot projects in nature or seek to establish readiness. Interviews highlighted that no credits were sold. As a seller and generator of CER and not buyer, it did not provide the impetus to establish a domestic carbon market.

The 12MP outlined the first official intention to develop a domestic carbon pricing scheme. Malaysia will study the feasibility of implementing a carbon tax and emission trading scheme. KASA then announced that a DETS would be launched and issued guidelines for VCM. A national carbon pricing policy is expected to be developed in 2022 or 2023, to outline the way forward for Malaysia with regard to its use of CPIs.

According to stakeholders, Malaysia is developing a domestic carbon pricing scheme for three reasons. First is Article 6 of the Paris Agreement and the subsequent developments in the rulebook for the carbon market. A clear critical path from the intergovernmental process is evident with the focus on selling of credits. As a megabiodiverse country, as well as participant in creation of CERs under the Kyoto Protocol, the economic rationale as a credit seller influenced the interest to formulate a carbon pricing system. A carbon pricing policy is also required to "adjust" the selling of carbon credits with Malaysia's NDC aims. Clarity is required for Malaysia as forests, and by extension, carbon, are a state matter and a policy to guide the states on the way forward is required (see chapter 6).

This is evident in the launching of the VCM guidelines where one of its key focus was on addressing corresponding adjustments. The complexity of balancing the right and interests of states to sell credits and the need to conserve Malaysia's carbon pools compelled the development of a carbon pricing policy. The policy is driven by economics and interest of powerful actors at the state level.

Second, corporations are now strong proponents of carbon pricing because of the shifting investment landscape. With institutional investors and asset managers ramping up pressure, carbon pricing schemes can aid corporations that rely on international investors in different ways. This incldues the ability to offset and purchase credits towards meeting commitments for net-zero emissions. The push for measuring indirect emissions in a company's value chain (scope 3 emissions) also requires a broad economic wide instrument, such as carbon tax to catalyse behaviour changes. As an oil producer, the carbon lock-in is due to the significant contribution and interest of powerful groups in the energy sector (Susskind et al, 2020). Both Petronas and TNB rely on international investors and have set out their net-zero strategies to show their commitment to energy transition and ambitious climate goals. These developments have played a major role in breaking the carbon lock-in of the energy sector, which is responsible for about 80% of emissions.

The financial sector in Malaysia has also responded to international demand by facilitating the transition among financial institutions. This includes the establishment of the Joint Committee on Climate Change (JC3), chaired by Bank Negara Malaysia and Securities Commission. The strengthening of the capacity of financial institutions to evaluate risks related to climate change also led companies to increase climate disclosures and reporting.

Third, a carbon tax is seen as a way to generate revenue. When the Pakatan Harapan government took over, one of its promises was to abolish the goods and services tax (GST). The GST abolishment resulted in a loss of about RM20 billion of revenue. The Covid-19 pandemic widened the fiscal deficit (from about 6.5% in 2021) and federal government debt (58.5%) (World Bank, 2021b). Budget 2022 was an expansionary one with a higher revenue collection of RM234 billion compared with RM221 billion in 2021. As a result, there is an impetus for fiscal reforms to increase and diversify the revenue base. This demonstrates the economic rationale behind a carbon tax.

Key forces in CPIs

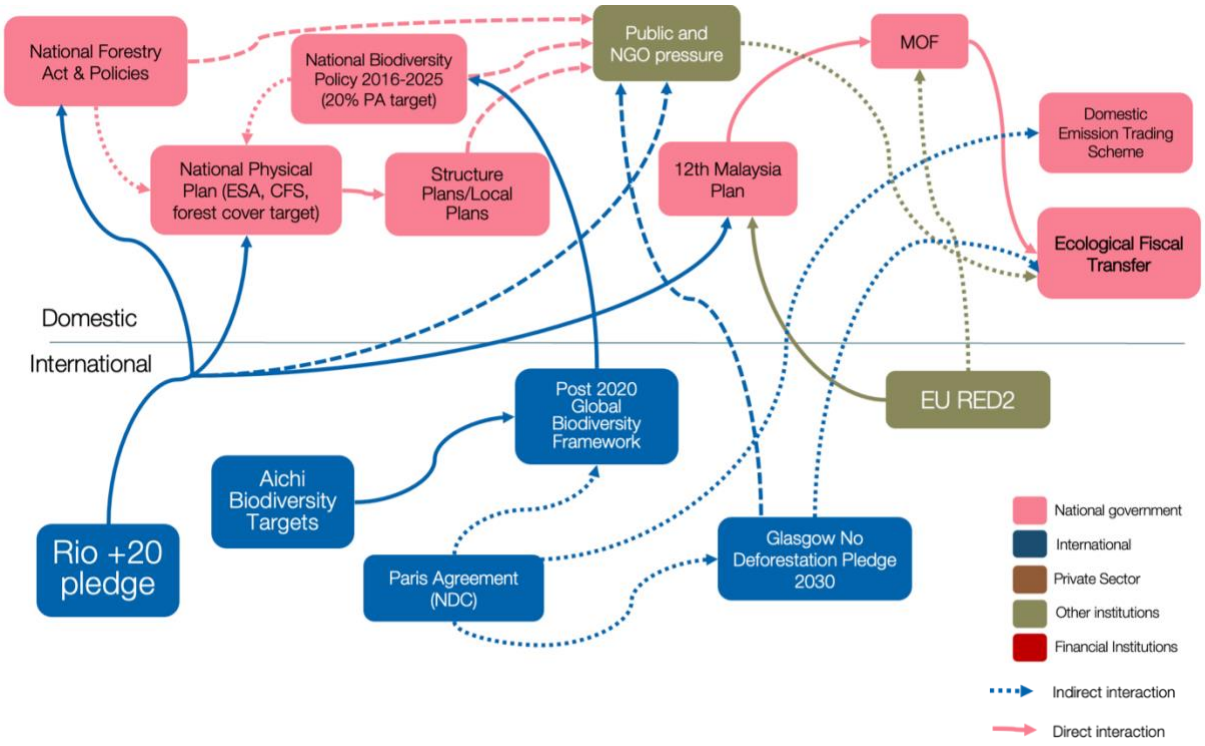
The causal analysis highlights that the international developments have influenced carbon pricing domestically. This includes compliance with intergovernmental processes and the impacts on the economy, especially trade and investment. Broadly, the rationale is based on an economic objective, including selling carbon credits in the international market, attracting international investments, and generating revenue. There is no evidence whether the carbon pricing schemes will meet Malaysia's climate goals of reducing 45% emission intensity and achieving net zero GHG emissions by 2050.

4.2.2 State conservation financing instruments

The Conservation Finance Alliance (CFA) defines conservation finance as mechanisms and strategies that generate, manage, and deploy financial resources and align incentives to achieve nature conservation outcomes. Based on Section 3 findings, conservation financing is one of the economic instruments with the highest implementation potential with strong climate mitigation, adaptation and biodiversity co-benefits in Malaysia.

One of the key financial instruments for conservation financing is Malaysia is the ecological fiscal transfer (EFT). The government announced the launch of an EFT scheme in 2020 with an annual allocation of RM70 million. EFT is a form of conservation financing from the federal to state governments to conserve their forests. In both Budget 2022 and the 12MP, the government plans to institutionalise the implementation for EFT and detail out its framework, mechanism and criteria. Figure 3 maps out the conservation financing process.

Figure 3: Causal analysis of state conservation financing in Malaysia



International compliance

Malaysia showed strong ambition in environmental protection as early as the 1990s. At the 1992 Earth Rio Summit, Malaysia pledged to maintain at least 50% of its total land area under forest cover (also known as Rio +20 Pledge). This commitment, however, is not binding in any legal form although it is appears every five years in the Malaysia Plans, government policies, annual reports and communication.

Forestry commitments

Before the pledge, Malaysia had already placed few legal instruments to safeguard its forest resources. This includes the National Forestry Policy 1978, followed by the National Forestry Act 1984 (amended in 1992 and 2021), which aimed to conserve and manage permanent forest estates (now called permanent reserved forests), based on the principles of sustainable forest management to protect the environment and conserve biological diversity and genetic resources. Malaysia has generally been able to keep this target despite not having a clear road map to maintain/meet them and mechanism to ensure fair share distribution in keeping

forested area among the states. As of 2019, Malaysia's forest cover was at 55.31% at 18.27 million hectares (JPSM, 2020).

The Rio +20 pledge and other multilateral climate agreements have influenced forestry, land use and biodiversity policies. For example, the Aichi biodiversity targets by the Convention of Biological Diversity (CBD), which Malaysia is a party to since 1994, are part of the National Policy on Biological Diversity (NPBD) 2016-2025. The NPBD adopted the Aichi targets of ensuring 20% of its terrestrial land and 10% of its marine waterways are gazetted as protected area. These targets, along with 50% forested area commitment, were one of the bases in formulating land use and spatial policies in Peninsular Malaysia. The NPBD is under review and expected to update its targets in accordance with the post-2020 global biodiversity framework.

The National Physical Plan (NPP), in place since 2005, translates the aforementioned targets for forestry and protected areas in a spatial manner. Under the Town and Country Planning Act 1976, state structure plans and local district plans must be updated to reflect the directions, strategies and actions of NPP. However, states retain their independence to determine the use of land, forests and natural resources. NPP has given rise to several important instruments, such as Environmentally Sensitive Area[22] Framework and Central Forest Spine Master Plan[23], tools deployed by civil society and environmental activists to ensure these policies are adhered to. The fourth version of NPP was released in 2021 and set even more ambitious policies, such as 50% forest cover target for Peninsular Malaysia alone, which now stands at 43.7%. This requires the equivalent of three Taman Negara to meet that target.

Climate commitments

One of the important drivers for Malaysia to conserve its forests comes from its climate commitments made in Copenhagen in 2009. In 2016, Malaysia submitted its first NDC under the Paris Agreement, where it intends to reduce its GHG emission intensity of GDP by 45% by 2030 relative to the emission intensity in

[22] The Environment Sensitive Area (ESA) Framework rank categories of areas according to their conservation priorities with management prescriptions as a basis for regulation development.
[23] The CFS Master Plan aims to increase the integrity and connectivity between the four major complexes through the "Ecological Linkages" that addresses habitat fragmentation.

2005[24]. Malaysia reported to have achieved 29% emission intensity reduction compared with 2005 levels in 2016 (BUR3). This target was achieved through the inclusion of CO_2-eq removals by sinks from the land use and land use change and forestry (LULUCF) sector. The removals amount to 259 $MtCO_2$-eq, which is about 78% of the total emissions of Malaysia. This shows that despite green technology and low-carbon initiatives, contributions from LULUCF still play a crucial role. Their importance will continue after the updated NDC submitted in 2021.

This causal analysis outlines how international pledges and obligations influenced natural resources and climate policies in Malaysia. Nonetheless, the current system faces long-standing challenges of meeting these targets. External pressures have also increased the need for conservation financing.

Domestic conditions: the federal-state jurisdictional dichotomy

Under the constitution, land allocation and management are state matters while guidelines and policies pertaining to the forest and biodiversity management are set at the federal level (see RESCU, 2022). State governments are empowered to enact the laws and formulate policies pertaining to land, forestry and natural resource management. However, the division between federal and state jurisdictions proves a challenge for forest conservation because most states do not have any economic incentive for conservation. They rely heavily on revenue from land and associated resources to maintain state coffers and fuel socio-economic development. Hence, many initiatives at the federal level have not trickled down to most states, such as the ESA framework, Central Forest Spine and state biodiversity action plans.

Low commitment and buy-in from state governments also arises from the fact that pledges, such as maintaining 50% of forest cover and 20% of terrestrial protected areas, were made without adequate consultation and consensus from state governments. Similiarly, the Glasgow deforestation pledge by 2030 signed in COP26 was a cabinet decision without state government buy-in.

Many policies have called for more equitable revenue sharing between federal and state government to conserve forests. In 2010, the NPP2 suggested that “fiscal

[24] Consists of 35% on an unconditional basis and a further 10% is condition upon receipt of climate finance, technology transfer and capacity building from developed countries.

measures shall be introduced to enable state governments to offset potential revenue loss as a result of biodiversity conservation initiatives" in environmentally sensitive areas, and that "studies shall be carried out to formulate the most appropriate mechanisms", including payment for ecosystem services (PES) schemes such as public payment instruments, carbon trade and biodiversity offsets. These needs were reinforced in NPP3 (2015) through the establishment of the National Conservation Trust Fund. Government agencies, such as PLAN-Malaysia, have advocated a compensation scheme to conserve natural forest and granary areas.

Public pressure and partnerships

Public pressure from civil society and CSOs has increased in recent years on deforestation linked with the climate crisis, disaster risks and human rights. While WWF-Malaysia and Malaysia Nature Society (MNS) have long advocated for forest conservation, more youth-led groups are emerging, such as KUASA, Sahabat Alam Malaysia, KAMY, Gabungan Darurat Iklim, to hold the government accountable to implement its policies and meeting its international pledges. My-HUTAN was formed specifically to advocate for ecological fiscal transfer from the federal government to state government.

There is an emerging model of multi-stakeholder partnerships between government, civil society, local communities and the private sector in natural resources management. Some examples include rehabiliation of the North Selangor peat swamp forest (see box 4.2.2 – 1), Kelab Alami Tanjung Kupang, Johor that cultivate youths' role in marine conservation and blue economy, and co-management of protected areas in Kota Kinabalu wetlands in Sabah, and Setiu wetlands in Terengganu.

Box 4.2.2 – 1: Multi-stakeholder partnership and local communities' empowerment in the rehabilitation of North Selangor peat swamp forest

The NSPSF covers 73,592ha and comprises of the Raja Musa forest reserve (50,106ha) and Sungai Karang forest reserve (23,486ha). On the peninsula's west coast, the NSPSF is the largest peat swamp forest. The peatland has an important role in biodiversity, water catchment protection and carbon sinks. The NSPSF is managed by the Selangor Forestry Department through an integrated management plan and employs five key management strategies, including

hydrology restoration/rewetting, fire prevention and control, encourage natural regeneration, assisted re-vegetation, and enrichment planting. This is in addition to the Selangor-wide logging moratorium, enacted in 2010.

A multi-stakeholder partnership was established to work with the Forestry Department to rehabilitate NSPSF. In 2012, a community-based organisation (CBO) known as "Friends of North Selangor Peat Swamp Forest (FNSPSF)" was established to provide a platform for partnerships between the private sector, civil society, local communities and authorities to restore the peatlands. The FNSPSF patrols and monitors the buffer zone area, participates in restoring activities and firefighting operations. The CBO participation has improved their livelihood as the community members also run small business activities that benefit the peatland restoration (e.g nursery, handicrafts and ecotourism).

The Forestry Department, in collaboration with Education Ministry and Global Environment Centre (GEC), initiated the peatland forest ranger programme with support from businesses and corporations. FNSPSF organises peat awareness programme for children and opened two centres to raise awareness on the importance of conserving and rehabilitating peatlands. Routine tree replanting activities are part of efforts to rehabilitate 1,000ha of forest in Raja Musa forest reserve.

Source: Malaysia Sixth Report to the CBD (2020)

Trade and economic risks

Another key factor related to deforestation is indirect land use change (ILUC) under the EU RED II that was revised in 2018. Under this directive, it includes elements of phasing out biofuels that use oil certified as high ILUC risk. This means that EU countries may no longer accept palm oil used for the production of biofuels if it is sourced from deforested areas/peatlands and extension of agricultural land into areas with high carbon stocks. Malaysia, which accounts for 28% of the global palm oil supply share, opposed this requirement strongly. While this requirement can be challenged under WTO trade rules, the efforts and mechanisms for deforestation-free products will likely continue. A greater concern for Malaysia is a snowballing effect i.e. if the requirements for banning high ILUC product extends to other palm oil-related products that fail to meet sustainability requirements of the European Union. The Ministry of Plantation and Industrial Commodities (MPIC)

has made efforts to improve sustainability of the palm oil industry, such as capping the oil palm plantations areas at 6.5 million hectares by 2023, mandating MSPO certifications for plantations and smallholders and reclassify land to match current use and conslidating spatial data to reduce land conflicts. However, Barthel et al (2018) show that various palm oil certification schemes in Malaysia (e.g. RSPO, MSPO, ISCC) do not address the ESG issues stated in EU and UN policy objectives.

Key forces for state conservation financing instruments

The causal analysis undertaken through policy mapping, tracing and stakeholder interviews, although not exhaustive, generally provides a few important conclusion. International pledges and commitments, such as 50% forest cover targets, 20% terrestrial protected area, although not legally binding, have influenced land use and forestry targets. While these targets are often made without consensus from states, there is pressure for an equitable sharing of revenue in forest conservation. There are also trade and investment risks if Malaysia fails to protect its natural resources. As commodity exporter of palm oil, timber and rubber, there are concerns if more countries impose stronger requirement for sustainable and deforestation-free products. At the same time, businesses, investors and financial institutions are engaging environmental, social and governance (ESG) with more companies taking a lead towards net-zero to remain competitive.

4.3 Key findings and conclusions

The causal analysis highlights the importance of political will and policies to drive the creation and adoption of instruments; the lack of science and ecological-based rationale; economic-based and power-based rationales as the main forces; and emergence of trade and financial risks.

Importance of political will in policy causation

The most prolific era in the creation and adoption of economic instruments was during the green technology wave. GTFS, GITA/GITE, LSS and FiT (and eventually NEM) were all attributed to policies formulated during this “wave”. One of the key reasons for this shift is due to green technology being high on the prime minister’s policy agenda vis-à-vis the New Economic Model and the Economic Transformation Programme (ETP). This demonstrates the importance of political

will to drive forward the agenda, as climate change and the environment cut across various ministries. Second, it demonstrated the importance of clear policies that link actions to policy instruments. The broader mapping highlighted the lack of "hard" policy instruments implemented in Malaysia.

Lack of science- and ecology-based rationale

An assessment of the formation of existing instruments demonstrates a lack of science-based approach in the interaction between economic and environmental goals. While studies were undertaken to develop the instruments, there was little evidence of the impact on climate outcomes. For example, incentive-based instruments, such as GTFS, GITA, GITE, focused on technology adoption but did not have clear climate goals. There is also no evidence of analysis undertaken pre-formation of instruments on the social costs and the marginal benefits accrued by polluters.

Economic rationale dominates mitigation instruments

Out of the nine instruments assessed for mitigation, all were judged to have an economic rationale as the main reason for their adoption or formation. The design of the economic instruments focused on economic outcomes, such as job creation and wealth creation. While instruments are often developed to achieve multiple objectives, linkages to climate goals was unclear as the cost or quantities required (i.e. amount of emission or pollution reduction) were not tied to the instrument. The carbon tax may be driven by the government's focus on increasing and diversifying the revenue base.

Power-based rationales dominate natural resource management

While the rationale for mitigation instruments was clearly economic, adaptation and natural resources more generally were largely influenced by interest groups. Instruments for state conservation financing, which revolves around natural resources, are influenced by the political processes and vested interests.

Emergence of trade and financial risks

While the above acts as constraining factors to the development of effective economic instruments for the environment, global trade and financial risks now drive the adoption of instruments that have ecological rationale. In particular, the requirement of ESG compliance by investors is tied to the need to offset carbon and/or ensure compliance down the supply chain (i.e Scope 3 emissions).

Furthermore, the risks and impact of extraterritorial implementation of carbon tax, such as EU's CBAM, have resulted in companies to at least have an understanding of quantifying carbon emissions if not supporting application of carbon pricing in Malaysia.

These factors are discussed in chapter 5.

5

Assessing the Performance of Malaysia's Economic Instruments for Climate Policy

Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

5 Assessing the performance of economic instruments for climate policy

Chapter summary

Malaysia implemented 11 economic instruments to boost the deployment of low-carbon technology. The emphasis was on renewable technology and energy efficiency measures through FiT, LSS, and NEM; GTFS, GITA, and GITE.

These instruments culminated in the deployment of some 3,713MW of installed RE capacity, or 47% of Malaysia's 2025 RE target. Some instruments have been more successful than others in this regard, particularly LSS, while the FiT held enormous promise early on. Constraints have been identified across some instruments – mainly insufficient funding and access to financing. Weaknesses in instrument design also played a part. Chapter 5.1 assesses each instrument on the basis of its design and performance.

None of the instruments can be considered "pure" economic instruments nor do they seek to or achieve the internalisation of the external costs of GHG emissions. Instead, many provide incentives for technology deployment. As a result, they are considered "second-best" policy responses, which address climate needs in a piecemeal manner

Forthcoming economic instruments, such as carbon emission trading scheme and/or tax, can synergise with the existing instruments and spur positive climate outcomes, notably by enhancing the attractiveness of low-carbon investment and technological deployment.

This section analyses the effectiveness of the instruments mapped in chapter 3 and chapter 4. These instruments refer to the economic and financial instruments that have either direct (e.g. FiT, NEM, LSS) or indirect (e.g. GTFS, GITA, GITE) price effects and their impacts on market dynamics. Table 2 provides an assessment of the effectiveness and key considerations of some of the economic and financial instruments. Chapter 5.1 provides an overview of the effectiveness of economic instruments and their achievements. Chapter 5.2 focuses on the outcomes of these instruments, developing a list of indicators highlighting Malaysia's progress towards decarbonisation.

Table 7: Overview of effectiveness of economic instruments for climate policy

Instrument(s)	Lead agencies or authorities	Performance
Fuel subsidies	MOF, MDTCA	
GTFS 1, 2, 3	KASA, MGTC, MOF	
FiT	KeTSA, EC, SEDA	
GITE	MOF, MGTC, MIDA	
GITA	MOF, MGTC, MIDA	
EEV policy	MITI, MOT	
LSS direct awards	EC, KeTSA	
NEM 1, 2, 3	KeTSA, EC, SEDA	
LSS 1, 2, 3, 4	EC, KeTSA	
(E)TOUT	TNB, KeTSA, EC	
Green electricity tariff	KeTSA, TNB	N/A; recent initiative in early stages of implementation
Carbon pricing (VCM, DETS, tax)	EPU, KASA, MOF, Bursa Malaysia	N/A; ongoing focus to be analysed in chapters 5.2, 5.3

5.1 Effectiveness of mitigation economic instruments

5.1.1 Feed-in tariff (FiT)

Malaysia's focus on low-carbon technologies and the energy transition started with REPAP and GTP alongside the RE and SEDA Acts. These led to the first policy instrument used in Malaysia to achieve its climate-related objectives: the feed-in

tariff (FiT). FiT involves long-term supply contracts[25] between feed-in approval holders (holders) and distribution licensees (DLs), allowing holders to sell excess electricity generated through biogas, biomass, small-hydro, and solar to DLs at guaranteed rates. The contract length for biogas and biomass generators is 16 years and 21 for small-hydro and solar. To fund the FiT mechanism, the RE Fund was set up, deriving its financing from surcharges imposed on electricity bills of consumers using more than 300kWh each month. Since 2014, the surcharge rate has been raised to 1.6%, applying to roughly a quarter of consumers[26].

The programme featured a total quota of 1GW between 2012 and 2017 across technologies. Capacity limits for each technology, particularly solar, may have served to "cool" markets, inhibiting more natural growth rates. Yet these limits were in place for two reasons. SEDA's operations and the FiT are financed by flat renewable energy taxes imposed on consumers' bills. These taxes amounted to 1% surcharge on electricity consumption of more than 300 kilo-watt hours (kWh) per month and accounted for just over a quarter of consumers[27]. Concerns over the ability to integrate larger quantities of RE without further investment and modernisation in grid infrastructure were a second limiting factor[28].

A later issue related to turnaround times between approval and operationalisation (especially outside of solar) cropped up. This was due in part to the lack of financing to cover capital costs at the individual and institutional levels. Ultimately, financing constraints remained the most significant limiting factor. Incentives offered to consumers generated significant interest, particularly in solar PV, but the programme's (and SEDA's) reliance on the RE Fund led to the decoupling of solar PV from FiT, and the subsequent establishment of the net energy metering (NEM) policy.

[25] Contract lengths vary by type of energy: 16 for biogas and biomass, and 21 for small-hydro and solar.

[26] SEDA's website contains a detailed overview of FiT, including lists of all holders organised by type of technology, year, and installed capacity.

[27] This tax was later raised to 1.6% and remains the main source of funding for SEDA and FiT's operations, i.e. the 'RE Fund'.

[28] This is being addressed by TNB's ongoing investments through its 'Grid of the Future' programme, comprising of upgrades and expansions between 2021 and 2023', at a cost of RM27 million.

SEDA (2021) reports that the cumulative installed RE capacity through the programme amounted to just under 575MW as of 2020, or 7.32% of the target of 7,838MW by 2025. Much of this capacity is driven by feed-in approvals for solar, which still accounts for 56.2% of FiT's total generation capacity despite its earlier discontinuation. Biogas (19.3%), biomass (12.3%), and small-hydro (12.2%) all contribute a smaller share and growth of FiT has slowed dramatically since 2016. Between 2012 and 2016, growth rates averaged more than 90% annually but between 2016 and 2020, this fell to under 4% a year.

Another metric reported by SEDA is the cumulative capacity of approved applications. Naturally, there is a lag between approval and operationalisation because of construction times but also difficulty of obtaining financing for deployment. A total of 1.2GW has been approved through FiT. Small-hydro accounts for a proportion of the approvals yet to operationalise and of an approved capacity of 511.5MW, only 13.7% is operational. Rates for biogas (49.4%) and biomass (42.6%) are higher. These figures are put into greater contrast when considering growth rates of approved capacities; between 2016 and 2020, this amounted to roughly 14.5%, relative to over 137% between 2012 and 2016. These numbers show that the efficacy of the FiT as an incentive is waning and has been since the discontinuation of solar as a RE source.

5.1.2 Financial instruments: GTFS, GITA, and GITE

Between the establishment of the FiT and NEM, launched in 2016 to support the deployment of solar PV, several policy instruments were introduced with the intention of generating positive climate impacts. These include MyHijau, an eco-labelling programme; Minimum Energy Performance Standards (MEPS), mandating minimum EE standards for household appliances; National Energy Efficiency Action Plan (NEEAP), which set (modest) targets for energy savings; enhancements to the biodiesel blending programme, an initiative to reduce emissions by blending biofuels with diesel; and the energy efficient vehicle (EEV) programme, which provided loans, tax breaks, grants, and duty exemptions for the manufacture of low-emissions vehicles – the standards of which were, again, modest.

More signficantly, however, was the introduction of financial instruments aimed at enabling the growth of domestic low-carbon technology industries: green technology financing scheme (GTFS), green income tax allowance (GITA) and

green income tax exemption (GITE). GTFS, in its third iteration, was introduced in Budget 2010. It provides financing of up to RM100 million for technology projects contributing to emission reductions, environmental or energy conservation, or the development of renewable resources, dispatched through working capital and/or term loans. Between 2010 and 2017, funding reached roughly RM3.5 billion. The second iteration allocated RM2 billion between 2018 and 2020 and the third iteration reached RM2 billion between 2021 and 2022. As Malaysia's flagship low-carbon technology financing scheme, it could enable and facilitate the deployment of renewable energy and energy efficiency technology to assist in the meeting of emission reduction targets. Its funding of RM9.5 billion outstrips that of the FiT and NEM mechanisms.

GTFS approved 431 projects[29] between 2010 and 2017, with a majority catered to RE and EE measures. GTFS 2 approved just two waste-sector projects, for instance. GTFS 1 and 2 approved projects valued at RM5.54 billion. MGTC has published data on the impacts of the GTFS on two other key climate variables or indicators: GHG emission reductions and low-carbon job creation. GTFS 2 has contributed to emission reductions of some 1.3 million tonnes of CO_2-eq and overseen the creation of close to 500 low-carbon jobs. That its allocated funding is routinely utilised indicates high demand for financing assistance for green technology, showing the potential to expand GTFS or similar mechanisms to spur the deployment of low-carbon technologies in Malaysia.

Beyond GTFS are the tax incentives for green technology. GITA is targeted at investors of green energy technologies, who receive tax allowances for the purchase of low-carbon technologies or assets. GITE allows low-carbon service providers to receive tax exemptions on income earned through the sale of green assets, equipment, or services. GITA approved 523 projects between 2016 and 2020, with 445 catered towards RE. Only three were green building-related, with the rest comprised of energy efficiency projects. Within RE itself, projects are skewed towards solar (426 projects). By comparison, GITE is smaller –33 services were approved between 2016 and 2020. This is an indication that the ecosystem for low-carbon service provision remains small in Malaysia, relative to the number of entities interested in investing in and deploying green technologies. About two-thirds of approved GITE projects were limited to RE. In 2020 alone, MGTC

[29] All data pertaining to the GTFS, GITA, and GITE are drawn from MGTC (2020).

approved 243 applications, worth some RM965 million, for both tax incentives, with these projected to culminate in emission reductions of about 575,000 tonnes of CO_2-eq and the creation of 471 jobs.

These instruments were formulated to enhance the ability of firms to produce and invest in low-carbon technologies and to drive the growth of the overall low-carbon investment and service provision ecosystem..

5.1.3 Net energy metering (NEM)

When NEM was launched in 2016, Malaysia had deployed 446MW of RE capacity, against the target set in REPAP of 975MW. Challenges in financing the FiT led to the creation of NEM, which focuses exclusively on solar. NEM, in its original form, enabled two mechanisms: self-consumption of electricity generated through solar PV by “consumer-producers” and the sale of surplus energy to DLs at a predetermined “displaced cost”. Electricity consumers benefit from such a scheme in several ways: attaining some degree of self-sufficiency in electricity generation, reducing their reliance on fossil-fuel powered electricity from the grid and savings on utility bills through “electricity credits” earned from sale of excess electricity to the grid.

Yet, in contrast to the solar quotas offered through FiT, NEM was routinely undersubscribed. Between 2016 and 2018, only 4.5% of the subscription quota offered to consumers through was fulfilled (SEDA, 2021). Several factors contributed to this : first, financial incentives were insufficient, equivalent to less than half the compensation offered through FiT. In fact, rates were lower than average electricity tariffs, meaning that some households were paying for the sale of their self-generated electricity. A second issue was the “rollover” periods whereby credits could be carried over on a month-to-month basis for up to 24 months. Beyond the two years, credits expired.

Given the high costs of solar PV, this stipulation denied consumers tangible long-term returns on their investments. FiT, in contrast, featured 21-year contracts for solar, at more favourable rates. Additional financial burdens were imposed on NEM participants: costs associated with meter installations, upgrades, and replacements are the responsibility of holders rather than the DLs or the government.

Since 2019, NEM has revised its incentives: rather than "sell" excess electricity to DLs at a displaced cost, each kWh exported is offset against electricity bills on a one-for-one basis. Quotas are still a feature, with a total of 500MW allocated in 2020 across residential, commercial, industrial, and agricultural consumers in Peninsular Malaysia. This was expanded to 600MW for 2021 to 2023, but as of January 2022, only 38% of this quota had been subscribed to. The majority of this is the result of applications from industrial players to the net offset virtual aggregation (NOVA) programme. For households and the government, the take-up rate remains low, with under 20% of the quota subscribed to.

Several reasons may explain the lack of interest in the latest iteration of NEM. The first is the economic downturn from the Covid-19 pandemic, with solar PV requiring significant upfront investment despite financing opportunities and the availability of solar-leasing schemes. A second possibility is the weakness of incentives. The shift to one-for-one offsetting was a positive step for the mechanism but given the successes of such instruments internationally (Muro and Saha, 2016), priority must be given to the identification of further weak points in NEM. Third is the possibility that demand has peaked for households and the government and the market has reached a saturation point. Yet this argument is tenuous as the potential for rooftop solar deployment remains large in Malaysia; see Lackovic and Ruiz-Cabrero (2021).

5.1.4 Large-scale solar (LSS)

At the start of the NEM journey, Malaysia commenced the auctioning of licences for the generation of solar through large-scale solar "farms" (LSS). The first LSS contract was awarded via direct negotiation to 1MDB Solar Sdn Bhd[30]. In 2016, another contract was awarded to a consortium of three companies with no prior experience in the solar industry[31]. Parliamentary and public scrutiny forced the Energy Commission to hold two rounds of open tenders for LSS in 2016 and 2017. The two auctions led to LSS projects that would see the generation of 1GW of grid-connected electricity by 2020, with the five lowest-cost approved bids in the first auction averaging roughly 39.63 sen per kWh, which dropped to 35.04 sen/kWh in LSS 2 (ST, 2016; ST, 2017).

[30] https://www.theedgemarkets.com/article/1mdb-explains-solar-ties-us-firm
[31] https://www.malaysiakini.com/news/363178

The EC held two further bidding exercises in 2020 and 2021. LSS 3 saw the approval of 490MW of LSS capacity, with LSS 4 adding a 823MW, the largest single auction in Malaysia. More importantly, the levelised costs of electricity for LSS have decreased to 22.3 sen/kWh in LSS 3, and between 17.68-24.81 sen/kWh across the approved bids in LSS 4 (ST, 2019; ST, 2021a). Of all efforts to deploy RE, LSS has proven to be the most successful in terms of quantity. Yet challenges exist, such as LSS developments' impact on deforestation and land-use change, particularly where areas of highest solar irradiation coincide with that of productive arable land. Large-scale floating solar farms are an alternative avenue to facilitate the deployment of LSS without the risks to land-based LSS. Exploring the potential of agrivoltaic solar is one of the recommendations in the water sector transformation 2040 study conducted by the Malaysian Academy of Sciences.

5.1.5 Tariffs in the electricity sector: TOUT, ETOUT and GET

Electricity-sector tariffs do not seek directly to increase investment in specific technologies compared with FiT, NEM, and LSS. These seek to affect consumer behaviour. These are the time-of-use (TOUT) and enhanced time-of-use tariff (ETOUT), applicable to the commercial, industrial, agricultural, and mining sectors. ETOUT nudges consumers to shift usage from peak to off-peak hours. It achieves this by pricing electricity differently across three "time zones", creating incentives for consumers to shift consumption from peak hours.

Links to emissions reductions are tentative. Malaysia's electricity grid is powered by fossil fuels, predominantly coal. ETOUT does not stimulate the deployment of clean energy, but can smooth out demand curves for electricity. If this can curtail reserve margin or reduce the need for coal-fired baseload electricity generation, it can support mitigation efforts. A greater understanding of these impacts is required to measure the instrument's effectiveness. While Malaysia's use of "time zones" is progressive, it falls short against best practices in other countries, as highlighted in IRENA (2019). Malaysia can move closer towards a dynamic pricing framework, linking retail and wholesale sectors and matching supply and demand in real time. These advances would require investments in the modernisation and upgrading of electricity meters and the grid..

Introduced in 2021, the green electricity tariff (GET) allows residential, industrial, and commercial consumers to purchase low-carbon electricity on a subscription

basis at a rate of 3.7 sen per kWh in exchange for Malaysian RE credits (mRECs). Proceeds from the programme go towards RE development initiatives. While it is too early to gauge its effectiveness, the programme's launch featured procurement pledges from several public sector agencies and ministries, key private sector players in banking, F&B, insurance, utilities, and other sectors.

5.1.6 Fuel Subsidies

Carbon pricing schemes are most effective when combined with efforts to rationalise existing energy and fuel subsidies (UNDP, 2021). Blanket fuel subsidies can counteract the impacts of carbon pricing by lowering the price of fossil-fuel energy and distorting incentives for consumers and businesses towards lower-carbon development. Fuel subsidies are also inefficient and regressive, encouraging overconsumption and raising emissions, while reducing the fiscal space available to policymakers (Anand et al, 2013). Indeed, the need to rationalise fuel subsidies has long been recognised by countries in the region. As far back as 2009, G20 and Asia-Pacific Economic Cooperation (Apec) leaders agreed to eliminate fuel subsidies in the near future (Jha et al, 2016). In Malaysia, such efforts were undertaken in 2009, 2010 and 2013.

These rationalisation efforts, especially in 2013, managed to remove subsidies on RON95 petrol, RON97 petrol (a more expensive, higher-octane petrol) and diesel. This generated about RM26 billion savings in 2015/2016 period but the government had to compensate lower-income households with cash transfers (Bergaoui, 2017). Amid the rise in global oil prices in 2018, the government reintroduced fuel subsidies for RON95 and diesel, reversing some of the reforms in 2013[32].

Currently, the two major fossil fuels subject to government subsidies are RON95 and diesel. These subsidies are implemented via a national price ceiling for retail prices and based on the automatic pricing mechanism (APM). The APM formula takes into account global fuel prices[33], guaranteeing margins for local oil companies and petrol station operators, and then calculates the government subsidy to reduce the retail petrol price to a pre-specified level (IISD, 2013). As of

[32] https://www.nst.com.my/news/nation/2018/05/372343/price-fuel-pumps-remain-says-pm

[33] This measure is benchmarked by the Means of Platts Singapore (MOPS), which is an index for refined (processed) petroleum.

2022, RON95 petrol and diesel cost RM2.05/litre and RM2.15/litre respectively – a ceiling price that has remained unchanged since 27 February 2021[34].

These fuel subsidies, first introduced in 1983, are intended to reduce the cost of living for households by lowering retail fuel prices and prices of other goods and services using fuel as an input (e.g. food, transport). But in line with international experience and evidence, these subsidies create enormous fiscal costs in addition to their inefficiency and regressivity. In 2021, the total cost of fuel and gas subsidies reached about RM8 billion, roughly 3.6% of federal government operating expenditures based on available fiscal projections[35]. The Covid-19 pandemic levelled large negative impacts on government finances through adverse shocks to both government revenue and expenditure, making fiscal savings from subsidy rationalisation crucial (Cheng, 2022).

Blanket fuel subsidies also benefit higher-income households disproportionately. Household income and expenditure data, reported by the Department of Statistics Malaysia (DOSM), indicate that transport expenditure rises both in amount and proportion of household expenditures as household incomes rise. This means higher-income households consume a significantly larger quantity of subsidised petrol than lower-income households. The average household in the top 10% of the household income distribution spent more on transportation than the bottom 50% of households combined.

A viable plan towards carbon pricing should first include the removal of blanket fuel subsidies. This can start with removing the sales tax exemption on retail sales of RON97 petrol. Subsequently, ceiling prices for RON95 and diesel can be incrementally raised. This will gradually reduce the subsidy amount, raising prices closer to market-determined levels. When prices for RON95 petrol and diesel are close to market prices, they can be put on a “managed float” similar to RON97 petrol, where retail prices are adjusted weekly in line with monthly average prices for crude oil.

There will be huge challenges to the removal of fuel subsidies. First, despite the regressive nature of blanket fuel subsidies, their removal will hit lower-income households. Higher fuel prices will exert pressures directly through higher transport

[34] https://www.comparehero.my/transportation/articles/latest-petrol-price-ron95-ron97-diesel
[35] https://www.reuters.com/article/malaysia-politics-idUSL2N2NU02O

costs and indirectly through higher prices of other goods and services. For instance, estimates suggest that a 50 sen increase in RON95 prices may add about RM600 to annual household expenditure. This will have devastating impacts on low-income households in certain regions that spend more on fuel and gas like rural Perlis and urban Sarawak. However, these concerns should not stop subsidy reform. Targeted cash transfers to lower-income groups are more efficient than blanket subsidies.

Such offsetting transfers can take the form of fuel dividends for lower-income households. Operationally, this may entail supplementary "top ups" to the unconditional cash transfer programme, Bantuan Keluarga Malaysia (BKM). The "top-up" amounts can be scaled to retail fuel prices. In the longer term, steps can be taken to phase out even these targeted subsidies, to reduce any potential conflict with the implementation of CPIs.

5.2 Outcomes: analysing low-carbon indicators

5.2.1 Low carbon development indicators

The bulk of emissions in Malaysia is caused by the burning of fossil fuels. KASA (2020), which presents emissions data through 2016, gives the most detailed breakdown of national emissions by sector and activity. Fossil fuel combustion accounts for more than 75% of emissions. The production of electricity is the single greatest contributor to emissions at 31% of the total. The transport sector is responsible for under a fifth of emissions, while a further 16.5% is accounted for by oil and gas production processes. The rest is made up of agricultural, industrial, manufacturing and construction, and waste sector emissions (see table 8).

Table 8: Emissions by sector in Malaysia, 2016 (KASA, 2020)

Sector/activity	Emissions (tCO_2-eq)	Share of total emissions
Electricity and heat	103,435,820	30.91%
Transport	63,277,090	18.91%
Oil and gas production	55,197,540	16.49%
Waste	25,518,281	7.63%
Manufacturing and construction	23,934,910	7.15%
IPPU	21,217,280	6.34%
Agriculture	14,167,910	4.23%

Figure 4 depicts a time-series view of sectoral emissions, illustrating the increase in overall emissions since 2009 following the passage of NPCC, NGTP and NREPAP. There is a lag between the implementation of a policy and realisation of intended goals, but despite a minor drop in emissions between 2015 and 2016, the general trend is one of gradually increasing total emissions across sectors. This is despite the growing emphasis on emission reductions through the utilisation of the various economic and financial instruments. Any mitigation strategy in the electricity and transportation sectors will have a large influence on Malaysia's capacity to reduce emissions, as these two sectors account for more than half of national emissions. This creates enormous scope for carbon pricing instruments (chapter 6) to bring about shifts to address climate change. Meanwhile, action to minimise methane emissions from oil and gas production can play a part in the nation's goal to reduce methane emissions, as indicated by Malaysia's signing of the global methane commitment at COP26 in Glasgow.

Figure 4: Sectoral emissions (1990-2016)

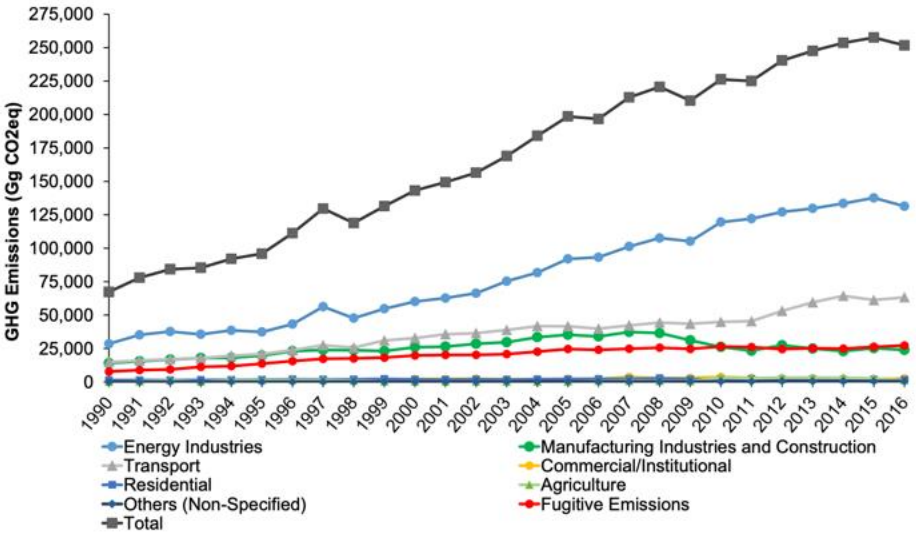


Table 6 presents an overview of Malaysia's performance in key low-carbon indicators, focusing on their performance between 2009 and 2020. A total of 16 indicators have been considered, covering emission-related metrics, energy use, RE capacities, investment and job creation (for the financial instruments), and budgetary allocations. It is difficult to assess how the economic and financial instruments assessed have contributed to Malaysia's progress or lack thereof. The analysis does highlight that installed capacity of renewable energy has increased.

In other words, technology adoption of instruments is successful but carbon emissions continue to rise.

Table 9: Key low-carbon indicators (2009-2020)[36]

#	Indicators	2009	2012	2015	2018	2020
1	Total GHG emissions (kilotonnes)	181,020	203,280	232,550	239,620	N/A
2	GHG emissions per capita (metric tonnes)	6.53	6.99	7.68	7.6	N/A
3	GHG emissions intensity of GDP (kg per US$)	0.836	0.787	0.772	0.687	N/A
4	Electricity consumption (GWh)	96,307	102,174	110,770	120,617	N/A
5	Fossil fuel share of electricity generation	93.4%	92.4%	88.7%	83.2%	N/A
6	Energy intensity per capita (kWh/person)	3,429	3,943	4,248	4,721	N/A
7	Energy intensity of GDP (GWh/GDP in RM millions, 2015 prices)	0.114	0.115	0.113	0.112	N/A
8	FiT – installed RE capacity (MW)	N/A	106.99	379.1	575.51	574.09
9	NEM – installed RE capacity (MW)	N/A	N/A	N/A	13.77	513.77
10	LSS – approved RE capacity (MW)	N/A	N/A	N/A	1,022	2,625 (2021)
11	Installed RE capacity (FiT, NEM, LSS)	N/A	106.99	379.1	1,611.28	3,712.86 (2021)
12	Installed RE capacity (share of 2025 target)	N/A	1.37%	4.84%	20.56%	47.37%
13	GTFS, GITA, GITE – investment (RM billions)	N/A	N/A	N/A	N/A	6.19
14	GTFS, GITA, GITE – emission savings (millions of tonnes of CO2-eq)	N/A	N/A	N/A	N/A	1.875
15	GTFS, GITA, GITE – jobs created	N/A	N/A	N/A	N/A	962
16	Annual climate-related budgetary allocations (RM billions)	N/A	1.06	1.2	1.05	1.1

These indicators can be grouped into four broad categories. The first set pertains to emissions and emission intensities. In line with its commitments to the UNFCCC, through its NDCs, Malaysia saw a decrease in the emission intensity of its GDP between 2009 and 2018, of roughly 18%. However, total and per-capita emissions rose by 32.4% and 16.4% respectively across the same time period. This highlights the dangers of Malaysia's approach to its NDCs – as long as GDP growth outstrips those of emissions, long-term climate targets may be met without necessitating significant decarbonisation.

[36] The data in this table are derived from various sources. Indicators 1 through 4 are drawn from the World Bank's data repository; indicators 4 and 5 from ST (2021b); indicators 6 through 8 from SEDA (2021a) and SEDA (2021b); indicators 9 and 10 from the author's subsequent calculations; indictors 11 through 13 from MGTC (2021); and indicator 14 through the authors' manual process of climate budget tagging, covering budgetary allocations for both adaptation and mitigation projects.

The second set of indicators relate to energy consumption and efficiency. Here, results are more mixed. Malaysia has succeeded in reducing its reliance on fossil fuels steadily since 2009, when coal, gas, oil, and other fossil fuels accounted for 93.4% of electricity generated. By 2018, this figure had fallen to 83.2%, with RE programmes such as FiT, NEM, and LSS playing some role in this regard. Total and per-capita energy consumption, however, have continued to rise, by 25.2% and 37.7% respectively. This is to be expected as Malaysia remains a developing nation. However, that per-capita energy consumption continues to rise despite efforts to enhance EE in tandem with the GTFS, GITA, and GITE schemes is most concerning. There is also little progress in reducing Malaysia's energy intensity of GDP during the same time period.

Meanwhile, the financial instruments (GTFS, GITA, and GITE) have managed to catalyse investment and job creation, while ensuring emission reductions. Unfortunately, data reported by MGTC on the effects of these three programmes do not allow for a time-series analysis of progress along these three metrics. Finally, budgetary allocations towards climate change adaptation and mitigation measures have been considered. These figures have been compiled through a manual assessment of Malaysia's budgets since 2010, as the government has not formalised the use of climate budget tagging. The analysis shows that total budgetary allocations towards climate-related initiatives has not grown significantly since the initial push to address climate change.

5.3 Key findings and conclusions

The assessment in this section provides findings on the effectiveness of economic instruments for climate policy. It assessed the effectiveness of these instruments against their established objectives (typically, in the form of targets for installed RE capacity) as well as against broader climate outcomes. The findings provide important insights into enhancing the existing instruments and lessons for prospective instruments. Among the issues were those pertaining to the design, implementation, and impact of the instruments.

Design-related issues

Design-related issues have been identified across a number of instruments. The first pertains to the scope of the instruments. For example, FiT included a quota of 1GW, with capacity limits for each technology, which inhibited growth. The incentives for technology adoption, including GTFS, GITA and GITE, were skewed towards RE and EE projects. The scope of the instruments should ultimately be linked with broader climate targets (e.g. CO_2 reductions) for the instrument to be effective. Explicit climate targets should be built in to the scope of the design.

A second issue relates to the strength of incentives and incentivisation structures. For example, NEM's incentives are far weaker than FiT's. Even after its enhancement in 2019, uptake of NEM 3 has been slow and remains low. The incentive structure should take into consideration various factors, including market demand and overall prices.

Third, the design of instruments is based largely on the achievement of economic objectives and not on climate factors. There is no evidence that the design of instruments takes into account the marginal benefits and costs of abatement activities, nor do they seek to achieve an internalisation of the emission externality that causes climate change.

Implementation-related issues

Several issues were also flagged in terms of instrument implementation, including logistical and administrative issues. Issues pertaining to processes of policy formulation have been covered in detail in chapter 4. However, other important implementation issues are flagged in this study.

First, access to finance remains a challenge. Instruments such as NEM require high upfront capital costs and have long-term payback periods. While GTFS offers government guarantees, it still requires external financing for individual projects. Various challenges were cited by stakeholders in terms of struggles to receive the requisite financial support for their initiaves. One particular problem relates to financial institutions' inability to evaluate green projects involving nascent or untested technologies. This is a key reason the benefits of the various financial instruments accrue to RE and EE, and within RE, to solar PV.

A second issue is a lack of funding. FiT, for example, included the use of quotas and faced challenges in its early years because its funding is derived almost solely from the RE Fund, with little in terms of annual budgetary allocations to SEDA or the programmes it administers. State conservation financing also faces the challenge of limited funds.

Impact-related issues

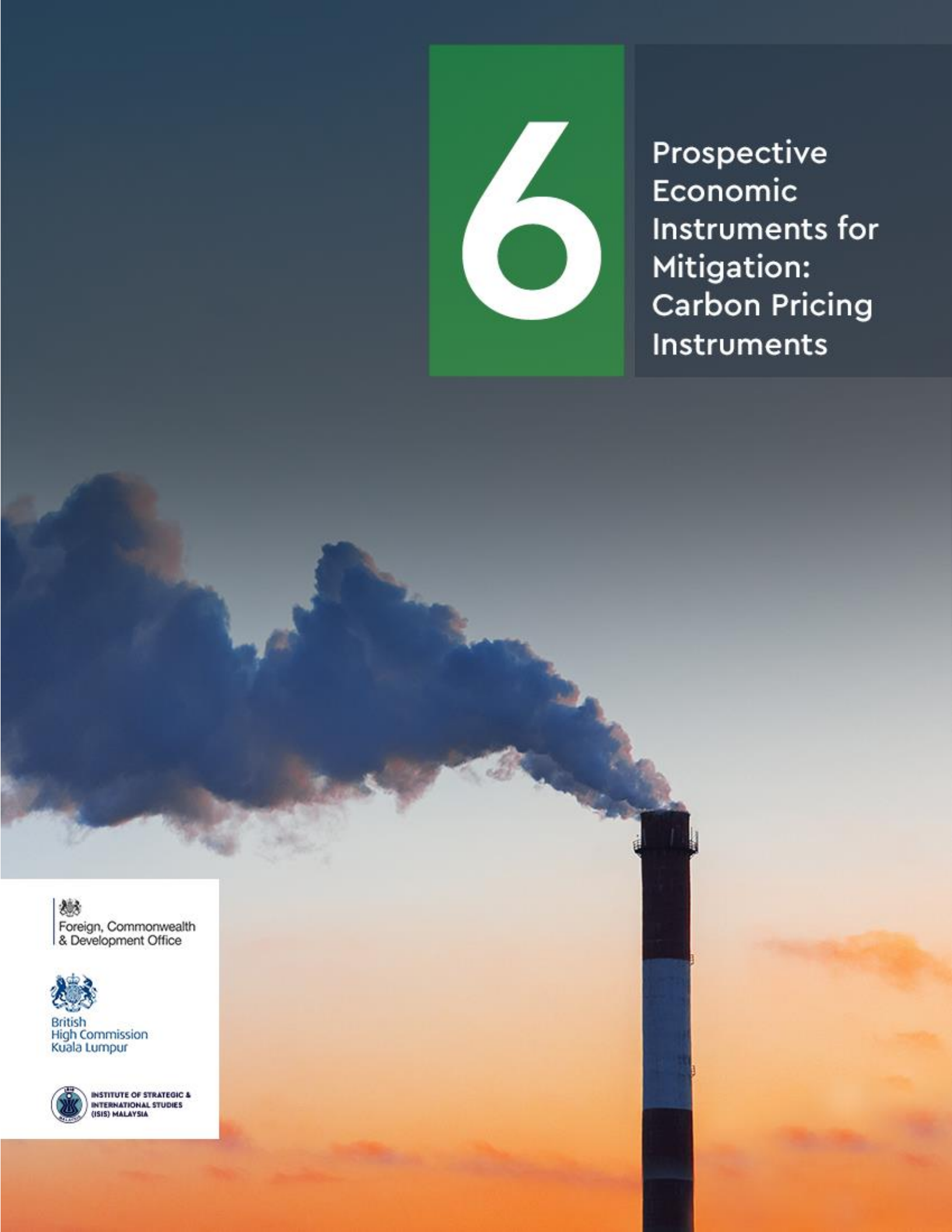
Many of the design and implementation issues highlighted resulted in less than optimal outcomes. As seen in chapter 5.2, absolute emissions continue to rise, while there is little indication that energy efficiency has improved to a significant degree. While low-carbon technology deployment has grown, the achievement of positive climate outcomes remains a challenge. Nevertheless, recent efforts to quantify the various outcomes of GTFS, GITA, and GITE are a step in the right direction.

Generally, a major issue at the impact level is the lack of a holistic approach to address the challenges. For example, the persistence of fuel subsidies is harmful to the environment and emission reduction targets. They can also send inconsistent market signals and conflict with instruments, such as carbon pricing, which seeks to tax the same fuels being subsidised. At the same time, conflicts may grow for some of the more successful instruments. LSS can lead to land-use change, given the need for vast areas of land, and high areas of solar irradiation overlap with areas of productive agricultural land.

Ultimately, the economic instruments that have been established since 2009 are "second-best" policies. Their impacts are likely to be limited in the absence of more holistic instruments or policies designed to internalise external costs and address market failures.

6

Prospective Economic Instruments for Mitigation: Carbon Pricing Instruments



Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

6 Prospective economic instruments for mitigation: carbon pricing instruments

Chapter summary

Malaysia's intention to introduce carbon pricing was first announced in the 12MP. A feasibility study will be conducted assessing the various CPI options, culminating in the establishment of a policy on carbon pricing. This policy will likely inform the implementation of either an emissions trading scheme or carbon tax, or a hybrid system featuring the adoption of both instruments.

Various pressures, domestic and international, have led to the consideration of carbon pricing in Malaysia. Most prominent among these are the increasingly pressing need to engage in sustained decarbonisation; carbon pricing can enhance this process directly through its market effects, and by creating a source of revenue to fund further climate-related initiatives including existing economic instruments. Internationally, the development of the Article 6 rulebook of the Paris Agreement and carbon border adjustment taxes are highlighted as influencing factors, amongst others.

This chapter highlights key requirements related to the implementation and design of CPIs:

a) **With regard to implementation, steps need to be taken to enhance domestic capacity for CPIs**. This includes building general, widespread understanding of carbon pricing and its intentions, as well as developing the requisite capacity for implementation, including establishing a robust MRV ecosystem and mainstreaming the publication of emissions data.

b) **With regard to design, consideration must be given to establishing accurate, long-term price signals (for a CT and to a degree, ETS) and absolute emissions caps (for an ETS); identifying the optimal scope of each instrument in terms of sectoral coverages; and establishing a plan for the transparent redistribution of carbon revenues**. Further thought must be given to the choice of instrument, particularly in the case of a hybrid system; some sectors may be better regulated through emissions trading than carbon taxation, and vice versa.

The assessment of these key considerations for the design and

implementation of CPIs set the basis for the development of policy recommendations on carbon pricing, established in chapter 8.2.

Since 2009, Malaysia has adopted an array of policies and policy instruments with the aims of stimulating the growth of domestic low-carbon industries and enhancing the nation's capacity to mitigate and (to a lesser extent) adapt to climate change. The success of these instruments and policies in meeting their various objectives and targets, as assessed in chapter 5, has been mixed. Many existing instruments aim to influence markets through the use of incentives for the production, purchase, and deployment of low-carbon technologies. Amidst all these efforts remains a caveat: none of the existing instruments, whether economic or otherwise, directly address the key market failure causing climate change.

Climate change is caused largely by the increase in the atmospheric concentration of greenhouse gases; through these GHGs, it will cause significant (current and) future economic damages through rising surface temperatures and the negative impacts this in turn has on a variety of variables across a range of sectors. Markets are unable to account for and react directly to these economic damages without a price being placed on GHG emissions. It is for this reason that many economists consider carbon pricing to be a fundamental response to climate change[37]; if emissions are priced, emitters will be forced to take into consideration the costs arising from each unit of CO_2-eq they emit during their operations, or which are emitted as a result of investments decisions. This – if carbon is price appropriately – can have positive repercussions for the low-carbon transition as the (relative) costs of using high-carbon technologies would increase.

A detailed case of the factors driving Malaysia's decision to explore the implementation of a carbon pricing instrument (CPI) have been highlighted in chapter 4. The objective of this chapter is to briefly lay out the landscape around carbon pricing as it stands in Malaysia today, and to highlight some of the key prerequisites for the successful implementation of CPIs.

Chapter 6 is therefore comprised of two components that combine to present a comprehensive analysis of the key prospective economic instruments for climate policy in Malaysia, which will have economic and climate implications throughout the 2020s and beyond. First, it analyses carbon pricing, covering the basics of

[37] https://www.wsj.com/articles/economists-statement-on-carbon-dividends-11547682910

carbon pricing and highlighting the key factors that drive its implementation internationally, before overviewing the state of affairs vis-à-vis CPIs in Malaysia and detailing key design considerations for policymakers. Second, it overviews the various ongoing efforts with regard to SCFIs in Malaysia, highlighting the issues and opportunities that have arisen through these efforts to date, and how Malaysia's use of SCFIs can bring broader benefits in the context of conservation.

6.1 Overviewing carbon pricing instruments

The 12MP established Malaysia's aim to develop a policy on carbon pricing, with the view that this policy would lead to the subsequent establishment of either, or both, a carbon emissions trading scheme and a carbon tax. The carbon pricing policy will itself be an important document, necessitating of assessments of the tradeoffs between the two forms of carbon pricing, as well as of the many design considerations involved in the development of carbon pricing instruments (CPIs).

The Ministry of Environment and Water (KASA) subsequently announced intentions to develop a domestic emissions trading scheme (DETS), while the 12MP and announcements by the Prime Minister have asserted an interest in the development of a carbon tax (CT) mechanism, administered by the Ministry of Finance (MOF)[38].

This section describes carbon pricing and illustrates the requirements in the development of an effective set of CPIs. It assesses the theoretical basis of carbon pricing from the perspective of climate change economics, and illustrates requirements for the development of effective CPIs. It explains the importance of and need for greater capacity-building for CPIs across the public and private sectors, before considering the many elements of CPI design. This includes outlining the various forms of CPIs[39], before discussing issues related to setting

[38] https://www.theedgemarkets.com/article/special-report-12th-malaysia-plan-2021-2025-malaysian-case-carbon-tax

[39] An added layer of complexity to the carbon pricing landscape in Malaysia is the intention to deploy multiple CPIs in the form of carbon taxes and an emissions trading scheme. Countries such as Canada, Colombia, Indonesia, Japan, and Mexico have either implemented or are in the process of implementing such 'hybrid' CT-ETS mechanisms. Planning is required to ensure synergies between the two mechanisms whose functions might otherwise overlap. This would, for instance, eliminate the possibility of double-taxation, or inconsistent market signals sent by variations in the price of carbon across instruments should they exist.

prices on carbon, the selection of emissions caps, the identification of the instrument's scope or tax base, and establishing plans for carbon revenue use.

This analysis will set the tone for a set of policy recommendations around carbon pricing (see chapter 7) to ensure the effectiveness of economic instruments in addressing climate change and catalysing low-carbon development, while internalising the costs of emissions to Malaysian society.

6.1.1 Carbon pricing and the economics of climate change

Carbon pricing represents an effort to enforce the internalisation of the negative externality costs of GHG emissions[40], the driving force behind current and future increases in average surface temperatures. Economic damages are subsequently felt through impacts such as extreme weather and sea-level rise, and the numerous other consequences likely to arise as a result of climate change. This includes, but is not limited to, threats to agricultural productivity; food and water security; human health; natural and physical infrastructure; and economic growth more generally.

In Malaysia, the costs of climate change have been estimated by Rasiah et al (2016) and Sarkar et al (2018) to reach over RM450 billion annually by 2050 under a BAU scenario – or just under RM50 billion a year under a scenario of gradual emissions reductions through midcentury. Indeed, floods in Malaysia in December 2021 alone caused at least RM5.3–6.5 billion in damages[41], without factoring in output losses. It is evident that the social cost of GHG emissions in Malaysia is significantly greater than zero; anything less amounts to an implicit recognition that emissions do not create economic costs. The pricing of carbon is discussed in greater detail in chapter 6.1.2.

CPIs can take several forms. The two most commonly used, direct forms of CPIs are carbon taxes (CT) and emissions trading schemes (ETS). Beyond these, mechanisms such as fuel and congestion taxes or charges, fossil fuel subsidy

[40] The degree to which these emissions are internalised depends on the price of carbon. See Chapter 6.1.2.

[41] This figure is based on comments by Minister in the Prime Minister's Department Mustapa Mohamed, citing studies conducted by the Department of Statistics Malaysia (DOSM). Further flooding events have affected isolated areas of the country since, including in Klang Valley in March 2022.

rationalisation schemes, the use of the social cost of carbon (SCC) in regulatory rulemaking, internal carbon pricing programmes, and international carbon markets do provide indirect avenues towards the internalisation of the negative costs that arise through GHG emissions. CTs are the most straightforward; they entail setting a tax rate on GHG emissions directly or the carbon content of fossil fuels combusted to generate energy. In this regard, they are not a guarantee of emissions reductions; emitters will only mitigate emissions if the marginal costs imposed by the carbon tax exceed the marginal costs of abatement. This can be achieved through investment in technology such as RE, or carbon capture-and-storage, as well as enhancements to energy efficiency.

ETSs, on the other hand, set a 'cap' on emissions, ensuring emissions do not exceed a specified quantity during a given year. These caps can be set economy-wide, at sectoral levels, or across firms subject to emissions regulations, depending on the scope of the CPI used. In contrast to taxes, ETSs do not guarantee a fixed price for carbon – this is influenced by carbon markets, with prices discovered through the process of trading allowances or permits to pollute. Nevertheless, certain ETS programmes in place around the world feature floor and ceiling prices for carbon, to ensure that broader macroeconomic conditions or other exogenous factors do not hinder the effectiveness of these instruments. The choice of carbon pricing instrument is discussed in greater detail in chapter 6.1.2.

The internalisation of the externality costs of GHG emissions through the implementation of a CPI will have significant repercussions for economic activity in Malaysia given the nation's high dependence on fossil fuels, particularly in the electricity and transport sectors which account for over half of total national emissions. Electricity generation is particularly carbon-intensive, with roughly 60% of demand met through coal, and a further 35% through natural gas (KASA, 2020). Meanwhile, Malaysia has some of the highest rates of motorisation and multiple-car ownership in Asia, and coupled with weaknesses in public transportation ecosystems – particularly the issue of last-mile connectivity – the issue of transport sector emissions reductions is difficult to shift. Further, Malaysia remains reliant on revenues from oil and gas production, which accounts for a further fifth of national emissions. How CPIs will impact profitability across these sectors, and how these changes to market dynamics will impact socioeconomic variables such as employment and economic growth across sectors and the economy as a whole are still poorly understood in the context of Malaysia. To date, no studies have

been conducted or have commenced regarding the anticipated sectoral effects of carbon pricing in Malaysia.

6.1.2 The state of carbon pricing in Malaysia

The Malaysian government's intentions to employ carbon pricing instruments (CPIs) were formally established through the 12MP in late-2021. More specifically, the document cites that "a feasibility study will be conducted on carbon pricing […] will recommend the most suitable carbon taxation system to incentivise the right behavioural changes and introduce a platform for carbon trading", with the aim that "these instruments will also help mobilise investments required in stimulating the development and utilisation of green technologies as well as green market innovation, thus promoting low-carbon economic growth".

Further momentum to this push came in the form of international pressures. The finalisation of Article 6 of the Paris Agreement, a mechanism through which to establish international carbon markets and enable cross-border carbon trading, during COP26 in Glasgow. Its long-term directions are unclear, but could in the longer-run act as precursors to the establishment of a more standardised regional or global carbon pricing mechanisms[42].

A second international pressure, also arising in 2021, came in the form of the European Union's planned carbon border adjustment mechanism (CBAM). This measure essentially amounts to a tax on the carbon content of imports into the EU, and the EU amongst Malaysia's largest trading partners. Vickers at al (2021) provide a detailed review of the impacts of the CBAM on Commonwealth nations, finding that up to US$6 billion worth of Malaysian exports to the EU in 2019 would have been at risk of adjustment taxes. The more important point to note, however, is that border adjustment taxes have been theorised and analysed from various perspectives since the mid-2000s.

Pauwelyn (2012) analyses such mechanisms and their legality under World Trade Organisation (WTO) laws, identifying potential compliant design options. From the perspective of countries with domestic CPIs in place, border adjustment taxes are

[42] Practically, such a mechanism would be impossible to enforce. From a theoretical standpoint, however, a global carbon pricing instrument, in the presence of perfect compliance and a uniform global carbon price, remains the first-best policy response to addressing the global externality costs of GHG emissions.

an appealing tool through which to reduce the uneven impacts faced by their export-facing industries. The EU's CBAM was likely only a global first due to its politically-tricky consequences CBAMs, and could act as a precursor of more such mechanisms to come. As a greater number of countries institute increasingly-stringent domestic CPIs, longer-term, more substantial risks to the Malaysian economy will grow, particularly from the perspective of its export-facing industries and if steps are not taken to minimise carbon price differentials internationally.

Beyond brief statements prior and subsequent to the publication of the 12MP, details on CPIs in Malaysia are at present scarce, in terms of their various design elements include their scope and the intended price(s) of carbon. It is clear that steps will also have to be taken to ensure the capacity of the various implicated stakeholders across the public and private sectors *(see chapter 6.1.1)*. This creates somewhat of a blank slate in the context of this study's approach to carbon pricing, and subsequent sections of this chapter aim to fill these blanks by highlighting key considerations and requirements for the development of effective CPIs in Malaysia.

6.2 Designing CPIs in Malaysia

In the context of the design of CPIs, several factors should be considered from the point of view of the implementing authorities. These include the choice of instrument; the price of carbon over time; the sectoral scope or coverage of the CPI and the point of taxation (in the context of carbon taxes; i.e. whether it would be a downstream or upstream tax); and the need for mechanisms to collect and facilitate the recycling or redistribution of 'carbon revenues'. Each of these design considerations will be addressed in turn.

6.2.1 The choice of instrument: carbon taxes and emissions trading schemes

Many forms of carbon pricing instruments are used across the world. These were briefly highlighted in chapter 6.1. The emphasis here is on the two most commonly-used CPIs: carbon taxes (CT) and emissions trading schemes (ETS), with a focus placed on the key distinguishing features between the two instruments, as well as their tradeoffs. World Bank (2021) identifies 64 operating CT or ETS mechanisms and a further three scheduled for implementation, with these instruments covering 21.5% of global emissions, at national and subnational levels of jurisdiction.

While the intention of this section is to express key differences between CT and ETS instruments, it is worth noting that Stavins (2019) finds through a comparative analysis of the two mechanisms that *"when [CT and ETS] systems are designed in ways that make them truly comparable, their characteristics and outcomes are similar, and in some cases fully equivalent in terms of emission reductions, abatement costs, possibilities for raising revenue, costs to regulated firms when revenue-raising instruments are employed, distributional impacts, and effects on competitiveness"*.

On this basis it is clear that the design of the relevant instruments matters greatly, even relative to the decision on what type of instrument should be used. This adds further importance to the various elements of design consideration expressed in greater detail throughout this chapter. Nevertheless, Table 8 highlights the various similarities differences and tradeoffs between the two systems, adapted from Stavins.

Table 10: Comparing carbon tax and emissions trading schemes (adapted from Stavins, 2019)

Similarities	Differences
Emissions Reductions Both mechanisms incentivise the adoption of low-carbon practices, technologies, and other means of production by placing a tangible price on the costs of GHG emissions.	**Complexity, and Administrative and Transaction Costs** ETS systems are typically more complex to design and administer, leading to greater costs, particularly in the process of establishing the instruments. Further transaction costs are likely to arise in the process of allowance trading, e.g. through enlisting the services of trade brokers. These costs are much reduced in CT systems.
Abatement Costs Under both systems, incentives for emissions abatement are similar: firms maximise profits (vis-à-vis the CPI) by investing in abatement technologies up to the point where marginal abatement costs are equal to either the tax rate under a CT or the carbon price under an ETS.	**Uncertainty** CT systems offer certainty in prices and uncertainty in emissions reductions, while ETS systems offer certainty in emissions reductions and uncertainty in prices. Further uncertainty over rates of technological progression can also impact the clarity of market signals created by either instrument.
Carbon Leakage and International Competitiveness The implementation of CPIs will shift comparative advantages in favour of economies with weaker regulations (e.g. those with lower carbon prices or which cover fewer	**Price Certainty and Stability** Under CT systems, prices are exogenously-determined (during the design and implementation stages), whereas under ETS systems prices are an endogenous variable

<table>
<tr><td>sectors). This is the case regardless of the type of CPI used.</td><td>determined by the supply and demand for allowances.</td></tr>
<tr><td>Revenue Generation
While the setting of fixed prices of carbon, through CT systems, allows greater long-term clarity in revenue generation, the auctioning of emissions allowances allows for revenue generation through ETS systems.</td><td>Potential Corruption and Market Manipulation
Both mechanisms require stringent regulatory oversight, beginning with MRV in emissions. Safeguards would be needed to prevent market misconduct and manipulation, whether financial or technological, and against tax evasion (for CT particularly)</td></tr>
<tr><td>Social Costs
Both mechanisms incentivise the adoption of low-carbon practices, technologies, and other means of production by placing a tangible price on the costs of GHG emissions.</td><td rowspan="2">Interactions with Complementary Policies
CT systems generally complement other climate-related policies well, and can assist in driving further emissions reductions sans the establishment of emissions caps. Not the case with ETS; little incentive for emissions reductions beyond what is established by the emissions cap, and could even lead to carbon leakage in the presence of other instruments whose objectives overlap with the ETS.</td></tr>
<tr><td>Distributional Impacts
Both mechanisms incentivise the adoption of low-carbon practices, technologies, and other means of production by placing a tangible price on the costs of GHG emissions.</td></tr>
</table>

6.2.2 The price of carbon

In order to completely address the aforedefined market failure of climate change and fully internalise the externality costs of GHG emissions, the pricing of carbon should be a fundamentally scientific process. It is clear from the fact that the impacts of climate change will cause economic damages that the price of carbon must be greater than zero; economies without a carbon price in place are implicitly issuing that climate change is costless.

But what exactly is this price, and how is it calculated? The answer comes in the form of the 'social cost of carbon'[43], which is established through a process comprising of five major steps, described below:

1. Establishment of emissions trajectories across a variety of low-development pathways, in particular BAU;
2. Translating emissions trajectories into estimates of temperature impacts;

[43] For a detailed review of the processes involved in the estimation of the SCC, and other considerations, refer to Metcalf and Stock (2015).

3. Translating temperature impacts into physical impacts, such as sea-level rise and flooding, changes in agricultural productivity, increases in heat-related mortality and productivity loss, increases in the prevalence and infectiousness of vector-borne diseases and other health costs, etc.;
4. Converting physical impacts into estimates of potential economic damages;
5. Discounting future economic damages to reflect their present values.

Rennert et al (2021) conducted the most recent detailed study into the global SCC on the basis of the steps outlined above, finding a central estimate of the SCC of between US$55.90 and $56.20 per tonne of CO_2. World Bank (2017) estimates an SCC of US$40–80/$tCO_2$ in order to stimulate the necessary emissions reductions activity to ensure outcomes consistent with temperature goals set in the Paris Agreement, while the United States government[44] currently uses a figure of approximately US$51/$tCO_2$. Domestically, Sarkar et al (2019) find that meeting Malaysia's NDC as per the Paris Agreement necessitates a carbon price of RM43/tCO_2 in 2025, rising to RM62/tCO_2 in 2050.

Yet in practice, carbon prices used in CPIs enforced around the world rarely meet what scientific evidence suggests the true cost of carbon is, primarily for economic and political concerns. World Bank (2021) reports carbon prices of as low as under $1/$tCO_2$ in Poland and Ukraine to as high as $101 in Liechtenstein and Switzerland, and $137 in Sweden. Yet countries routinely adopt a gradual approach to raising the enforced costs on emissions to circumvent these concerns.

Singapore recently announced intentions to progressively increase its carbon tax rate from S$5/$tCO_2$ today to between $50 and $80/$tCO_2$ by 2030. Indeed, this gradualist approach to the implementation of carbon prices within CPIs that over time increasingly adhere to estimates of the global SCC is relatively. In 2020 alone, for instance, Latvia (from €9/tCO_2 to €12), Canada (C$30 to C$40), and Ireland (€26 to €33.50) all announced increases in their carbon tax rates; indeed, Canada provides clarity on annual increases in the tax rate of C$15/ tCO_2, while Ireland increased its target rate for 2030 from €80 to €100/tCO_2. Such an approach can play a role ameliorating the economic and political risks associated with pricing

[44] See IAWG-SCGG (2021).

carbon too steeply, particularly in the initial stages of the policy's introduction[45]. Some of these risks have been described in chapter 6.1.1.

While steps should rightly be taken to address some of the economic and political concerns with adopting a high, global-level SCC at the immediate onset of the implementation of CPIs, it must be ensured that the pricing schedule for carbon is not too lenient that it doesn't sufficiently incentivise emissions abatement or do much to internalise the externality costs of emissions. After all, a carbon pricing scheme isn't an end in and of itself, but must be judged on the basis of its ability to stimulate a lasting shift away from carbon-intensive processes and the use of high-carbon products and technologies, towards lower-carbon alternatives.

The selection of a carbon price is therefore a process that requires scientific, political, and economic analyses. In the context of Malaysia, the authorities involved in the development of CPIs – namely KASA and the MOF – should identify potential price points for carbon on the basis of these analyses, including projecting the potential impacts of varying levels of carbon prices on key socioeconomic variables, in deciding how it will approach the issue of internalising the externality costs of climate change.

6.2.3 Determining GHG emissions caps

In contrast to carbon taxes, which are price-based instruments, emissions trading schemes are market-based instruments which typically set a quantity cap on the total level of emissions allowed across all sectors it regulates. Internationally, these schemes have been employed at various levels of jurisdiction[46], used to cover activities contributing to emissions across economies as a whole or applied at sectoral levels, such as within power generation, or industrial processes, as examples. By virtue of being quantity-based, ETS systems drive emissions reductions across targeted sectors more directly than a CT, through which such

[45] CPIs, especially those implemented in carbon-intensive countries and where the scope of the instrument covers particularly high carbon-intensity sectors, can have inflationary effects most keenly felt by low-income subgroups. This highlights, again, the importance of the conduct of robust impact assessments during the process of designing and developing the relevant CPIs.
[46] Examples include supranational ETS systems, such as in the EU; national ETS such as in China, Mexico, New Zealand, and South Korea; and subnational ETS such as in the northeastern and western United States, as well as a number of cities and/or provinces in Canada and China. See World Bank (2021a).

reductions are dependent on the relative marginal costs of abatement and pollution. Indeed, the setting of increasingly stringent emissions caps can be a strong driver towards achieving guaranteed absolute (or relative) emissions reductions and provides clarity on long-run emissions trajectories.

While the global social cost of carbon is determined primarily by scientific evidence, with national or subnational carbon prices then influenced by economic and political rationale, emissions caps are dictated by longer-term emissions pathways. In this regard, the efficacy of ETS systems are influenced to a large degree by the ambition of national-level emissions targets. In the context of Malaysia, then, emissions caps would likely be influenced by two long-term, emissions-based targets in place nationally. The first of these is Malaysia's NDC, to achieve a 45% reduction in the emissions intensity of GDP relative to levels in 2005. The second is Malaysia's ambition to achieve net-zero emissions by 'as early as' 2050.

The complicating factor with Malaysia's emissions targets vis-à-vis the implementation of a cap-and-trade scheme, therefore, is an absence of targets referenced to absolute emissions, although this complication can be managed. Provided that assumptions regarding future GDP growth are plausible enough, and in this case intensity-based targets can be used to project absolute emissions over time and subsequently used to inform absolute caps on emissions in an ETS. This approach would allow for Malaysia to impose more traditional 'absolute' caps on emissions through its ETS that are based on emissions intensity targets.

Due to the nature of Malaysia's emissions targets being based on GDP, and projections of rising absolute emissions in both business-as-usual and NDC scenarios[47], a chief benefit of ETS systems may thus be lost; emissions will be allowed to grow in accordance with the country's NDCs, which may have implications for the effectiveness of the ETS in terms of driving absolute emissions reductions. A further complicating factor arises in the context of uncertainty or inaccuracies in projecting GDP over the course of the compliance period; should GDP deviate greatly from projections, 'ex-post' adjustments may be necessary to establish emissions caps and the corresponding allocation of emissions

[47] See MESTECC (2018), Malaysia's second biennial update report to the UNFCCC. This document includes projections of absolute GHG emissions through 2030 under three scenarios of varying climate ambition, in line with Malaysia's NDCs at the time.

allowances. Zeng et al (2016) overview the various challenges associated with the implementation of intensity-based caps for emissions trading, focusing on the experiences of China.

6.2.4 The scope of carbon pricing

Another important design consideration for CPIs is the intended coverage of the instrument. The scope of potential emissions reductions within any sector can act as powerful predictors of the efficacy of CPIs, and is influenced by two factors. The first is based on the quantity of emissions arising from a particular sector. Naturally, sectors with a higher absolute emissions have greater scope for meaningful and consequential emissions reductions. The second is the availability and potential for emissions reductions through existing and emerging low-carbon technology.

In the context of Malaysia, up to 70% of national emissions arise as a result of just three sectors: electricity, transport, and oil and gas. All three sectors have the potential for emissions reductions through the adoption of low-carbon practices and technologies: RE, EE, and CCS technologies can assist in achieving emissions reductions in the power sector, while the latter features prominently in the sustainability plans of oil and gas sector firms. Within transport, hybrid, electric, and public transport offer avenues through which to reduce emissions. At present, however, and in the absence of a price on carbon, market signals are not strong enough to incentivise these shifts. Malaysia's carbon pricing system would do well to encompass these sectors that contribute significantly to national emissions, but at the same time must be mindful of the potential for emissions reductions within each of these.

Yet the selective application of carbon pricing within certain sectors creates inconsistencies across the wider economy. As with the selection of carbon prices below the scientifically-established social cost of carbon, implementing CPIs selectively across sectors would not lead to the full internalisation of the externality costs of emissions. Some emissions would not be subject to carbon-related regulation and within these sectors, incentives for the adoption of lower-carbon technologies would not exist, sending inconsistent and imperfect market signals. This could lead to imperfect market outcomes, particularly where firms operating within regulated sectors face any form of competition with those operating outside regulation. A further challenge comes in the form of conglomerates, which may be comprised of companies or subsidiaries with operations in both regulated and

unregulated sectors. In this event, further safeguards would be required to ensure that, for instance, emissions aren't shifted from a regulated sector firm to an unregulated one. These issues can be circumvented through the establishment of longer-term plans to encompass all sectors under CPIs, focusing in the early stages on sectors which display the potential for near-term emissions reductions as described earlier in this section, but which issue guidance for other sectors to prepare for the eventual implementation of CPIs which apply to their activities.

Another key factor related to the scope of CPIs is that different CPI designs, whether a tax or emissions trading scheme, are better suited to different sectors. For instance, in sectors where emissions are the result of activities conducted by large corporations, such as the power and industrial sectors, emissions trading schemes may be more effective in driving emissions reductions. Setting a cap on total sectoral emissions would allow the trading of pollution permits amongst industry players such that those with the lowest marginal abatement costs would engage in decarbonisation. A carbon tax, on the other hand, would not take into consideration these within-sector nuances and may lead to more inefficient outcomes in terms of investment in emissions-mitigating technologies, in addition to not being able to guarantee a set level of emissions reductions because of the lack of a cap on total emissions.

A carbon tax, for its part, is likely to be more effective in the mitigation of emissions in sectors where sources of emissions are more diverse and numerous. An example is the transport sector, where emissions are the result of activities of the millions of drivers who take to Malaysian roads on a daily basis. Imposing a tax on the purchase of fuel would be relatively straightforward to administer and can influence behavioural shifts through its impact disincentivising the use of petrol. Faced with higher costs of driving, consumers may be tempted to shift towards public transportation or the use of more fuel-efficient private vehicles, including electric and hybrid vehicles, and can boost industrial growth for EVs, HEVs, and even nascent transport technologies such as those powered by hydrogen fuel cells. This has implications in the context of Malaysia, where concurrent plans are being drawn up for the implementation of both a carbon tax system as well as an emissions trading scheme. Consideration will have to be given to the suitability of individual sectors to the CPIs in question, as well as in ensuring that the two mechanisms are synergistic and do not overlap in terms of their coverage.

6.2.5 The uses of carbon revenues

A highly important aspect of the design of carbon pricing instruments is the question of what happens with the revenues generated from such a scheme. Joshi (2019) highlights that under a carbon tax regime with an SCC of just RM50/tCO_2-eq, and which covers emissions from the electricity, transport, and oil and gas sectors, Malaysia would generate between RM10.8 and RM11.5 billion in 2022. At a carbon price of RM150/tCO_2-eq towards the end of the decade, revenues would rise to RM39–47 billion, roughly a quarter of total tax revenue collections in 2018. These are considerable sums, and in order to enhance the palatability of CPIs, as well as to address some of the regressive effects they bring about (such as an increase in general price levels, especially for carbon-intensive products and services), plans must be put in place to ensure these revenues are redistributed in a transparent manner.

Examples of such 'revenue-neutral' CPIs can be found across the world. Canada has incorporated revenue-neutrality into its CPI design since their onset; proceeds from carbon taxation have been used to finance reductions in distortionary taxes, such as corporate, personal income, and property taxes. Most of these tax reductions have been targeted towards lower-income groups and industries most vulnerable to climate change and/or the low-carbon transition. For transparency, the Canadian government publishes annual reports highlighting the various uses of its carbon revenues. CPLC (2016) overviews some of the common options for carbon revenue redistribution seen around the world, including providing funding for climate investments; reducing distortionary taxes and public debt; enhancing support for lower-income households and other inequality- and poverty-alleviation efforts; and supporting transitional support for particularly affected industries. There are pros and cons to the use of carbon revenues for each of these purposes, and some might be more pertinent within the context of Malaysia than others.

First, Malaysia, like many other developing countries, require greater financing capacity to better address the challenges of mitigating climate change and better adapting to its consequences. KASA (2020) highlights 17 activities across 10 sectors for which Malaysia requires either financial[48], technical, technological, and

[48] Funding requirements for these projects highlighted in KASA (2020) amount to US$72.9 million, or approximately RM306 million. This figure, however, isn't exhaustive and is only

capacity-building support – some of these needs can be met through the re-investment of CPI revenues, reducing the nation's reliance on uncertain international climate funding to address its most pressing needs. Second, plans must be put in place to ameliorate any additional burden CPIs may have on the economic security of low-income households in Malaysia. This can be achieved by leveraging on existing methods of aid disbursement to low-income groups, such as the BKM scheme, as proposed in chapter 5.1.6 which highlighted avenues towards fossil fuel subsidy rationalisation.

A third area of focus vis-à-vis carbon revenues in Malaysia should be on ensuring sustainable and just transitions for affected sectors. A highly fossil fuel-intensive (at present), trade-exposed nation, the pricing of carbon will likely have deep financial implications for many firms across many industries, which could in turn have adverse socioeconomic consequences if improperly addressed. In the UK, for instance, a Climate Change Levy was introduced to ensure such transitional support. Funding was provided to serve three purposes: to finance corporate tax rate reductions for exposed industries; to set up a Carbon Trust used to support investment in low-carbon initiatives and technologies; and to support participation in a pilot ETS programme. Similar measures, if enacted in Malaysia, could be targeted to support energy and industrial sector players who are likely to face challenges upon the implementation of CPIs.

6.3 Implementing CPIs in Malaysia

6.3.1 Capacity-building for effective carbon pricing

At a fundamental level, the implementation of carbon pricing requires the presence of strong ecosystem for GHG emissions monitoring, reporting, and verification. This necessitate actions on the parts of both emitters, subject to carbon regulation and on whom reporting burdens fall, and regulatory authorities, tasked with administering CPIs. Guidelines need to be set to support the consistent, harmonised reporting of emissions applicable to all sectors under the coverage of any planned CPI. Beyond this is the need for a robust independent emissions verification ecosystem.

reflective of Malaysia's needs at the time of its most recent BUR submission to the UNFCCC. It is likely that as greater efforts are made to adapt to and mitigate climate change that these funding requirements will increase.

Guidance on developing robust reporting mechanisms can be drawn from international practices. The International Organisation of Standardization (ISO) in 2018 issued GHG emissions accounting and verification guidelines applicable to both governments (for national and subnational accounting) and for industries (to facilitate firm-level reporting and verification). The enforcement of guidelines such as ISO 14064[49], or the various emissions reporting standards by the Greenhouse Gas Protocol, would set industries up with the required capacity to facilitate the implementation of CPIs.

Emissions reporting is, however, still in its nascency in Malaysia. The most detailed requirements for emissions reporting apply to companies listed on the stock exchange. In accordance with Bursa Malaysia's Sustainable Reporting Guidelines, listed companies must submit 'sustainability statements' containing 'balanced, comparable, and meaningful' information pertaining to climate impacts. Scope 1, 2, and 3 emissions are listed amongst Bursa's recommended indicators within sustainability reporting guidelines, and many listed companies do adhere to, at the very least, the reporting of Scope 1 and 2 emissions. Such capacities must be expanded to ensure that all firms and industries subjected to any future carbon pricing legislation have the ability to accurately report emissions data.

In order to facilitate the growth of strong domestic MRV capabilities, broad improvements in human capital and technical knowledge of carbon pricing is necessary. At the firm-level, expertise is required to enable the accurate identification of emissions sources and the monitoring and reporting of emissions. Regulators need the capacity and expertise to be able to convert raw emissions data or emissions factors of production into measures relevant to either CT or ETS mechanisms. This can be a straightforward enough calculation for electricity sector emissions, for instance, taking into account the carbon content and quantity of fossil fuels combusted (or alternatively, considering emissions factors of combustion and electricity production). The prevailing carbon price would need to then be applied to these emissions to calculate taxes due (in the case of a CT). Such straightforwardness may be lost in other sectors, such as within industrial processes with multiple sources of emissions and variation in emissions intensities, where greater levels of expertise would likely be required.

[49] See International Organization of Standardization (2018).

For the government, the development of laws which pertain to MRV capacities and functions is an immediate requirement the implementation of its desired CPIs.

6.3.2 Modelling CPI impacts

A second crucial step towards implementing carbon pricing successfully is the development of a clear understanding the projected impacts of CPIs on the economy and the achievement of climate- and environment-related objectives. Across all sectors to which it is applied (see chapter 6.1.2 for a discussion on selecting the scope of carbon pricing instruments), CPIs will have monetary impacts impacting investment and operational decisionmaking, as well as a host of broader economic variables, directly and through pass-through cost effects.

Carbon pricing can cause a general increase in price levels, particularly in economies (such as Malaysia) starting from a high carbon-intensity baseline (see chapter 5.2). For instance, a carbon tax covering the electricity sector would put upward pressure on the costs of generating electricity, potentially leading to (short-term) increases in the electricity tariff[50]. In the transport sector, rising fuel costs through the imposition of a CT would have implications for household finances[51]. These impacts need to be understood in advance of the implementation of CPIs; further studies are required to investigate the relationships between CPIs, inflation, economic growth, household income and, crucially, whether these instruments are able to stimulate the growth of low-carbon industries in replacing high-carbon incumbents (see chapter 6.1.2 for a discussion on the pricing of carbon).

A second area of required impact estimation is how CPIs of varying intensities can affect carbon-intensive firms and industries[52]. Risks to these firms must be managed, such as through a combination of plans for transitional support mechanisms as carbon-intensive firms increasingly decarbonise operations and

[50] For instance, Fabra and Reguant (2014) estimate cost pass-through of 77–86% in electricity markets in Spain following the implementation of the EU ETS.

[51] These would almost act in conflict to existing transport fuel subsidies, overviewed in chapter 5.1.

[52] Recall that the economic objective of CPIs is to address the market failure of climate change (i.e. the failure to internalise the externality costs of GHG emissions). In other words, it aims to achieve a balance in the balance the good (use of fossil fuels for economic development and growth) and the bad (the extent to which emissions contribute to climate change).

investments, and during the process of designing the instruments themselves (such as through gradual phases of implementation).

Malaysia is both a producer and consumer of fossil fuels – the very target of a CPI – and as a result carbon pricing have significant economic impacts within, for instance, the oil and gas industry and on utilities. This will not only affect the profitability of operations in these industries and sectors but on broader economic variables such as employment and investment. These extent of these risks are still not understood in Malaysia. Further, there is a general lack of planning for transitional support for these carbon-intensive industries and sectors. The process of planning for the implementation of CPIs must take this into account. Indeed, such plans remain a necessity whether or not carbon pricing is to be utilised as a policy tool; the need to engage in sustained decarbonisation to address climate change anyway requires a low-carbon energy transition, which will have the deepest implications for firms operating in fossil fuel industries.

6.4 Case Study: Sabah's mooted Nature Conservation Agreement

One key challenges for the implementation of a carbon pricing policy in Malaysia is the fact that natural resources, including land and forests, are under the jurisdiction of the individual states. The governance of land and forests and, by extension, carbon, is fragmented across the federal and state structures and subject to devolved objectives. Streamlining state- and federal-level policies, laws and targets related to climate change will be a challenging task in the national carbon pricing policy. This case study, focusing on Sabah and its recently-reported 'Nature Conservation Agreement' (NCA) demonstrates some of the challenges and key considerations in policy design.

Sabah has long participated in the carbon market and carbon-related initiatives. This includes a carbon offset project in 1992, through the enrichment and rehabilitation of the degraded and overlogged forests of Ulu Segama-Malua Forest Reserve. The project was in conducted by the Sabah Foundation and Face Foundation. In 2013, Sabah amended the Sabah Forest Enactment 1968 to include carbon as a forest product.

In relation to carbon credits, Sabah has introduced several initiatives under Reducing Emissions from Deforestation and Forest Degradation (REDD+). This includes the EU-REDD+ project titled 'Tackling Climate Change through

Sustainable Forest Management and Community Development' which commenced in 2013. The four-year programme focused on three demonstration sites: Kampung Gana in Kota Marudu; Kinabatangan; and Ecolinc Kinabalu Zone, with the aims of contributing to sustainable and low-carbon development across the state. More specifically, it aims to define the role of local communities in REDD+ implementation to identify means to reward these communities while leveraging on international funding. The project was co-financed by the EU and the Sabah Government; the EU contributed a sum of some €4 million.

In 2021, the Nature Conservation Agreement was announced. It should be noted that the concept of carbon trading under REDD+ are entirely distinct to the NCA. It has been reported (and confirmed through stakeholder interviews) that the mooted NCA involved the 'lease' of 2 million hectares (ha) of land over a period of 100 years. The deal would have given the third-party (i.e. the buyer) a means of receiving funds from the sale of carbon credits, in addition to that of other natural capital such as water resources (carbon and non-carbon), depending on specific terms and conditions. While various questions were raised on the credibility of this deal, this case study considers the NCA purely from the perspective of carbon pricing, particularly given the recent updates to the Article 6 rulebook under the Paris Agreement.

One way Malaysia is implicated by the finalisation of Article 6 relates to the issue of corresponding adjustments as a means towards avoiding the issue of 'double-counting' of emissions reductions. Should Malaysia, or states in Malaysia, engage in the sale of carbon credits to a third-party (whether a country, corporate entity, or others), these credits cannot be used to offset Malaysia's own carbon emissions. Corresponding adjustments are used to address this issue; these ensure the credits sold do not appear within Malaysia's GHG accounting processes as offsets. This is given greater importance because Malaysia includes LULUCF in the measurement of its emissions intensity reductions and in reporting emissions data more broadly.

Another key consideration for Malaysia that has been revealed through this NCA is the need to determine how to align national- and state-level targets. In other words, targets need to be established at the state-level for parameters such as forest conservation and protection, among others. States differ greatly in terms of their shares of forest cover, geography and topography, economy, and a host of

other factors. Based on this, the fair share contributions of each state towards the achievement of national targets (in this instance, for national forest cover) needs to be established. Such an endeavour would likely be fraught with challenges, requiring inclusive bargaining process that would likely lead to lengthy negotiations. It would not be inconceivable, for example, for states with little forest cover and high economic development to have to buy credits from other states. Regardless of how these fair share contributions are developed, the general idea is that contributions and targets need to be established for each state, and these need to align to federal-level targets.

One way to address this challenge is to allow only domestic carbon trading. This is the rationale for KASA to launch the Domestic Emissions Trading Scheme (DETS), as opposed to pursuing the international market. But various issues remain. At the crux of it, as forest and carbon is under state jurisdiction, it is assumed that states can at least participate in the voluntary carbon market or other international processes. A second issue with focusing on the domestic rather than international market ultimately comes down to dollars and cents. While it remains to be seen how carbon will be priced domestically, it is unlikely that it would be more economically competitive than the status-quo, where natural capital can be monetised through the sale of commodities, including timber and other wood products. Additionally, there is no clarity at present on how domestic carbon prices would compare with those set internationally. For example, a comparison of carbon prices can be seen below:

Table 11: Carbon prices in Australia, China, the EU, UK, and US[53]

Carbon Pricing Scheme	Price per tonne of CO_2-eq
Australia: ACCU carbon spot price	~US$39.89
China: ETS carbon price	~US$10.19
EU: ETS carbon futures price	~US$101.15
UK: ETS carbon futures price	~US$112.01
US: SCC under the Biden Administration	US$51

If these prices were applied to the NCA, the value of the deal would far exceed the touted figure of US$80 billion. A preliminary estimate of what the deal could be worth using these internationally-recognised carbon prices, based on the details

[53] These prices are accurate as of February 2022.

of the mooted NCA (i.e. a 100-year lease applying to 2 million ha of forested land, and assuming a range of tropical forest carbon sequestration[54]) is as follows:

1. *Australia:* US$93.6bn (lower-bound, dependent on actual sequestration potential of forests in Sabah) to $292.5bn (upper-bound)
2. *European Union:* $237.4bn to $741.8bn
3. *United Kingdom:* $262.9bn to $821.4bn
4. *United States:* US$119.7bn to $374bn

More importantly, the challenge from a national level would be to convince state actors to trade domestically as opposed to internationally. On the other hand, questions remain on the impact and attractiveness of an uregulated market on the prices internationally.

Another issue that arises is the fact that states may decide to participate in the VCM instead. However, given the outcomes of the Glasgow Climate Pact and the establishment of a rulebook for Article 6, the future of VCM is unclear. It is likely that VCM can authorised by govenrments. As KASA has prepared the VCM guidelines, it may well be that trades following these guidelines would be authorised by the Ministry. Nonetheless, another question arises on the adoption of voluntary standards (such as the VCS) to ensure that the credits meet the rules and standards required. For the VCM to be considered, it will need to either harmonise or identify standards that are in line with national standards and methods of verification. Currently, KASA's VCM guidelines highlight the need for "an independent entity" which "shall be appointed by the project participants to undertake validation and verification processes. They shall follow the requirements stipulated in the standard adopted". Yet these guidelines do not specify which standards are to be adopted. Clarification is needed on the issues of price and participation across domestic and international markets.

Another challenge relates to meeting the requirement of 'additionality'. Additionality is the requirement that carbon credit projects should generate

[54] As the carbon-dioxide sequestration potential of forests in Malaysia has yet to be established (another gap in need of addressing), data is used from FAO (2001) on the carbon sequestration potential of tropical forests. This study finds a lower-bound of 3.2 tonnes and an upper-bound of 10 tonnes. These figures were converted into CO_2 sequestration potential and used to determine the implied price of carbon under this NCA, as well as what the total value of the deal might have been using carbon prices established in Australia, the EU, UK, and US.

benefits, such as reduced emissions or increased removals, that would not have happened in the absence of the beneficial activity (i.e. the BAU scenario). For example, the Kenyir State Park has an additionality component establishing that without any interventions, forests in the area would have been cleared by logging activities. Similarly, all REDD+ projects in Sabah have components of additionality. In the case of Sabah's NCA, reports highlighted that the deal included 600,000 ha of forests classified as Totally Protected Areas (TPAs); these are areas already locked-in for conservation and protection under various state laws and international treaties. It is unclear whether areas under TPAs qualify for carbon credits.

On a broader note, through Article 6, many corporations and countries will be able to search far and wide for arbitrage opportunities – wherever they can buy the cheapest credits, they will, to assist their own pro-climate goals and objectives. In countries where it is more expensive to obtain credits domestically, entities will increasingly look towards markets where carbon is priced more cheaply, where carbon pricing does not exist, and where governance is lacking or unstable. For Malaysia, these risks need to be mitigated, and the establishment of a national policy on carbon pricing as well as methods to assuage concerns over the state-federal conundrum in natural resource management would help.

The above case study demonstrates the complexities involved in designing carbon pricing models to take into account LULUCF, and in particular, roles and obligations at the state-level. Moving forward, in the establishment of a national carbon pricing policy, various factors need to be taken into consideration, including the establishment of state-level targets for forest (and consequently carbon) protection; a fair-shares model; the roles and regulations of the VCM, including the establishment of standards and the requirement of additionality; as well as broader questions around carbon trading and sovereignity.

7

Prospective Economic Instruments for Co-Benefits and Adaptation

Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

7 Prospective economic instruments for co-benefits and adaptation

Chapter summary

Three major prospective instruments have the potential to create significant benefits for climate adaptation, as well as co-benefits with climate mitigation and biodiversity in Malaysia: Ecological Fiscal Transfers (EFT), Payments for Ecosystem Services (PES) and Climate Adaptation Financing.

EFTs do not, at present, have specific targets. Performance-based indicators should be developed for monitoring and evaluation, and be used as a criteria for fund disbursement. Examples include 'simple' indicators such as percentage of forest cover and the quantity of protected areas to the more 'complex', such as wildlife population and habitat connectivity. Targets should complement land use zones and land use cover targets in line with the National Physical Plan and State Structure Plans.

To ensure conservation is a viable business model, amount of EFT transfers need to be equivalent to or greater than alternatives which don't entail conservation.

PES arrangements vary greatly; options include national-level PES, multi-stakeholder public-private partnerships, and standalone agreements between buyers and sellers. All require the establishment of legal frameworks, the recognition of property rights, enabling institutions, formalised contracts, and governance. At present, no legal frameworks for PES exist at the federal level.

The implementation of PES is challenged by the under-representation ecosystem services value in gross domestic product (GDP) and national accounting measures. For example, water tariffs are subsidised: this discourages water conservation and distorts market prices.

Economic instruments for climate change adaptation are still underdeveloped in Malaysia, with the costs of climate change impacts on key economic sectors is unclear without comprehensive risk assessments. Three prospective market-based instruments are recommended to meet climate objectives and improve economic efficiency: 1) taxes and surcharges; 2) risk transfer and insurance; and 3) resource pricing instruments. Moving forward, these instruments should be integrated into broader adaptation and disaster-risk reduction financing

strategies to achieve optimal outcomes.

This section reviews the prospects for economic instruments aiming to achieve co-benefits across mitigation and adaptation. In addition to carbon pricing, defined in this study as a mitigation instrument because of the potential for carbon pricing to enhance the relative attractiveness of low-carbon technologies compared to fossil fuels, Malaysia has taken steps towards the implementation of another set of economic instruments aimed at further assisting its conservation objectives. Under this umbrella of what are defined in this study as 'state conservation financing instruments' (or SCFIs) are mechanisms such as EFTs and PES.

These instruments will benefit climate action from the perspective of mitigation and adaptation, but also environmental conservation more broadly through the protection of biodiversity and the scaling-up of nature-based solutions (NbS). As indicated in chapter 3, there is a lack of effective climate economic instruments beyond those designed to support mitigation efforts.

Setting the stage for this chapter, the 12MP highlights a set of strategies with the aims of preserving, and restoring the capacity of forest ecosystems to act as carbon sinks. The roles of natural forests and nature-based approaches towards addressing climate hazards, such as floods and droughts, as well as for disaster risk reduction and adaptation was also acknowledged. Additionally, the government is increasingly considering the importance of natural climate solutions, including NbS and ecosystem-based adaptation, and how these can provide benefits across mitigation, adaptation, and biodiversity, in addition to potentially having positive societal and socioeconomic repercussions.

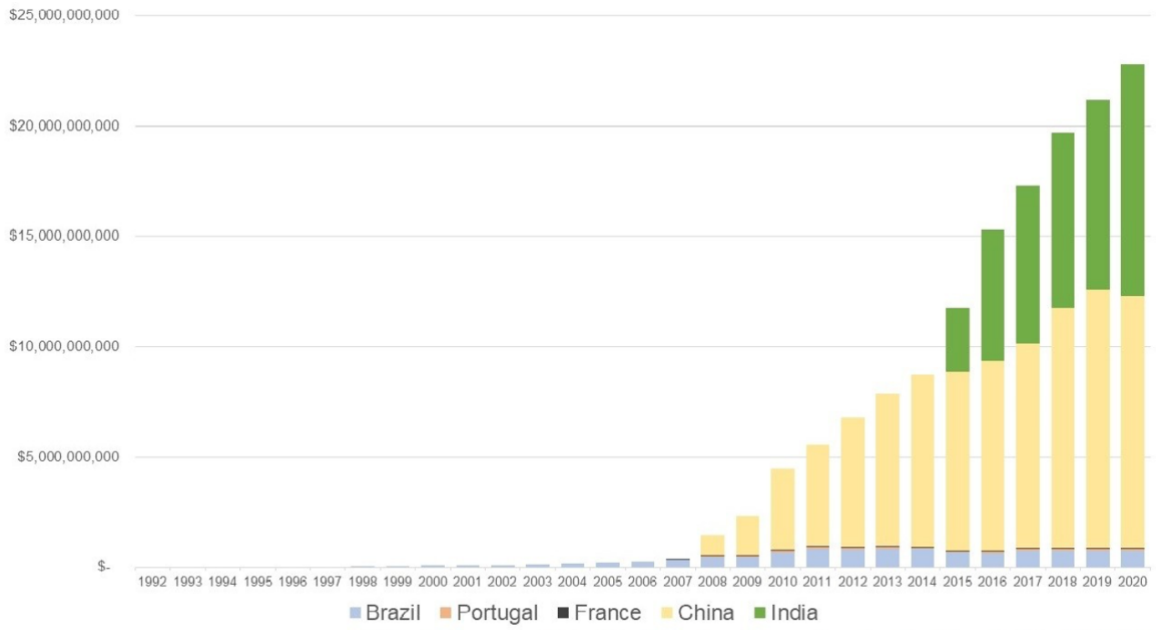
Chapter 4.2 established that there has long been a shortage of funding for conservation efforts, and little by way of incentives for state governments to conserve their forests. Public budgetary allocations remain low in absolute terms (<1% of the total), and relative to the significant potential benefits that biodiversity and ecosystem services can generate. This situation is likely to change for the better moving forward, with the government promoting more innovative financing mechanisms to support green growth and support efforts to enhance climate change adaptation and resiliency.

7.1 Ecological fiscal transfers

Broadly speaking, ecological fiscal transfers (EFTs) refer to mechanisms of transferring public revenue between levels of government within a country, based on ecological indicators. It is considered a subset of intergovernmental fiscal transfers (IGFT).

Compared to other economic instruments for conservation, EFTs are relatively straightforward to implement as existing conservation funds can be channelled from national to sub-national governments. This process is established in five countries, with ten others exploring them (Busch et al, 2021). Investment in EFTs has grown rapidly since the mid-2000s, from US$0.35bil in 1992 to $23 billion in 2020 (see Figure 5). Some of key factors behind their emergence include the presence of established mechanisms to redistribute public funds (such as IGFT); incentive-based EFTs are likely to emerge in countries where recipient governments have greater decentralised authority for land-use decisionmaking, such as in Brazil, China and India (Busch & Amarjagal, 2020).

Figure 5: Annual global volume of EFTs, 1992-2020



Source: biofin.org

In Malaysia, EFTs were announced in 2019, aiming to encourage the protection of forests and other protected areas (PA) by state governments, the custodians of land and natural resources. It has long argued by academics, professionals, and

NGOs that a more equitable model of revenue-sharing between federal and state governments is urgently needed to improve natural resource management. EFTs remain in their early stages of development in Malaysia. The 12MP and Budget 2022 highlighted the government's plans to institutionalise the implementation of EFTs and establish an outcome-based ecological criterion. At present, RM70mil is allocated annually for EFT implementation across states.

This chapter provides inputs aiming to improve the design and implementation of EFTs in Malaysia, and highlighting potential impacts if well-designed. These inputs are based on a combination of findings from a literature review, international best practices, and stakeholder interviews.

7.1.1 Design and implementation of EFTs

The design of EFTs is diverse and flexible. It can be revenue transfer 'vertically' from higher-level to lower-level governments or 'horizontally' between governments at the same level. In most countries, the former is more common. However, the rationale is generally similar; to compensate states/districts for fiscal disability of forgone tax revenue from restrictions regarding land use in order to contribute to broader environmental outcomes. In case of Malaysia, the outcome could be targets such as 50% of forest cover and 20% of protected area over land mass,

Indicators and criteria of EFTs

It is as yet unknown what kind of indicators will be adopted for EFT in Malaysia. But generally, they can relate to nature conservation or abatement of environmental pollution. It could be based on several aspects of natural capital such as existing status of natural capital (e.g. forest cover, as in India), improving natural capital (e.g. reforestation activities, as in Peru) or taking actions to conserve natural capital (e.g. forest fire risk reduction measures, as in Tocantins).

Generally, indicators should be easy to monitor and based on data that is reliable, standardised, and collected consistently across all jurisdictions. In context of Malaysia, there are several existing parameters that can be considered in designing EFTs in line with national policies. Some of these are highlighted in the first column of Table 12. Other indicators can be more complex, difficult to measure and which data not available but provide better picture of ecosystem health and can help to establish weightage-based indicators. The government of India, for

instance, has considered the use of such indicators but ultimately opted for the use of simple indicators (such as areas of dense forest cover), for ease of implementation.

Table 12: Simple and complex indicators for EFTs

'Simple' Indicators	Complex Indicators
• Existing percentage of forest cover over land use • Total amount of Protected Areas based on definition in "*A Protected Area Master List"* (e.g. National Park, State Park, Wildlife Reserve, Protection Forest Reserves) • Percentage of Environmental Sensitive Area (ESA) Rank 1 or Rank 2 in accordance with ESA Framework in the National Physical Plan • Percentage of water catchment areas gazetted • Percentage of highland forest of certain heights (e.g. ASL of 1,000 m)	• Quality and density of forest (primary, secondary) • Biodiversity indicators (e.g. richness, presence of rare, endemic, and threatened (RET) species) • Wildlife populations (e.g. number of tigers, elephants) • Habitat connectivity (e.g. Central Forest Spine and Heart of Borneo)

Regardless, the indicators should be:

1. Performance-based, closely tied to desired outcomes to avoid recipient state governments improving indicators without improving outcomes (Droste et al, 2018). The two scenarios below provide some examples and these perverse activities should be considered EFT design and conditions of funds disbursement.

- *Scenario 1*: State government is being compensated to retain a certain Permanent Reserved Forest (protection) and proceeds to clear areas in adjacent forest reserves.
- *Scenario 2*: Gazettement of forest area or water catchment area on paper but the state issues usage permits (*permit penggunaan*) that allow the performance of other harmful activities (e.g. building transmission lines and highways, mining, and aquaculture). Currently, this is allowed under state forestry enactments.
- *Scenario 3*: State government receives an EFT to conserved a plot of forested land but uses it as a means to generate carbon credits and

trades these in voluntary carbon market to 'double-dip', impacting Malaysia's NDCs.

2. Within the authority of the state government to control (i.e. land-related matters) rather than certain environmental parameters (e.g. industrial pollution) which may falls under the responsibility of federal agencies.
3. Adopting human rights-based approaches by considering customary land rights, importance of community-based natural resources management and performed with free, prior, and informed consent.

Size of EFTs

The size of EFT will depends on the rationale. If the rationale to provide adequate financial capital for providing ecological public goods and service, then estimation can be made by required monetary compensation to maintain that function. The size of an EFT transfer can be based on operation cost for forest or protected area management, assuming they are currently underfinanced.

If the rationale is on incentivising state governments, which is what Malaysia intends to do, then the size of EFT transfers need to be at the very least equivalent to its opportunity costs (i.e. benefits derived from practices such as logging and the sale of carbon credits). A similar rationale should be applied if EFT transfers are used to gazettement of new protected areas, or restoration activities, In India, EFTs amount were calculated in proportion to estimation of forgone state tax revenues.

The government presently allocates about RM75 million annually for EFTs, to be distributed across states. While this amount is if relatively significant and expected to evolve over time, it is inadequate to compensate the opportunity cost derived from land-based activities for the state government, especially from logging and clear felling. States that generate significant forestry revenues in Peninsular Malaysia such as Kelantan, Pahang, Perak and Terengganu earn between RM20 million and RM150 million annually from forestry revenue. Therefore, there may be a need to increase size of EFT by tapping into other sources such as capital markets.

Disbursement methods

It remains unclear how the allocated RM75 million will be distributed across states. In countries that implement EFTs, EFTs generally sit within larger IFGT systems as part of public goods provision (Ring & Barton, 2015). In these countries, the percentage of land area is usually a precursor to EFTs which then include forest cover as part of land area. There are several ways to enhance and formalize the disbursement of EFT as mentioned below. Regardless of the method, EFT mechanisms with greater visibility and transparency often receive greater support from regional recipients (Busch et al, 2021).

1. *Part of Capitation Grant*

In Malaysia, the Federal Capitation Grant to the States is based on population and length of state roads which one might argue it's not nature or climate positive. Additional rates based on environmental criteria such as forest cover or protected area acreage, based on EFT indicators, can be included in annual capitation grant although this requires the amendment of the Federal Constitution.

2. *Debt-for-Nature Swaps*

Originally, debt-for-nature swaps are financial mechanisms that allow portions of foreign debts of a nation to be cleared, in exchange for commitments to invest in biodiversity conservation. Recently, it has emerged as a tool to assist high-debt and rich-biodiverse developing countries that can meet triple goals of debt, climate and nature as part of Covid-19 recovery. Similarl mechanism may be adopted in EFT where States that performed well in conservation based on established criteria be used to clear unpaid loans.

3. *New Institutional Arrangements*

Another method that may be considered to be new arrangement to implement the EFT, similar to how Malaysia Forest Fund (MFF) was established to implement the REDD Plus Finance Framework (RFF). This new institution may also be responsible for coordination and monitoring as well as measurement, reporting and verification of EFT.

7.1.2 Effects and impacts of EFTs

The positive effects of EFT in five countries (India, China, France, Brazil, Portugal) were largely based on revenue ‘equalisation’. This was the main criteria and rationale for the implementation of EFTs and their incorporation into IFGT. The equalisation here refers to rationalising grants allocated from national to sub-

national governments. Regions that receive larger EFTs, based on larger shares of forest cover, are typically remote, with greater fiscal needs and lower fiscal capacities. On the other hand, regions that received smaller shares of EFT are often higher-income, urban areas able to generate revenues from other sources such as taxes and through business. In case of Malaysia, a well-designed EFT can reduce the existing dependency on land clearing for state and local government revenue. This will subsequently contribute positively to climate action, with activities such as hill-clearing, overdevelopment, and deforestation having been identified as contributing factors towards climate vulnerability.

EFTs can potentially be part of government nature and climate pledges with increasingly heightened environmental ambition to the UNFCCC, CBD as well as other goals such as UN Decade of Ecosystem Restoration and the SDGs. For example, India's NDC to the UNFCCC references the EFT as supporting the achievement of its national forest cover goal of 33%. While Malaysia does not mention EFTs directly in its NDCs, EFTs have major impacts on its climate commitments. This include maintaining or increasing its carbon sinks (where LULUCF accounts for more than 70% of carbon offsets) for mitigation, increasing preservation of vulnerable ecosystems in PA networks, and gazetting water catchments for adaptation.

7.2 Payments for ecosystem services

PES are one of the most common economic instruments for conservation based on relatively simple concept. The general idea is to pay landowners to protect their land in the interest of ensuring the provision of some "service" rendered by nature. These services can be clean water, habitat for wildlife, or carbon storage in forests. However, in reality, the design and implementation of PES programmes is rather complex, and can be scoped and implemented at national, state and local level. There are more than 500 PES schemes with different varieties around the world, of which 70% are related to services derived from watershed (GEF, 2021). Despite the growing PES schemes and its promising potential, existing scientific literature found little evidence of its effectiveness in achieving its environmental outcomes (e.g. deforestation), generally as payments were insufficient to cover the opportunity costs of other land-use activities.

The concept of PES has generated a great deal of interest in Malaysia despite the lack of PES schemes. The Economic Planning Unit has made general

recommendation of PES in Malaysia while WWF-Malaysia studied the feasibility water-based PES in several forested areas such as Ulu Muda FR in Kedah and Fraser Hill in Pahang. The 12MP reiterated the government's plan to strengthen PES implementation, citing that a "*mechanism will be established to ensure the payment for ecosystem services commensurate with the benefits derived and costs incurred from the services*". It remains unclear what kind of mechanism will be implemented. In Malaysia, only one known PES scheme is presently operational, in the form of an agreement between the Perak State Forestry Department (as a seller) and the Perak Hydro Renewable Energy Corporation (buyer), with payments made to the forestry department at 0.25% of profits.

7.2.1 Design of PES programmes

Institutional arrangement and requirements

The key requirements to a basic PES program are: (a) At least one service buyer; (b) At least one service provider; and (c) transactions that take place. But the design and arrangement of PES schemes can varies widely, from narrow market-based definitions with direct transactions between providers and beneficiaries; including schemes where private buyers and sellers arrange voluntary and conditional transactions for the delivery of ecosystem services; to broader schemes level in which those who benefit from the ecosystem services pay (usually indirectly) those who provide the services.

To summarise, there are three different type of PES scheme that can take place:

1. *National Level PES Scheme*. This arrangement entails federal government directly compensates landowners for activities that have been identified as contributing to a sustainable environment. One of the biggest example and model is the Environmental Services Payment Program (FONAFIFO) in Costa Rica where forest and plantation owners across the country are financially paid and legally acknowledged for conservation of natural forests, reforestation through sustainable plantations or agro-forestry (see Box 7.2.2 – 1).

2. *Multi-Stakeholder Public-Private Partnership*. An example is the Pilot PES in Babagon Catchment, Sabah that is currently being developed. The programme enhance legal and institutional basis for those who benefit from reliable low-cost water from a healthy catchment (water utility companies,

water users) to share the costs of maintaining its good health through contracts that pay those in the watershed to look after it (e.g. local communities, Sabah Parks, Forestry Departments). Here, existing laws are amended to enable collection of PES charges and paid into PES Trust Account, which is managed by independent non-profit body that reports to Sabah Water Resources Council.

3. *Stand-Alone Agreements between Buyers and Sellers*. An example is PES scheme in development in Bintang Hijau Forest Reserve, where Perak State Forestry Department; landowner of the watershed area sells water and agreeable rate to downstream users of two buyers, Air Masyarakat (local communities managed by JPKK) and Lembaga Air Perak (LAP).

Regardless of how the arrangements are made, design and implementation of PES programme requires legal framework, recognition of property rights, enabling institutions, formalised contract and governance structure. The degree of complexity often increases from stand-alone agreement up to national or transboundary level.

Ecosystem services to trade and its economic value

Ecosystem services of natural capital such as forested area are based on its provisioning, supporting, regulating, and cultural services (MEA, 2005). However, its known that market value of a forest are defined largely by wood-based industry such as timber products. Part of environmental outcome of PES scheme is to address consumer surplus where price is put for other crucial ecosystem services of forest that can't be found in market places. However, they are not so easy to measure. Although there are various tools to measure value of ecosystem service, there is no standardised methods or guideline to assess them in context of Malaysia. Furthermore, value of ecosystem services into national accounting system to help establish basis for development of PES schemes at national and sub-national level.

Among the type of services, provision services, specifically water supply and quality regulation is the most common 'product' that can be used, reflected by existing PES schemes globally and in Malaysia. However, there are ecosystem services that getting more attention such as carbon sequestration (carbon credits), recreation and tourism (conservation fee) or flood control regulation (avoided

damages to infrastructure or agriculture land). This means there are actually various products of PES that can be explored, however it depends on economic valuation of these products, type of institutional and legal framework and agreement between seller and buyer.

Market and price effects

To incentivise development of PES scheme in Malaysia, business cases needs to be built. As water is expected main 'product' in PES scheme, certain systemic challenges remain. One of they key issue is water tariff in Malaysia are among the lowest in the world. Subsidised water services discourage water conservation practice (especially in irrigation that accounts nearly 80% of total water consumption) and limit the potential of innovative financing on water services. In some States, politically motivated initiatives such as 'Free Water Scheme' in Selangor decentivise them further.

Therefore, there is a need to review the water tariff in each States and take into account the whole cost of water protection and utility including treatment of water pollution. For example, in urbanised region the cost of treating raw water has risen due to increasing pollution. Water utility company may opt to partake in PES scheme by partnering in management of watersheds to reduce cost of treating and supplying water, thus improve profitability and lower cost to consumers.

7.2.2 Implementation of PES programmes

The potential designs of PES programmes are different across jurisdictions, each featuring distinct governance structures, systems of land tenure, and ecosystems. This means the design and implementation of PES is highly contextual and specific to local needs. Significant capacity-building is required in addition to location selection in the context of implementing PES schemes.

Capacity building

Capacity building for designing and implementing PES scheme at the local and national levels is ongoing is required in Malaysia. Building institutional and human capacity will continue to be in high demand, especially among local and indigenous communities in order to facilitate effective participatory planning and engaging in equitable agreements with buyers in PES scheme. While there are increasingly various online modules and education tools, access to service providers in remote

places will necessitate a variety of approaches that is more practical, such as facilitation by NGO/CSO or secondment of local or regional specialists. Pilot projects in Malaysia could be important to demonstrate success of a PES scheme, such as the ongoing Pilot Project in Babagon Catchment, Sabah.

Priority areas for PES

Several key biodiversity areas can be selected to enhance of effectiveness of PES scheme at national, state or local level. This area can include (but not limited to):

1. Central Forest Spine Landscape (which 80% of it are comprises of critical water catchment area). Key areas within this landscape can include critical ecological linkages (primary and secondary) and its surrounding forest landscape as identified in the latest Central Forest Spine Master Plan.
2. Environmentally Sensitive Areas in accordance with National Physical Plan 4, State Structure Plans and Local Plans.
3. Protected Areas (PA), Production Forest Reserves, state-land forests or community-based forests that in needs of financing. For example, Kenyir State Park is in process of designing various PES schemes, as part of plan to generate revenue to service bonds/sukuk for management of the Park.

In locations where water is in short supply and high demand, PES solutions are likely to be developed and deployed. If the pilot sites are chosen to maximise the amount of services supplied, these programmes have the potential to deliver other co-benefits, such as biodiversity conservation and climate mitigation. Stakeholders in the private sector and central and regional governments' public utilities are most likely to continue participating in the development and implementation of PES schemes. Climate risk assessment can become an important instrument for determining priority areas of PES and downscaled climate models with higher spatial and temporal resolution will help to determine water-stressed areas.

Box 7.2.2 – 1: Payment for Ecosystem Services in Costa Rica

In Costa Rica, landowners receive direct payments for the ecological services that their lands provide as the result of adopting land use and forest management techniques that do not have negative impacts on the environment. The aim is to protect primary forest, allow the recovery of secondary forest, promote the reforestation of abandoned pasture and degraded lands, and promote forest plantations to meet industrial demands for lumber and paper products.

These goals are met through site-specific contracts with individual small- and medium-sized farmers. In all cases, participants must present a sustainable forest management plan certified by a licensed forester, as well as carry out conservation or sustainable forest management activities – depending on the type of contract (forest conservation, sustainable forest management practices, reforestation)– throughout the life of the contract.

This is made possible by Costa Rica's Forest Law, which recognises four environmental services provided by forest ecosystems:

1. Mitigation of GHG emissions;
2. Hydrological services, including provision of water for human consumption, irrigation, and energy production;
3. Biodiversity conservation; and
4. Provision of scenic beauty for recreation and ecotourism.

Payments are coordinated by the National Fund for the Financing of Forestry. Landowners who voluntary place their holdings under protection have the following obligations:

1. Prevent and control forest fires.
2. Prevent and support work to control illegal hunting.
3. Refrain from any actions of cutting or extracting forest products.

Where land has been deforested, the landowners must agree that reforestation is carried out with native species. Each hectare of forest placed under protection receives a sum of USD 210, paid over a 5-year period. Landowners are also provided with technical services on sustainable use options. In Costa Rica's San Juan-La Selva Biological Corridor, a target areas for protection and rehabilitation, landowners, who collectively hold 53,750 ha (22%) of forest within the corridor, have participated in PES programmes. This gives an indication that landowners are willing to modify their land use when they are rewarded with financial incentives.

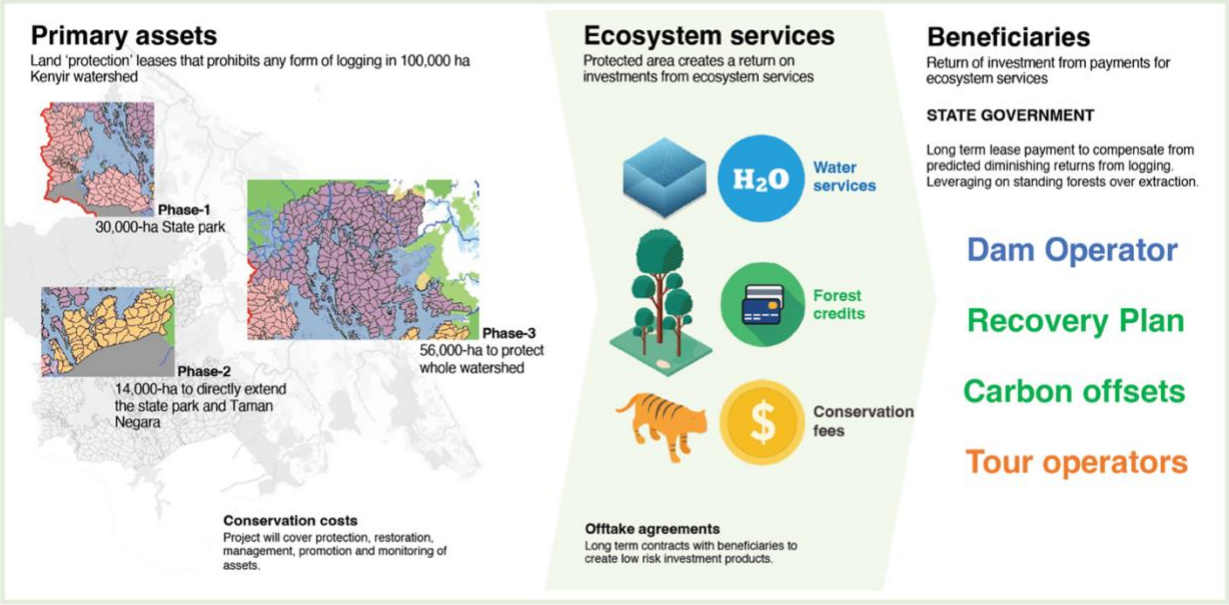
Source: *Sanchez et al. (2007); Perez (2006)*

7.2.3 Case study: Sustainable Conservation Financing in Kenyir

In Malaysia, several attempts were made to trade services from natural capital within a designated area with hugely different approach. For example, the recently-mooted Nature Conservation Agreement, a US$80 billion deal in Sabah involving the 100-year lease of 2 million hectares of land was hugely criticised for its lack of transparency, among other factors (see chapter 6.4).

Perhaps a better example would be the Kenyir for Life project. In this project, a local NGO called RIMBA works with the state government to develop financing opportunities for protecting the Kenyir Watershed, which involves newly-gazetted 30,000 ha state park with plans for a future expansion of up to 100,000 – 200,000 ha. The watershed is diverse, hosting at least 43 mammal and over 290 bird species. It also supplies vital ecological services to local residents, such as drinking water, flood mitigation, erosion management, and fishery resources. Based on stakeholder interviews, there are several economic instruments being considered (see Figure 6), particularly selling of carbon credits since Kenyir's high functioning biodiversity protects carbon stage and provide less risk of asset impairment and the 'additionality' component is present since the gazetted area was previously earmarked to be logged. Currently, modelling to determine potential verified carbon units is being finalised to obtain double standards of Verified Carbon Standards (VCS) and Climate, Community & Biodiversity Standards (CCB Standards)[55]. At the same time, the development of a legal framework to examine carbon rights to the state, due diligence, ensuring free, prior, informed consent (FPIC) is currently underway.

Figure 6: Economic rationale for the protection of the Kenyir Watershed



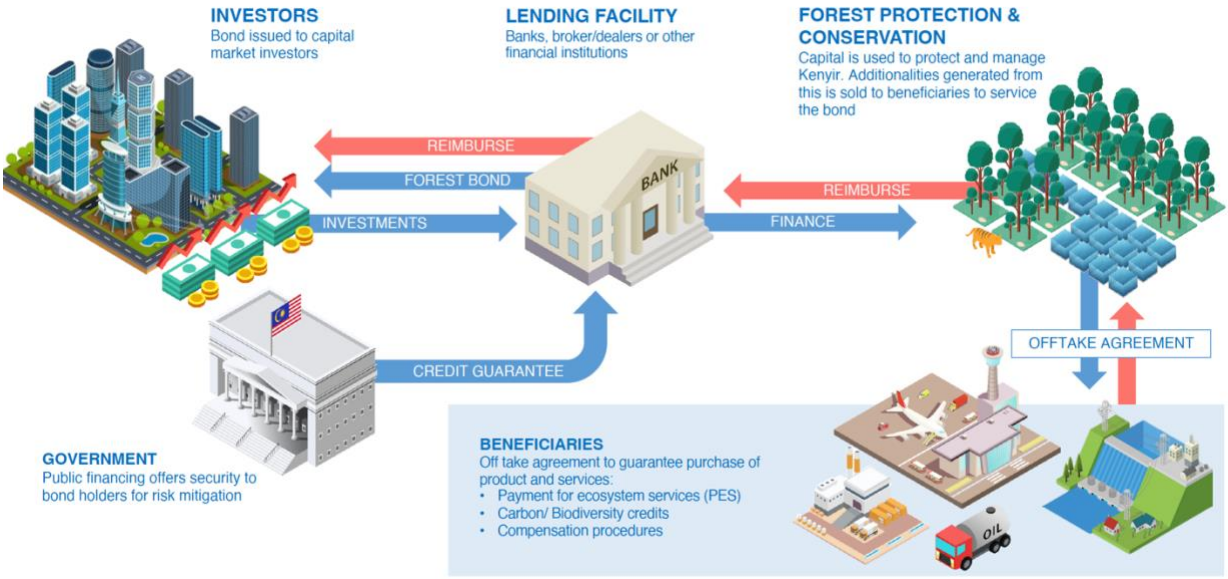
Another potential avenue to securing long-term financing includes issuing forest bonds to unlock sustainable financing that can enable the protection of entire forest

[55] https://verra.org/project/ccb-program/

landscapes (see Figure 7). The direct costs of protection ensure supply of clean water, carbon capture and thriving wildlife populations. Protected area creates a return on investments from ecosystem services, which then used to service the bond.

This mechanism could be important tool moving forward for States to earn sustaunable revenue stream from standing forest as opposed to logging and clear felling. While EFT may appear to be more straightforward, the amount is smaller and the amount may not be 100% secure since the government is still recovering from pandemic, while compounded risks such as recent 2021/2022 floods will likely affect the country's broader fiscal outlook.

Figure 7: Development of a forest bond to protect the Kenyir Watershed



7.3 Climate adaptation financing

The climate economics literature over the past decades has emphasised the importance of MBIs relative to command and control regulations (Barbier and Markandya, 2012), or it can together be applied in combination to address disaster risk management (Filatova, 2014). The use of MBIs for climate adaptation is rarely discussed in literature beyond insurance, but international experience has shown wide range of economic instruments are available such as taxes, subsidies, risk

sharing and transfer, water pricing or other tools that can reduce market failure and send a market signal to change behaviours (Filatova, 2014; IPCC, 2014).

The mapping highlighted that there is a lack of dedicated economic instruments for climate adaptation in Malaysia. This is similiar globally, where economic instruments play a relatively lesser role in contrast to mitigation policies (Braeuninger et al, 2011). There are several rationales of establishing economic instruments to enable effective adaptation in Malaysia.

Increasing climate risks

The climate is changing faster than the rate of decarbonisation[56] which increases the intensity and frequency of extreme weather events such as floods, droughts and heatwaves (IPCC, 2021; IPCC, 2022). Overlayed with unsustainable development practices, increases in vulnerability aggravates climate risks and harms Malaysia's development gains. The 2021-2022 flood events showed strong correlations between unusual rainfall patterns and uncontolled development, deforestation, poor planning, creating RM5.3 to RM6.5bil in losses and damages (DOSM, 2022).

Addressing market failures

Risks and negative externalities associated with natural hazards, in particular loss and damages, are often retained by government, businesses and individuals. This is as a result of the lack of an enabling environment to internalise negative externalities from unsustainable practices (e.g. development in flood plains with no retention ponds or insufficient drainage). If carbon pricing instruments (mitigation) aim to correct the market failure of climate change to internalise the externality costs of GHG emissions, although complex, a market mechanism is required to establish legal liability for addressing market failure from activities that aggravate vulnerabilities and internalise the externality cost of loss and damages (adaptation).

[56] According to Climate Action Tracker, the world is on track for 2.4°C warming based on latest NDCs submitted in 2021.

Another potential market failure is in the form of charity hazards[57]. Since the government provides various support and financial aid through extrabudgetary funds; where relief and response has always been the main focus of Malaysia's disaster risk management (Noraini et al., 2017). Several literature in Malaysia found that charity hazards, along with low perceived risk of disaster and low awareness of risk transfer tools contributed to low uptake of disaster insurance among household, businesses and farmers (Roslan et al., 2019; Alam et al., 2020).

Public expenditure on disaster risk measures has risen substantially. In particular, flood mitigation[58] allocation has increased across subsequent Malaysia Plans; from RM14 million in 1970 (Shah et al, 2017) to more than RM15 billion in 2022[59]. To address flooding and coastal erosion, KASA projects that over RM300 billion is required to address long-term flooding issues, including for water infrastructure development[60]. It is unclear how the figure was determined, whether it links to a broader outcome (reducing less exposure, losses and damages etc) and if it considers future climate projections, but such high demand in capital will likely require additional financing beyond government budget.

Long-term fiscal outlook

Compounding shocks from increasingly unpredictable extreme weather events and COVID-19 pandemic put a strain on an already limited fiscal space. The government has recognised the need to manage post-disaster liabilities more effectively to reduce its financial burden. Under the 12MP, the government plans to set up alternative disaster relief funds, explore disaster risk transfer mechanisms and scale up climate resilient and environment-friendly financing.

[57] Individuals tendency not to insure or take any other mitigation measures as a result of the reliance on expected financial assistance from federal relief programs or donations by other individuals.

[58] Note that the term mitigation here refers to traditional emergency management measures to undertake engineering efforts such as flood bunds, embankments and river works to protect communities, and not reduction in greenhouse gas emissions as used in climate change literature.

[59] https://www.nst.com.my/news/nation/2022/03/779826/additional-rm15-billion-allocation-flood-mitigation-projects-handled-kasa

[60] https://www.theedgemarkets.com/article/over-rm300b-needed-longterm-flood-management-—-environment-and-water-minister

Moving forward, the following sections provide several options of broad-based economic instruments through rapid literature review and international best practices. They aim to address the market failure for internalisation of externalities and establishment of legal liability mechanisms for loss and damage. This can induce behavioural change which then contributes to reducing climate risk. Their design and implementation are likely to be complex and requires linkages to overall impact/outcome, reliable climate information, a regulatory framework, and buy-in from stakeholders. The impacts and outcomes needs to be defined by ongoing policies in development such as National Adaptation Plan and National Disaster Risk Reduction Policy. The objectives are multiple, as they need to be designed to meet economic objectives (e.g. reduced government expenditure in flood mitigation works and disaster aids) and environmental objectives (e.g. reduced flood occurrence, number of deaths, affected people from disasters).

7.3.1 Tax and surcharge systems

In the context of adaptation and disaster risk management, taxes or surcharges are price-based instruments that can be introduced to internalise adverse effects of developments in high-risk areas to account for positive externalities. It's a form of preferential tax system that can be used to alter development patterns (Clinch and O'Neill, 2010). The concept is new in Malaysia, although countries including in Europe and United States have adopted some form of similiar tax system related to flood risk management (Filatova, 2014). Therefore it's design and implementation needs to consider the aspects below.

Risk-based development in high-risk areas

A major example of how this system can be applied in Malaysia is where development on flood plain, coastal zone or slopes are required to pay certain amount of charges. These taxes can influence land use in areas exposed to extreme events or slow-onset change of parameters which would not allow continuation of current use. Through such taxes, only activities or development with high-value added would be allowed or retained in the area and reduces the overall potential loss and damage.

The criteria to select the price and rates needs to undergo economic, scientific and political analyses. But certain criterias needs to be considered such as type and sizes of development (similar to rates of quit-rent), land use and level of vulnerability and exposure to climate change. Development that effectively

implement climate resilient and disaster risk reduction measures (e.g. permeable pavements, stormwater system, urban wetlands) can be made negligible for tax rebates, subsequently incentivising individual adaptation.

Fund collection and disbursement

The fund collected should be used to fund adaptation measures i.e. green infrastructure improvements, flood barriers and other mechanisms. This needs to be tied back to the overall outcome of reducing government expenditure on flood mitigation works and increase economic efficiency.

There is a need to determine on how funds should be collected, i.e. whether it goes to federal, state or municipals coffers or any new entity to manage the financial mechanism for this sector. This can be complicated and requires stakeholders to come to agreement on various issues including distribution, mechanisme of collection and type of projects to fund. Furthermore, land-related matters is under the purview of the state and local governments. Traditionally, flood mitigation projects fall under the responsibility of federal government but other measures have been funded by state[61] and local governments.

Regardless, a fund established through these instruments needs to be transparenct in terms of allocation and governance so that any expenditure is funded equitably and goes through a clear and accountable process.

Regulatory and legal frameworks

New regulations or existing regulations (e.g. National Land Code) needs to be amended to set out the law for obligation to pay the tax. A regulatory framework is also required with the need of climate risk assessment incorporated into planning level and sectors. Currently, there is no mandatory requirement for such assessments compared to countries such as the United Kingdom, which adopts the the UKCIP risk-based planning framework that mandates periodic climate risk assessment to be considered in policies, plans and actions.

Science and evidence-based information

[61] The Hybrid Off-River Augmentation System (HORAS) project by Selangor Water Management Authority aims to increase the yield and storage of water resources in Selangor state and mitigate flooding in downstream areas in Bestari Jaya.

Reliable and accurate climate projections that are downscaled[62], spatially-available and updated periodically (e.g. with every IPCC asssesment cycle) is required to understand the level of climate risks in a particular region and contribute to the selection of prices and rates. Malaysia has improved on its projection and translating the data to the spatial level, including the high resolution sea level rise map by NAHRIM. However, maps for other climate hazards they are not yet completed. For example, not all flood hazard maps by the Department of Irrigation and Drainage is completed for all river basins, while some has not incorporated the climate change factor. Furthermore, there is no dedicated data centre for climate informaton system in Malaysia.

Stakeholder buy-in

Tax can be economically and administratively efficient, but are likely to be up against legal hurdles and political sensitivities, not just because of opposition from businesss and property sectors, but also public distrust on how the funds would be used and distributed.

Another potentially difficult situation to maneuver in Malaysia is on the federal-state jurisdiction issue. Introducing new tax system to discourage development in high risk areas will likely receive strong opposition from state governments, especially when they rely on revenues from land (e.g. quit-rent, assessment taxes) for state revenue. An equitable sharing of revenue needs to be demonstrated, such as having a portion of revenue collected from new tax system to be distributed back to the state government. Some of these portions can also be used for conservation funds (such as through Ecological Fiscal Transfer) and financing sustainable urban drainage systems.

To make it feasible, authorities responsible for designing and planning for new tax system, such as the Ministry of Finance, need to undertake effective, transparent and inclusive stakeholder engagements with various groups. This include other ministries, state government, municipals, business groups and residential associations. In order to get the buy-in, stakeholders need to understand the importance of the new tax system in place and how it would be economically beneficial to them over long term.

[62] A technique used to translate data from large-scale Global Climate Models (GCM) to smaller spatial scales (e.g. a single watershed), which can be better utilised by regional and local stakeholders to address specific needs.

7.3.2 Risk transfer and insurance

Insurance is a common economic instrument that allows for a flexible and low-cost adaptation tool. When risks are adequately defined, insurance markets can establish prices and insurance availability to incentivise choices and behaviours that reduce vulnerability while simultaneously creating a pool of cash for post-disaster recovery. By taking disaster or climate risk insurance, policyholders can receive a payout if they experience loss and damage from extreme weather events such as floods, droughts and heatwaves. Climate risk insurance can come in various forms and design, but generally have three different levels – micro-, meso- and macro[63] (IPCC, 2014; Allianz, 2016).

While climate-risk insurance can enhance the social protection system, it is not recommended as the only risk management tool applied. It needs to be integrated with broader disaster risk management strategies and complement adaptation and mitigation actions. The impacts and outcome expected risk transfer instruments such as insurance are to improve efficiency (reducing public expenditure to cover losses and damages) by spreading the risks, but not necessarily to reduce loss and damages.

In Malaysia, currently, disaster insurance is not available as a stand-alone product since there is limited demand for such policies, owing to the low degree of disaster risk (save for infrequent floods) and lack of insurance culture. But with increasing frequency and intensity of extreme weather events, current premiums for household and commercial properties insurance may increase, ironically leading to even more unaffordability and lower uptakes.

Microinsurance for household, properties and businesses can be provided by private insurance companies, government public insurance through residual market mechanism[64] or through public-private partnerships. Supporting

[63] Micro-insurance is specifically designed to protect low-income individuals and households directly against diverse risks in exchange for regular (small) premium payments; meso-insurance is insurance sold to intermediaries (e.g. NGO, microfinance institutions) providing compensation to their clients or members; and macro-insurance is where entire regions or countries, or international charity organizations buy insurance (usually through risk-pooling) to fund recovery measures.

[64] Residual markets provide insurance to individuals or companies that either cannot find or are not willing to purchase insurance through private insurancers.

comprehensive and affordable insurance coverage of climate and disaster risks remains a challenge in many countries[65] (OECD, 2015) and there are many key questions to be addressed (see box 7.3.2 – 1). There are several interventions that can be considered by the government to support establishment of climate risk insurance market. These include:

1. Providing subsidies to increase update and pooling of resources. The subsidies should be income-based to ensure affordability and reduce moral hazards.
2. Implementing direct provision of broad-based insurance such as the National Flood Insurance Programme of United States and National UK Flood Programme. For the former, flood maps was utilised to identify high-risk flood areas and make flood insurance mendatory. The rate of insurance will be based on degree of flood risks in particular area and 10-year flood risk strategies in the municipal.
3. Improving the quality and availability of climate-related data. Existing data on climate and disaster related information (e.g. climate projections, sea level rise maps, flood hazard maps) should be made publicy available. In many countries that has disaster risk strategies and climate risk insurance, the availabilty of risk maps and collection mechanism of data on hazards, exposures, vulnerabilities and losses is well established and often with support of private sector and insurance companies. Reliable data is critical to determine premium rates and risk transfer triggers to reduce basis risk[66].
4. Providing reinsurance to insurance companies to encourage provision of various disaster coverage products.
5. Establishing initiatives targeted coverage to vulnerable segments of society such as farmers/fisherman or small entrepreneurs.

[65] *Disaster Risk Financing: A Global Survey of Practices and Challenge* provides a detailed overview of how countries are facilitating climate and natural hazard insurance through PPPs, subsidies and tax incentives, and the direct provision of insurance or reinsurance

[66] A mismatch between parametric insurance claims settlement and the actual losses of the insured.

Box 7.3.2 – 1: Risk Transfer Triggers

Risk transfer products can be triggered for payout in several ways based on its design, such as:

1. indemnity triggers (depend on actual losses)
2. index triggers (triggered by an estimated industry loss "index")
3. parametric triggers (based on well-defined parameters of an event)
4. modelled triggers (based on parameters input into exposure models)
5. hybrid triggers (combinations of the above triggers)

In practice, index-based, parametric and modelled triggers are often referred to as "index-based" to differentiate them from the more traditional indemnity products.

Source: UNU-EHS (2021)

7.3.3 Resource Pricing Instruments

Market-based instruments that prices resources well can help to strenghten efficient use of resources that will be impacted by climate change. For example, water resources will be scarce as a result of dry spells and reduced precipitations depending on the period and region. In Malaysia, projected increase in water demand (especially in agriculture), coupled with a projected decrease in water supply will increase water stress levels in some river basins (TNC, 2018). Water demand management was identified as one of the main strategies for adaptation in the water sector, as per Malaysia's 2021 NDC, since the nation has one of the highest rates of water consumption globally[67].

Some studies noted that water pricing schemes and water markets can enhance climate adaptation (Medellin-Azuara et al, 2008) by introducing them in regions that will likely to suffer from increased water scarcity and sectors that has high consumption rate. The general idea is when water is priced properly, it will incentivise behavioural change, leading to less overuse that otherwise, should supplies become more scarce, has to be corrected through measures such as building water infrastructure (e.g. off-river storage, retention ponds). In a way, market based instruments helps the transititon of water resources management

[67] As of 2020, latest data from the National Water Services Commission (SPAN) showed consumption per capita in Peninsular Malaysia and Labuan is 230 litres per capita per day (LCD), higher than the United Nations recommended daily water requirement at 165 litres per person every day.

that traditionally leans towards water supply management to a more balanced approach that includes water demand management.

The adoption of water pricing schemes can be politically challenging in a country that has among the lowest water tariffs due to subsidies. Correspondingly, states with lower water tariff structures tend to have higher water usage among consumers (MWA, 2018). Given that some sectors such as agriculture and industries are likely to oppose an increase of water costs, the revenues from water pricing could be redistributed to the sector while keeping the incentive for reduced water consumption intact.

Box 8.3.2 – 2: Key Questions in the Design of Climate-Risk and Disaster Insurance

1. Which hazard or hazards will be insured?
2. Is the primary goal of the product social protection? Should the product cover property, or business/ livelihood interruption? Are life, accident and health included or covered elsewhere?
3. What will be the basis of claims? Will the product be indemnity-based, index-based or parametric?
4. Will a premium payment or claims payout system need to be developed? What are the pros and cons of digital processes? Who might be excluded, and how can they be reached? What is the role of local network service providers, and what sustainable partnerships can be fostered for to increase access?
5. Can existing government systems, such as safety nets, social protection systems or provident funds, be scaled or otherwise leveraged for payouts? Which governmental ministries should be involved in the creation and management of products?
6. Will individuals and households be covered directly or indirectly via a meso or macro level product? What distribution and aggregation channels can be used?
7. How are the needs of women and men being met? Which segments of the population/livelihood groups are most vulnerable? Which segments are most critical to local and national recovery and resilience?
8. Should the product be mandatory (mandatory offer, mandatory purchase or mandatory extension)? Should it be a stand-alone, a rider to a pre-existing policy or credit-linked?
9. Will prices be flat (the same for all policy holders), risk-based or progressive (need-based)? Is it affordable? Should deductibles, copays or coinsurance be explored?
10. What form will government financial support take? Will the policies be partially or fully subsidized by the government or a government partner? If so, are these

market-enhancing subsidies or social insurance premium subsidies? Will taxes be waived?

11. Will the government provide other types of support, such as increasing financial literacy or creating the necessary infrastructure and enabling environment to support insurance?

Source: OECD (2015)

8 Policy Recommendations: Economic Instruments for Climate Policy in Malaysia

Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

8 Policy recommendations: economic instruments for climate policy in Malaysia

The section provides policy recommendations as a way forward for both designing and implementing economic instruments in Malaysia. Based on the mapping assessment; causal analysis; and effective assessments undertaken in the previous sections, this section will outline a set of general policy recommendations, followed by sets of recommendations for the improvement of existing (i.e. those assessed in Chapter 5), and prospective (i.e. Chapters 6 and 7) instruments. Finally, recommendations for international support are also outlined.

8.1 General policy recommendations

The assessments conducted in Chapters 3 through 5 give rise to several common issues observed in the design and implementation of existing economic instruments in Malaysia. Various economic objectives, such as technology production and deployment, have to a degree been achieved through many of these technology-based incentive programs, but there is little indication that climate objectives, or economic efficiencies, have been met. Economic instruments, in first-best forms, are theorised to be the most efficient means to achieving climate targets, such as emissions reductions, and the the broader internalisation of externality costs arising from emissions. Yet this has not been the intent of the instruments that have been adopted, which tend to focus on incremental, piecemeal – and specific – objectives, often driven by economic rationale.

Figure 8: Issues and challenges for economic instruments for climate policymaking in Malaysia

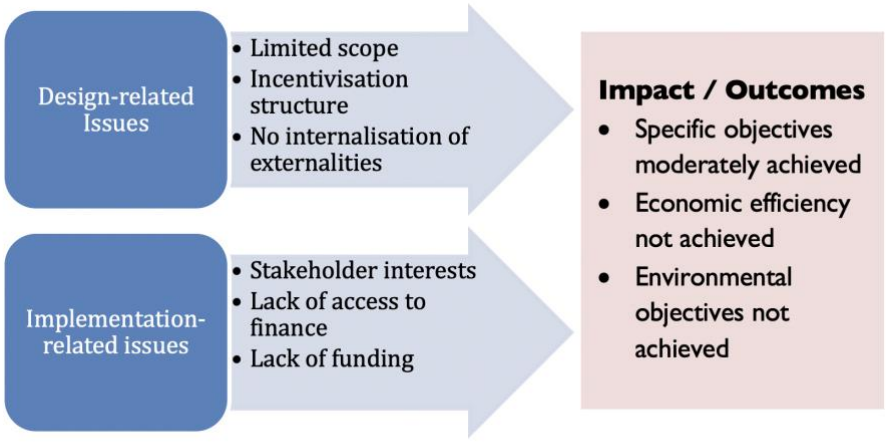


Figure 7 overviews some of the common issues across the economic instruments assessed in Malaysia, but these are not unique to Malaysia and have been found to persist across developing countries (see Rietbergen-Mcracken & Abaza, 2000). Nevertheless, this highlights opportunities to enhance the effectiveness of existing instruments in Malaysia and these lessons can inform the development of prospective instruments to maximise their effectiveness. This chapter consequently overviews sets of policy recommendations with these objectives in mind. First, ten broad recommendations are proposed which seek to address the common issues identified across Malaysia's use of economic instruments for climate policymaking. Second, recommendations are issued focusing specifically on the enhancement of existing instruments and the development of prospective economic instruments in Malaysia.

8.1.1 Recommendations for enhancing the use of economic instruments in Malaysia

In line with Malaysia's plans to enhance the use of economic instruments, as enshrined in the 12MP, this study has identified ten broad-based recommendations as a way forward. The majority of the recommendations are related to policy design and implementation; as a result, the key stakeholders are government agencies. These include agencies that are responsible for addressing climate change but also natural resources, fiscal policies and economic planning. The ten recommendations with the key stakeholders are listed in Table 13 and further detailed below.

Table 13: Recommendations to enhance the use of economic instruments in Malaysia

#	Recommendation	Key Stakeholders

1	Shift to an ecological and science-based rationale in policymaking	Government, Whole-of-Society
2	Catalyse a top-down approach through strong policies and political will	Government
3	Develop instruments for climate change adaptation	Government, Financial Sector, Industry, NGOs
4	Develop databases on value of ecosystem services and social cost of carbon	Academia, Government
5	Formulate first-best instruments with large, direct market effects	Academia, Government
6	Formulate 'hard' instruments to complement incentive-based tools	Academia, Government
7	Adopt a holistic approach to climate policymaking	Government
8	Obtain stakeholder buy-in through extensive engagement	Government (Federal & State), Private Sector
9	Gradually adjust the scope of instruments to meet climate and economic efficiencies and objectives	Government
10	Set prices and/or quantities (objectives) at appropriate scales to internalise externalities	Government

1. Shift to an ecological and science-based rationale in policymaking

Systemically, there is a need to shift towards an ecological rationale in designing economic instruments. The causal analysis undertaken to understand the formulation of the instruments highlighted that existing rationale is largely economic or interest-based.

An economic and industrial focus and prioritisation has been the modus operandi in environmental policymaking in Malaysia. Since the 1970s, when pollution control and the polluter's pay principle were first mooted, pollution charges were established in Malaysia. However, contravention licenses were granted to industries to allow sufficient time to comply with EQA requirements (Hezri, 2016). Obtaining the 'license to pollute', in some cases, was comparatively chaper than purchasing pollution control equipment.

As a developing country, this prioritisation of economic goals over economic outcomes is not uncommon. Nevertheless, at the instrument level, objectives should in theory and in principle be to both internalise externalities and achieve climate objectives. If the main objective are based on economic outcomes, it is

debatable whether the instruments should be classified as economic instruments specifically for climate policymaking.

Moving forward, an ecological rationale would entail setting clear quantities for pollution (or emission) reductions and calculating the social costs of pollution. While the social costs of carbon and biodiversity loss, for example, are extremely complex and difficult to calculate, the baseline nonetheless should be based on the rationale to reduce a target amount of emissions in the most efficient manner, based on best available science. This would also enhance transparency and accountability of any instrument developed.

2. Catalyse a top-down approach through strong policies and political will

The causal analysis highlighted the importance of political will and policy causation. In particular, the Green Technology Wave was the catalyst for a range of economic instruments. This demonstrates the need for any economic instrument to be tied to a larger strategic agenda that is driven and coordinated from the top. Climate change is a cross-cutting challenge and economic instruments in particular will have impacts across various sectors, issue-areas and ministries. Effective instruments will require it to be championed and coordinated centrally, from the Prime Minister's Office and/or the Economic Planning Unit. However, while the green technology wave catalysed technology adoption, as above, the rationale is still largely based on economic aims such as wealth creation and job creation. Moving forward, a top down approach with a strong ecological rationale is required to ensure that a holistic instrument is formulated and implemented.

3. Develop instruments for climate change adaptation

The assessment demonstrated little evidence of existing adaptation instruments as it is still in its infancy. In light of recent disasters as well as the projected impacts of climate change, and the loss and damages predicted, there is an urgent need to address adaptation effectively and efficiently through the use of economic instruments. Moving forward, innovative mechanisms that address both co-benefits and enhance resilience, such as support for climate risk insurance, needs to be considered.

4. Develop databases on the value of ecosystem services and the SCC

One of the major findings on economic instruments is that there is no evidence that their use is based on the internalisation of externalities as described above

and within this study. One of the main reasons is due to the lack of available studies and information for the value of ecoystem services and the social cost of carbon in the context of Malaysia. Such data is crucial as it can act as a baseline for identifying the marginal costs of pollution and the benefits of pollution avoidance. Moving forward, efforts such as the Systems of Economic-Environment Accounting (SEEA) by the Department of Statistics Malaysia and other valuation studies should be undertaken to provide base data for climate economic instruments.

5. Formulate instruments with large, direct market effects as first-best policies

The efficacy of economic instruments is dependent on the extent of their market or price effects. The design of economic instruments therefore needs to ensure that these have the ability to affect markets by impacting consumer and investor behaviour. 'Hard' economic instruments, such as fiscal instruments in the form of taxes (e.g. carbon taxes) and appropriately-rated charge systems, as well as market creation are recognised internationally as first-best policy options. While the efficacy of these instruments still depends on design, they often provide clear quantities (i.e. targets, quota, permits, etc.), as well as costs (i.e. carbon price) that does not discriminate across demand and supply. Moving forward, carbon pricing instruments, for example, should be formulated to address these issues. Furthermore, other instruments will likely be complentary to broad-based mechanisms such as carbon pricing.

6. Formulate 'hard' instruments to complement incentive-based instruments

The mapping highlighted that financial instruments, and in particular, incentive-based instruments dominate the instruments formulated in Malaysia. While it is undeniable that these instruments incrementally support the climate agenda, in particular, through technology adoption, previous literature and case studies warn that it is a second-based policy, in that it should be complementary to other instruments. Beyond economic instruments and while outside of the scope of this study, complementary hard instruments such as command and control approaches should also be formulated to enhance the effectiveness of economic instruments and achievement of climate goals.

7. Adopt a holistic approach to climate policymaking

The effectiveness of an instrument in meeting its overarching climate targets is often hampered by conflicting instruments and policies. To have price effects, an

'overall ecosystem approach' needs to be implemented as opposed to a piecemeal approach. For example, in the case of climate change mitigation and specifically carbon pricing, there is a need to design the instrument in a manner that takes into account the need to rationalise fossil fuel subsidies. In the case of payments for ecosystem services, there is a need to review pricing mechanisms, such as the low tariffs on water, to increase efficacy. Similarly, many challenges in state conservation financing involve practices of rent-seeking and corruption. Without addressing the root of the problems from a holistic point of view, instruments are likely to prove ineffective, particularly in meeting climate-related objectives.

8. Obtain stakeholder buy-in through extensive engagement

As a constitutional federal monarchy, natural resources are under the jurisdiction of the state. Economic instruments that are related to natural resources, including conservation and carbon pricing, require a bargaining process with the states. Due to this prevailing setting in Malaysia, any carbon pricing policy and state conservation financing mechanism will require intensive consultations with the stakeholders at the state level. Platforms such as Malaysia Climate Action Council (MyCAC) should be leveraged to come to an agreement on relevant instruments to climate change such as the carbon pricing policy.

9. Gradually increase the scope of instruments to meet climate and economic efficiencies and objectives

The assessment highlighted that many challenges are due to a limited scope due to various reasons. While the scope of instruments have and will continue to undergo a process of stakeholder bargaining and likely be reduced, it is essential that the design of instruments provide a scope that is fit for purpose. For example, a carbon pricing policy should cover the most carbon intensive industries (i.e. energy including electricity, oil and gas and transport). Moving forward, at the outset, it is essential to scope the economic instruments clearly and aligned to achieving specific climate targets. The upcoming NDC Roadmap may possibly provide such sectoral targets as a basis.

10. Set prices and/or quantities at appropriate scales to internalise externalities

Ultimately, economic instruments need to provide a business case for environmental conservation and climate action. Price-discovery and price-setting need to be competitive, providing price signals competitive with the alternative of resource extraction. More accurate price discovery will likely need diverse market

forces and participants. This will require mechanisms to leverage on financing from various sources including capital markets as well as innovative mechanisms such as blended financing.

8.1.2 Developing a phased approach to enhancing economic instruments

The framework and definitions adopted by the study as outlined in Chapter 1 identified that the first best instruments for economic instruments are those that internalise externalities through the most economically efficient approach. However, literature reviews shows two general challenges generally exist in creating 'pure' economic instruments in. Firstly, designing economic instruments in the setting of imperfect information is challenging as estimating the true costs of loss and damages, for example, on climate change or biodiversity loss, is based on uncertainities. Secondly, both the design and implementation of instruments does not occur in a political and social vacuum; various stakeholders have different interests and the outcome of instruments will be based on a bargaining process.

Taking these challenges into consideration, a phased and gradual approach is more realistic towards enhancing the use of economic instruments in Malaysia. As described above, the aim is to develop an economic instrument that corrects market failures by internalising externalities and achieve economic efficiency. This requires a shift in the instrument design basis. Specfically, three interconnected shifts are required and plausible based on existing and planned instruments and setting. Firstly, is the shift from status quo, which focuses on incentives for *technology adoption* to instruments that focus on providing *market effects* and price signals. This would provide the policy direction by developing ecological and science-based rationales as well as formulating top down policies. For example, current initiatives such as the review of the National Policy on Climate Change and the planned National Carbon Pricing Policy can play a role to set the direction for the creation and design of instruments such as carbon pricing mechanisms to have economy-wide impacts including both supply and demand trends. These policies would require championing from the highest levels of government to increase its likelihood to be effective.

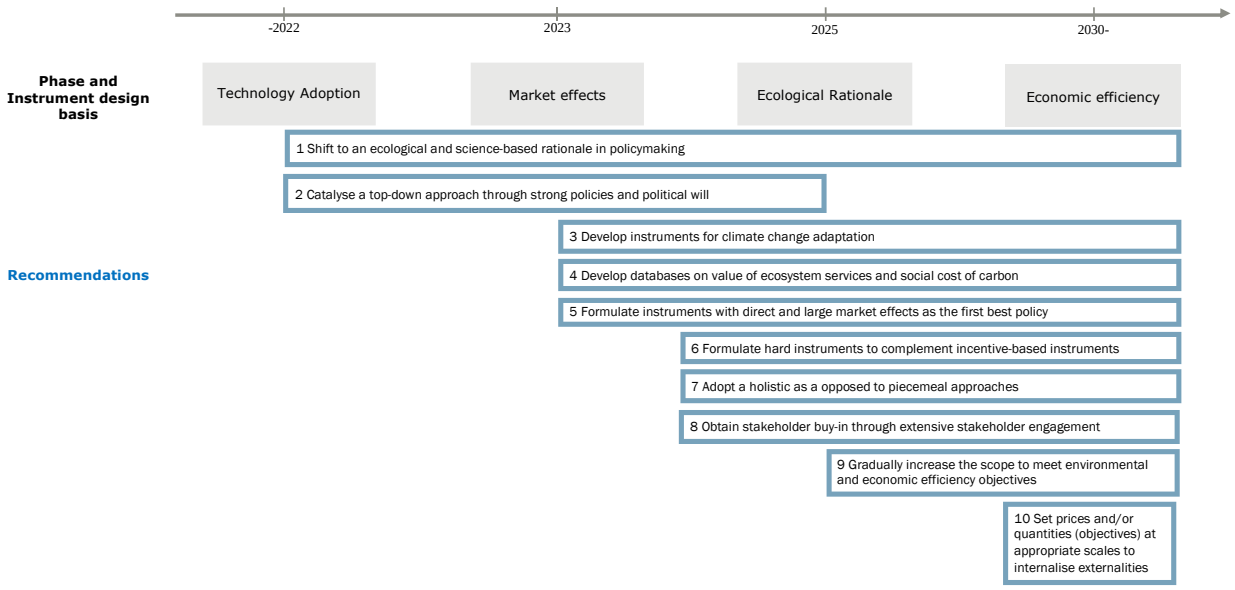
Secondly, is a shift from focusing only on market effects to build in an ecological rationale. This shift would require the instruments to be designed with an climate outcome in mind. For example, for carbon pricing mechanisms, the objective (ends) should incorporate an explicit emissions target. The instrument(s) (means)

should therefore be designed to achieve the reduction of emissions and/or any other climate target. This shift would include developing the database to calculate the value of ecosystem services and the social cost of carbon and the formulation and testing of instruments that have large market effects. The implementation and piloting of instruments such as the VCM, DETS, and PES have the potential to deliver significant market effects. The increased ecological rationale focus should also give rise to the development of instruments for climate change adaptation. At this stage, efforts to improve the design and implementation will also occur, including formulating and implementing hard instruments that will complement incentive-based instruments; adopting holistic as opposed to piecemeal approaches and obtaining stakeholder buy-in. Efforts to address systemic chalelnges such as rationalising fossil fuel subsidies and addressing governance issues are envisioned to prevail.

Finally, the focus turns to a shift from focusing on climate and ecological bottom lines to instruments that are created to achieve them in the most economic efficient manner. This will require instruments that internalise externalities and correct the market failures that exists in the system today. For example, ratcheting up carbon prices (as planned in Singapore and elsewhere) and gradually increasing the scope to cover all sectors are recommended to take place at this stage. Finally, the cost or quantities are set at a level that reflects the costs of internalising externalities.

The timeline provided is based on existing initiatives. As the objective to enhance the use of economic instruments is outlined in the Twelfth Malaysia Plan, many activities are envisaged to take place within the period of 2021-2025. Nonetheless, the complexities involved in designing and implementing economic instruments means the steps taken are likely to be incremental. Such a phased approach is visualised in Figure 9.

Figure 9: A phased approach towards enhancing the use of climate economic instruments in Malaysia



8.2 Recommendations for the enhancement of existing economic instruments for climate policy

Chapter 5 overviewed the effectiveness of existing economic instruments deployed in Malaysia since the passage of 2009, which marked the passages of the NPCC, NGTP, and NREPAP. The assessment highlighted the various aspects of the successes and shortcomings of each instrument based on their established objectives as well as their contributions to the advancement of the adaptation and mitigation agendas of the Malaysian government. These findings, as well as those expressed in chapters 6 and 7 covering prospective instruments for climate policy, are used to develop sets of policy recommendations designed to assist in enhancing or maximising their effectiveness. This section overviews recommendations for existing instruments; chapter 8.3 overviews recommendations for the instruments currently in development. Each instrument is overviewed only briefly in this section, with more detailed descriptions available in earlier chapters.

8.2.1 Green Technology Financing Scheme

As Malaysia's flagship financing programme for low-carbon technologies, particularly RE and EE, the GTFS aims to finance investment in the production of low-carbon products and technologies, and the deployment of these products and technologies. Since its initial introduction in 2010, it has been extended and enhanced thrice, and received a total budgetary allocation of RM9.5 billion.

Table 14: Policy recommendations for the GTFS

Recommendation	Key Stakeholders
Expand beyond emphases on renewable energy and energy efficiency projects. Within RE, to enhance financing of non-solar technologies.	Government
Develop evaluation mechanisms or guidelines to support financial institutions' evaluation of investments or projects in the context of more nascent, untested technologies.	Government, Financial Institutions
Continue extending the GTFS, with a broader scope to encompass sectors covered by prospective CPIs, to enhance cross-policy synergies.	Government
Periodic publication of data on GTFS, including effects on low-carbon indicators such as those highlighted in Chapter 5.2.	Government

8.2.2 Feed-in tariff

The FiT was Malaysia's first economic instrument for climate policymaking, developed to promote the deployment of RE in electricity generation. Its initial successes were driven by high demand for rooftop solar, in combination with generous rates of return (of approximately 67 sen per kWh, relative to the average electricity tariff of roughly 38 sen/kWh). Funding limitations, driven by the programme's reliance on contributions to the RE Fund, led to the discontinuation of solar PV under the FiT in 2016; since, growth of the programme has slowed markedly. The programme saw RM2.53 billion paid out to subscibers between 2012 and 2020, and as of 2020 achieved a cumulative capacity of 574MW, just over 7% of Malaysia's 2025 installed RE capacity target.

Table 15: Policy recommendations for the FiT

Recommendations	Key Stakeholders
Develop an equitable public-private financing mechanism, including annual federal budgetary allocations, for FiT operationalisation. Consideration can be given for private contributors in the form of mRECs/offsets.	Government, Financial Institutions

Conduct periodic evaluations of FiT performance, with a view to adjusting incentives and policy scope, to address low uptake rates for biofuels and small-hydro.	Academia, Government
Periodic publication of data on FiT, including effects on low-carbon indicators such as those highlighted in Chapter 5.2.	Government

8.2.3 Green Income Tax Allowance and Green Income Tax Exemption

In place since 2014, the GITA and GITE mechanisms have focused on both supply- and demand-sides across low-carbon industries, emphasising the increase in production and deployment of, predominantly, RE and EE services and technologies. While the program covers technologies across a wide range of sectoral applications, the majority of projects are RE-related (445 of a total of 523 projects). Within RE itself, projects predominantly cover solar production and deployment (426 projects). The GITE is a tax exemption given to low-carbon technology service providers on income earned through the sale of what it classifies as green assets, equipment, or services. The GITA is a tax allowance given to purchases of low-carbon assets, services, or technologies.

Table 16: Policy recommendations for the GITA/GITE

Recommendations	Key Stakeholders
Expand beyond emphases on renewable energy and energy efficiency projects. Within RE, to enhance financing of non-solar technologies.	Government
Develop evaluation mechanisms or guidelines to support financial institutions' evaluation of investments or projects in the context of more nascent, untested technologies.	Government, Financial Institutions
Periodic publication of data on GITA/GITE, including effects on low-carbon indicators such as those highlighted in Chapter 5.2.	Government

8.2.4 Net energy metering

The NEM program was introduced in 2016 to incentivise the deployment of rooftop solar across commercial and residential sectors as well as the government. The policy is currently in its third iteration (i.e. NEM 3). The first allowed the sale of excess electricity generated through solar PV to be sold to DLs at a prevailing 'displaced cost'; the second and third iterations enhanced this incentive such that excess electricity would be sold to the DLs to offset electricity bills on a one-for-one (unit) basis. This enhancement was made in response to low rates of uptake; of NEM 1's 500MW quota, only 4.5% was subscribed to. The improved incentives saw the full uptake of the 500MW available under NEM 2, which also saw the introduction of solar leasing as an option to reduce upfront capital cost requirements. NEM 3, ongoing between 2021 and 2023, currently has a subscription rate of 38% with the majority of interest from the commercial and industrial sectors. Residential uptake remains low.

Table 17: Policy recommendations for NEM

Recommendations	Key Stakeholders
Enhance financing mechanisms to support residential PV deployment, aimed at reducing upfront installation costs, to address recent lack of NEM growth.	Government, Financial Institutions
Conduct periodic evaluations of NEM performance, with a view to enhancing incentives to support continued deployment of solar PV.	Academia, Government
Periodic publication of data on NEM, including effects on low-carbon indicators such as those highlighted in Chapter 5.2.	Government

8.2.5 Large-scale solar

Malaysia's LSS programs are competitive-bidding exercises held for the production and procurement of electricity generated through large-scale solar programs. This push began with the direct award of two contracts worth some 650MW in 2014 and 2016; upon public and parliamentary scrutiny, a shift was made to procurement through the hosting of open-tender auctions. The first of these exercises was held in 2016, and three more have since been held (in 2017, 2020, and 2021). In total, over 2.3GW in LSS capacity has been awarded contracts, with the LCOE of LSS falling from over 39 sen per kWh in 2016 to between 17.7 and 24.8 sen/kWh in 2021.

Table 18: Policy recommendations for LSS

Recommendations	Key Stakeholders
Address concerns over impacts of LSS on land-use change, particularly where deforestation and conversion of agricultural land is required, through expanding the adoption of floating LSS and studying feasibility and potential of agrivoltaic solar technology.	Government, Academia, Industry

8.2.6 Energy efficient vehicles

Aimed at developing Malaysia as an 'energy-efficient' vehicle hub, particularly in the context of automotive production, the EEV policy provides incentives for EEV production through tax breaks, soft loans, import duty exemptions for parts and components, and excise tax exemptions. EEV classification is based on fuel economy (FE) and kerb weight, covering vehicles attaining an FE of between 8.3km per litre (for cars up to 2,500kg in weight) and 22.2km/L (for those under 800kg). These standards are, however, not mandatory.

Table 19: Policy recommendations for EEVs

Recommendations	Key Stakeholders
Enhance the stringency of EEV classification, and adopt mandatory fuel economy standards to drive emissions reductions from private vehicles.	Government
Enhance transparency of EEV incentives by removing stipulation for 'customised' incentives, issuing standardised guidelines applicable to all producers.	Government, Financial Institutions, Industry
Stimulate, through financial incentives, production of affordable, mass-market HEVs and EVs, and provide consumer-facing incentives (e.g. special loans, tax allowances) for their purchase.	Government, Financial Institutions, Industry

8.2.7 Time-of-use tariffs

The two time-of-use tariffs implemented in Malaysia, the TOUT and later, the ETOUT, are static time-of-use pricing models whick seek to encourage shifts in electricity demand and consumption from peak hours to mid- and off-peak hours. The first iteration, the TOUT, featured two 'time-zones' (peak and off-peak), while the ETOUT introduced a third time-zone.

Table 20: Policy recommendations for time-of-use tariffs

Recommendations	Key Stakeholders
Enhance TOUT/ETOUT by moving towards on dynamic, real-time pricing mechanisms linking retail and wholesale sectors, reflective of real-time matching of supply and demand.	Government, Industry

8.3 Recommendations for prospective mitigation instruments

8.3.1 Mitigation: carbon pricing instruments

The Government of Malaysia's intentions to employ carbon pricing instruments to support the achievement of its climate objectives was established in the 12MP. This emphasis will begin with the conduct of feasibility studies which culminate in the recommendations of 'the most suitable carbon taxation system' as well as the introduction of 'a platform for carbon trading'. It has since been announced that KASA is studying the feasibility of a DETS and has concurrently published guidelines for the VCM, to be established by Bursa Malaysia. In the meantime, it has been reported that the MOF is studying the feasibility of carbon tax

mechanisms[68]. Several considerations pertaining to the design and implementation of CPIs have been described in Chapter 6 and these form the basis of the policy recommendations listed below.

Table 21: Policy recommendations for carbon pricing instruments

Recommendations	Key Stakeholders
Develop public awareness of carbon pricing and its merits from the perspective of economic efficiency and impacts towards climate change	Academia, International Organisations, NGOs, Whole-of-Society
Conduct studies assessing the potential impacts of CPIs on socioeconomic variables, and develop strategies to manage adverse impacts through transitional support mechanisms	Academia, Government, Industry, International Organisations
Facilitate development of MRV capacities, emphasising the need for comprehensive emissions reporting, applicable for carbon pricing and credit-and-trading mechanisms • Extend capacity-building support for monitoring and reporting of emissions across SMEs and MSMEs; • Expand capabilities of listed (and other large) corporations to report Scope 1, 2, and 3 emissions; • Develop a robust emissions verification ecosystem	Government, Academia, Industry, International Organisations, NGOs
Develop laws governing emissions reporting, to complement the development of a national carbon pricing policy.	Government
Establish a domestic carbon price schedule, taking into account the SCC as well as NDCs and other climate commitments. To address economic and political feasibility, adopt a pricing schedule that features a price of carbon that rises gradually over time at predefined rates	Government
Establish a domestic social cost of carbon, based on projections of emissions, climate damages, economic growth, and other relevant variables	Academia, Government
Establish a schedule for sectoral-level absolute emissions caps to support the development of the DETS, based on Malaysia's NDC and long-term net-zero aspirations	Government
Establish the intended scope of CPIs, whether CT or DETS, including developing an understanding of how various CPI options best suit certain sectors, with a view to covering emissions-intensive sectors and eventually, all sectors	Government, Academia

[68] https://www.theedgemarkets.com/article/special-report-12th-malaysia-plan-2021-2025-malaysian-case-carbon-tax

Develop a framework for the transparent redistribution of carbon pricing revenues, including: • Earmarking revenue for reinvestment into climate-related initiatives including funding for economic instruments; • Provision of compensatory rebates or dividends to low-income households and vulnerable industries to support low-carbon transition efforts	Government
Develop a plan for the rationalisation of fossil fuel subsidies to minimise conflicts between CPIs and fossil fuel subsidy programmes, while ensuring protection of the interests of vulnerable/low-income households.	Government
Develop an internal shadow carbon pricing pilot programme to enhance familiarity with CPIs (see box 8.3.1-1).	Government, Industry

Box 8.3.1-1: The Benefits of an Internal Carbon Pricing Pilot Programme

Due to uncertainty on the future directions of CPIs in Malaysia given the nascency of this policy focus, there is value in measures that aid the preparedness of businesses for the new regime. A carbon pricing pilot program would allow for the relevant parties to gain familiarity with the processes involved in incorporating the price of carbon into decisionmaking. There are two major forms of 'internal carbon pricing', as such processes are known. The first is an internal tax or trading scheme which involves the tangible exchange of monetary assets across divisions or departments, or to a centralised pool, within an organisation. The second are shadow pricing mechanism whereby carbon is priced intangibly. This approach does not necessitate the physical transfer of financial assets, but still allows businesses to gain the experience of functioning in the presence of a price on carbon, and conducting the required monitoring, reporting, and verification of emissions. Importantly, it can give businesses an indication of how investment and other decisions might be impacted once the costs of using higher-carbon technology, or adopting higher-carbon processes, are internalised.

For these reasons, internal carbon pricing options have value in acting as stepping stones to the formal, government-led implementation of CPIs. A pilot programme should be enacted through which private sector corporations can voluntarily participate in a shadow carbon pricing pilot programme. As highlighted previously, there are several factors to address in the context of designing a carbon pricing instrument. In the case of the design of firm-level shadow carbon pricing pilot

programme, three prominent features include the type of policy instrument; the carbon price or emissions cap, depending on the type of instrument used; the scope of coverage in terms of sectors; and the scope of coverage in terms of gases.

Instrument Type: Shadow Carbon Pricing

In the case of internal carbon pricing systems, decisions regarding instrument type come down to preferences between tangible and intangible instruments. Tangible instruments can take the form of internal taxes or trading schemes that necessitate the physical transfer of financial assets across various departments or divisions across a company, or even across subsidiary companies under the same parent company, in response to emissions and subsequently the 'tax' or 'allowance' under the internal carbon tax or internal trading scheme. Shadow carbon pricing is the intangible instrument; instead of necessitating the transfer of assets in response to emissions levels, it only requires the costs of emissions to be incorporated into internal decisionmaking mechanisms and processes, financial appraisals, and so on, as an additional variable that may or may not impact decisions, but will factor into the decisionmaking process nonetheless.

Given the nascency of the government's focus on CPIs; the need for greater understanding and capacity-building related to carbon pricing within corporations; and the need to develop and enhance MRV ecosystems and emissions reporting practices, a shadow carbon pricing pilot is preferred over an internal tax or emissions trading mechanism. It would allow corporations to achieve the overarching objective of familiarising themselves with functioning in the presence of a price on carbon, and set up the necessary frameworks for doing so, particularly in the context of monitoring and reporting emissions. Stipulations also need to be made in the context of emissions verification.

Carbon Pricing: A Spectrum of Rates

It is proposed that as wide a range of carbon prices are used, reflecting various rates of carbon based on scientific evidence (i.e. SCC) and international best standards or practices. This approach would allow for the illustration of a wide set of potential impacts of various carbon price levels on internal decisionmaking processes and financial assessments, as well as to offer insights on potential external economic impacts that may arise through a mandated, federal-level

programme. Indeed, such flexibility is an advantage of the use of shadow carbon pricing compared to more tangible internal carbon pricing mechanisms.

Pilot Programme Coverage

Chapter 6 highlighted two important considerations in the identification of the optimal scope or coverage of CPIs, including ensuring sectors or industries covered have significant potential for direct and indirect emissions reductions (i.e. these should be heavy contributors to national emissions), and the presence of low-carbon alternatives to high-carbon incumbent technologies. On this basis it is proposed that the carbon pricing pilot be extended as a voluntary programme for firms within the energy (including electricity and oil and gas), industrial processes, and the financial sectors.

8.3.2 Carbon credit trading and offset mechanisms

Malaysia has committed to becoming a carbon-neutral nation by 'as early as' 2050. Carbon trading and offset mechanisms were identified as one of the key strategies in the 12MP to meet this target. The government is expected to introduce a platform for carbon trading, and is in the process of developing VCM guidelines as well as studying the feasibility of a DETS. However, various factors needs to be considered in the design of a carbon trading mechanism, including the establishment of targets and a 'fair-shares' model defining the contributions and roles of each state. The role of and regulations governing the VCM, including standards, regulating additionality, and carbon sovereignty, also need to be addressed.

Table 22: Policy recommendations for carbon trading and offset mechanisms

Recommendations	Key Stakeholders
Develop a national policy on carbon trading/credits.	Government, Financial Institutions
Develop a fair-share contribution for each state based on terrestrial or marine area/carbon pool capacity.	State and Federal Governments, NGOs
Establish a policy on the status of voluntary carbon markets after the establishment of a domestic emissions trading scheme (particularly if carbon prices are not consistent across mechanisms).	Government, Financial Institutions

Develop public- (i.e. government) and industrial-sector (e.g. consultants, financial sector, brokers, auditors) capacity for carbon trading including assessment, monitoring, reporting, and verification.	Government, Financial Institutions, Industry

8.4 Recommendations for prospective instruments for co-benefits between mitigation, adaptation, and biodiversity

Three prospective economic instruments were identified in Chapter 7 towards the achievement of co-benefits (across climate mitigation, adaptation and biodiversity) and adaptation outcomes. Several considerations pertaining to the design and implementation of these instruments were described and these form the basis of the policy recommendations below.

8.4.1 Ecological fiscal transfers

The Ecological Fiscal Transfer (EFT) refers to mechanism of transferring public revenue between governments within a country based on ecological indicators. In Malaysia, EFT aims to incentivise State government to conserve their Protected Areas and has gathered political mementum and public interests. Under 12MP, government plan to develop mechanisms to strenghten its implementation. While EFT has major potential to address funding gaps for conservation, it has yet to be formalised and institionalised. Several recommendations are provided below to enhance the design and implementation of EFT in Malaysia.

Table 23: Policy recommendations for EFTs

Recommendations	Key Stakeholders
Develop ecological indicators and criteria for EFTs, linked to fiscal-formulas for determining sizes of EFT transfers	Government, Academia, NGOs
Develop a legal structure and regulatory framework for EFTs including grants disbursement methods, performance evaluations, and monitoring and reporting to ensure accountability, transparency, and delivery of desired/optimal outcomes	Government, Financial Institutions, Academia, NGOs
Establish mechanisms to scale-up financing of EFTs by tapping into capital and carbon markets	Government, Financial Institutions

Expand the scope of EFTs beyond existing Protected Areas, and include ecological restoration projects in degraded and threatened ecosystems	Government, NGOs

8.4.2 Payments for ecosystem services

Payments for ecosystem services (PES) refers to variety of arrangements in which the recipients of environmental services pay charges to those whose lands provide these services. While PES has gained lots of interest in Malaysia, it's not implemented at the intended scale with only one successful project. PES was emphasised in the 12th Malaysia Plan to support finance and environmental objective. This emphasis is on establishing the mechanism commensurates with the benefits derived and costs incurred from the services. To support this mechanism, this Study listed down several recommendations to achieve market and price effects.

Table 24: Policy recommendations for PES

Recommendations	Key Stakeholders
Conduct evaluations of the value of ecosystem services nationally by applying suitable systems and frameworks[69] to develop the scientific and economic bases for implementation	Government, Academia Financial Institutions
Develop guidelines for PES, including establishing a legal framework and property rights, enabling institutions, and governance structure	Government, Academia, NGOs
Review and/or introduce appropriate pricing mechanisms (e.g. tariffs and charges) for ecosystem services (e.g. water abstraction charges, conservation fees)	Government, Financial Institutions, NGOs
Prioritise key biodiversity areas[70] and water-stressed region based on latest climate projections for implementation of PES projects	Government, Land Use Planners, Water Utility Companies, Academia, NGOs

[69] System of Environmental-Economic Accounting--Ecosystem Accounting & The Economics of Ecosystems and Biodiversity (TEEB)

[70] Examples such as Central Forest Spine lanscape, ESA and Protected Areas (PA), Production Forest Reserves, other effective area-based conservation measures (OECM) and community-based forests.

Recommendations	Key Stakeholders
Establish a model PES project[71] to showcase multi-stakeholder partnerships and demonstrate business case including the opportunity costs of land-clearing/natural resource extraction against PES scheme.	State and Federal Government, Academia, Industry, NGOs

8.4.3 Climate adaptation financing

Economic and market-based instruments for climate adaptation are currently lacking in Malaysia. The 12MP emphasised the need for disaster-risk financing to manage post-disaster liabilities, through disaster-risk transfer mechanisms. The use of economic and market-based instruments for climate adaptation is new in Malaysia. Furthermore, challenges arise since Malaysia is yet to conduct a comprehensive climate risk assessment to determine suitable economic instruments that can deliver optimal outcomes. Here, we provide recommendations on prospective market-based instruments based on international lessons that can meet climate outcomes and economic efficiency.

Table 25: Policy recommendations for climate risk insurance

Recommendations	Key Stakeholders
Formulate a disaster risk financing strategy, that include market-based instruments, as part of broader adapation and disaster risk management strategy.	Government, Academia, Financial Institutions
Undertake a feasibiliy study for undertaking new taxes and surcharge system for development in climate-prone and high-risk areas.	Government, Academia, Financial Institutions
Develop a climate database platform to analyse, collect and manage disaster and climate risk-related data to provide evidence-based information for risk financing strategy	Government, Academia, Industry
Conduct long term climate risk assessments for vulnerable sectors in Malaysia to understand the cost of climate change to key sectors	Government, Academia
Undertake a feasibility study to evaluate the potential of water pricing schemes across all States in water-stressed river basins.	Government, Academia

[71] The multi-stakeholder of public-private-community PES pilot project in Babagon Catchment, Sabah is a good potential model.

Recommendations	Key Stakeholders
Explore the formulation of a domestic regulatory framework on loss-and-damage related to natural hazards and extreme weather events	Government, Academia, Industry

8.5 Recommendations for international support

To meet the recommendations outlined above, the report highlighted a few areas where international support is either required or would be highly beneficial to support Malaysia's aims to enhance its use of economic instruments. These are listed below.

1. **Technical support for valuation of ecosystem services and the SCC.** One of the major limitations of the design of economic instruments is the lack of available data on the cost and benefits (i.e. marginal cost) of abatement. Internationally, technical cooperation and support on the calculating the values of ecosystem services and the social cost of carbon in the context of Malaysia would assist in setting the baseline for the design of economic instruments.

2. **Policy support for CPIs.** Malaysia's lack of experience in 'first-best' policies require a transfer of knowledge on the experience of other countries in their implementation of existing carbon pricing instruments. This includes experiences in carbon tax systems and emission trading schemes.

3. **Policy support for economic instruments for climate change adaptation.** As the instruments to address adaptation are still in its infancy in Malaysia, a transfer of knowledge based on international experiences on designing isntruments for climate change adaptation would be beneficial. This includes experience on tax an surcharges; risk transfer and insurance; and resource pricing.

4. **Technical and financial support for climate risks assessments.** In relation to climate change adaptation but also calculating the costs due to the loss and damages due to climate change, there is a need for developing climate risks assessments including through downscaled climate models with higher spatial and temporal resolutions.

5. **Technical and financial support for modelling CPI impacts.** Beyond climate modelling, there is also a need for both technical and financial support for developing economic modelling to understand the impacts of CPIs themselves. This includes projected impacts of both the economy and climate-related outcomes.

6. **Capacity-building support for monitoring, reporting and verification.** Effective CPIs will need an effective MRV system. This includes guidance on developing robust reporting mechanisms, improvements in human capital and technical knowledge of carbon pricing; technical expertise of regulators; and the development of laws which pertain to MRV capacities and functions. Technical and financial support for MRV is crucial to ensure effective implementation.

7. **Facilitation of carbon trade on a bilateral basis.** Under Article 6 of the Paris Agreement, as Internationally Transferred Mitigation Outcomes (ITMOs) are allowed as part of meeting each countries NDCs, the opportunities of carbon trade should be explored on a bilateral basis. As highlighted in the report, international demand is a major influencing factor in the creation of economic instruments. In this context, facilitation of carbon trade at the bilateral level would support market creation.

9

Conclusion

Foreign, Commonwealth & Development Office

British High Commission Kuala Lumpur

INSTITUTE OF STRATEGIC & INTERNATIONAL STUDIES (ISIS) MALAYSIA

9 Conclusion

The study provided an overview and assessment of the economic instruments for climate policymaking in Malaysia. It was undertaken at a critical time, as evidenced by international developments as well as an increasing domestic emphasis on climate change (which have given rise to the prospective instruments now under consideration in Malaysia). Internationally, under the auspices of the UNFCCC, the Article 6 of the Paris Agreement included a focus on market mechanisms. At COP26 in Glasgow, countries agreed to implement rules for the transfer of mitigation of emissions between countries, for example, through emission trading schemes. Globally, the role of asset managers and institutional investors have raised the emphasis and impetus of financial and economic instruments to be implemented.

Domestically, and largely in response to international and global trends, Malaysia has indicated its own interest in enhancing economic instruments. The 12MP, setting the development agenda through 2025, highlights carbon pricing, including carbon tax and/or carbon trading schemes, as well as strengthening conservation financing, as prospective instruments.

Economic instruments are not new in Malaysia. However, this study showed that the design of existing instruments have led them to be, for the most part, 'second-best' instruments that focus on technology adoption rather than internalise externalities or meet any specific climate-related objectives. 'First-best' instruments which address market failures such as the negative externality costs of emissions have been absent. This study recommended steps to shift the basis of instrument design from a technology adoption approach towards one that seeks to maximise economic efficiencies and achieve emissions reductions at lowest cost.

Moving forward, even the existing instruments in their narrowed scopes are likely to be more effective in the presence of broad-based economic instruments which deliver significant price and market signals. The planned carbon pricing policy has the potential to be a 'first-best' policy and, from the perspective of climate action, a gamechanger – if designed appropriately. This will require instruments to be carefully designed and, at the same time, manoeuvre the complex bargaining processes between stakeholders and interest groups. In particular, as carbon

increasingly becomes an important, tradeable commodity, the establishment of rules and buy-in from stakeholders will prove to be critical.

More broadly, the instruments will require a credible scientific basis, strong economic rationale (i.e. economic efficiency), the setting of clear climate-related objectives, and be mindful of political processes. While these challenges are extremely complex, it is hoped that this report, the most extensive analysis to date of Malaysia's use of economic instruments to support its climate agenda, has contributed to a way forward in enhancing Malaysia's use of economic instruments.

Still, this study has faced its limitations. A first challenge was the short timeframe for its development; this work has taken a total of five months, and this has disallowed a comprehensive, primary data-driven analysis of the existing climate economic instruments in Malaysia. For this reason, it has relied heavily on available secondary data, existing literature, and the input of stakeholders. Data has been another challenge more broadly, exacerbated by the fact that the cross-cutting nature of climate change means data is held by multiple owners across industries and sectors – where it exists. As this report highlighted, Malaysia still lacks significant capacity for the monitoring and reporting of emissions data that is crucial in the context of climate change. Further, Malaysia is in the process of developing several policies, roadmaps, and indeed instruments catered towards climate change. For instance, a National Climate Change Act; a Long-Term Low Emissions Development Strategy; the NDC Roadmap; the VCM; and DETS are all in the process of development, and all are likely to be consequential in the context of Malaysia's climate actions moving forward. Finally, Covid-19 has continued to pose challenges; for the study team, stakeholder sessions were conducted largely online or through phone calls.

List of References and Recommended Reading

ADB. 2017. *Risk Financing for Rural Climate Resilience in the Greater Mekong Subregion*. Asian Development Bank: Mandaluyong.

Alam, ASAF; Begum, H; Masud, MM; Al-Amin, AQ; & Filho, WL. 2020. *Agriculture Insurance for Disaster Risk Reduction: A Case Study of Malaysia*. International Journal of Disaster Risk Reduction, 47: 1–9.

Anand, R; Coady, D; Mohommad, A; Thakur, V; & Walsh, JP. 2013. *The Fiscal and Welfare Impacts of Reforming Fuel Subsidies in India*. IMF Working Paper. International Monetary Fund: Washington, DC.

Andersen, MS. 1994. *The Use of Economic Instruments for Environmental Policy – A Half-Hearted Affair*. Published in Reports from the Seminar on Instruments to Promote Sustainable Patterns of Consumption and Production, Stockholm 13-14 December 1994

Barbier, EB & Markandya, A. 2012. *A New Blueprint for a Green Economy*. Routledge: Abingdon and New York, NY.

Barde, J. 1994. *Economic Instruments in Environmental Policy: Lessons from the OECD Experience and their Relevance to Developing Economies*. OECD Development Centre Working Papers 92, OECD Publishing.

Bergaoui, J. 2017. *Five Key Lessons from Malaysia's 2014 Subsidy Reform Experience*. Energy Sector Management Assistance Program (ESMAP).

Blackman, A & Harrington, W. 1999. *The Use of Economic Incentives in Developing Countries: Lessons from International Experience with Industrial Air Pollution*. Discussion Paper 99-39, Resources for the Future.

Braeuninger, M; Butzengeiger-Geyer, S; Dlugolecki, A; Hochrainer-Stigler, S; Koehler, M; Linnerooth-Bayer, J; Mechler, R; Michaelowa, A et al. 2011. *Application of Economic Instruments for Adaptation to Climate Change: Final Report*. Contract CLIMA.C.3./ETU/2010/0011, Brussels, Belgium.

Busch, J & Amarjargal, O. 2020. *Authority of Second-tier Governments to Reduce Deforestation in 30 Tropical Countries*. Frontiers in Forests and Global Change, 3:1.

Busch, J; Ring, I; Akullo, M. 2021. *A Global Review of Ecological Fiscal Transfers*. Nature Sustainability, 4: 756–765.

Cheng, C. 2022. *The Socioeconomic Impacts of Covid-19 in Malaysia*. Asia Policy: 29 (1), 35–44.

Cocklin, C & Moon, K. 2009. *Environmental Policy*, in Kobayashi, A (ed) International Encyclopedia of Human Geography (Second Edition, Volume 3).

CPLC. 2016. *What are the Options for Using Carbon Pricing Revenues?* CPLC: Carbon Pricing Leadership Coalition, World Bank Group.

CPLC. 2017. *Report of the High-Level Commission on Carbon Prices*. High-Level Commission on Carbon Prices, Carbon Pricing Leadership Coalition. World Bank: Washington, DC.

Davidson, K; Nguyêt, PTM: Gunawan, N; & Boulle, B. 2021. *Green Infrastructure Investment Opportunities: Malaysia, 2020 Report*. Climate Bonds Initiative: London.

Droste, N; Ring, I; Santos, R; & Kettunen, M. 2018. *Ecological Fiscal Transfers in Europe – Evidence-based Design Options for a Transnational Scheme*. Ecological Economics, 147: 373–382.

European Commission. 2021. *Better Regulation: Guidelines and Toolbox*. EC: Brussels.

Fabra, N & Reguant, M. 2014. *Pass-Through of Emissions Costs in Electricity*

Markets. American Economic Review, American Economic Association: 104 (9), 2872-2899.

Filatova, T. 2014. *Market-based Instruments for Flood Risk Management: A Review of Theory, Practice and Perspectives for Climate Adaptation Policy*. Environmental Science & Policy, 37: 227–242.

FAO. 2001. *State of the World's Forests 2001*. FAO: Food and Agriculture Organization of the United Nation.

Haas, P. 2004. *When does power listen to truth? A constructivist approach to the policy process*. Journal of European Public Policy, 11(4), 569–592.

Haas, P. 2004. *Science Policy For Multilateral Environmental Governance*, chapter in Emerging Forces in Environmental Governance, eds. Kanie, N; & Hass, P. United Nations University Press: Hong Kong.

Hezri, AA. 2016. *The Sustainability Shift: Refashioning Malaysia's Future*. In Areca Books.

IAWG-SCC. 2010. *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*. Interagency Working Group on Social Cost of Carbon: United States Government.

IAWG-SCGG. 2021. *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under Executive Order 13990*. Interagency Working Group on Social Cost of Greenhouse Gases: United States Government.

IISD. 2013. *A Citizen's Guide to Energy Subsidies in Malaysia*. The International Institute for Sustainable Development, Global Subsidies Initiative: Geneva.

IMF/OECD. 2021. *Tax Policy and Climate Change: IMF/OECD Report for the G20 Finance Ministers and Central Bank Governors, April 2021, Italy*.

International Organisation of Standardization. 2018. *ISO 14064-1:2018, Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. ISO: Geneva.

IRENA. 2019. *Time-Of-Use Tariffs: Innovation Landscape Brief*. International Renewable Energy Agency: Abu Dhabi.

Jha, S; Zhou, A; Quising, P; Wooders, P; Beaton, C; Laan, T; Bassi, A; & Lang, K. 2016. *Fossil Fuel Subsidies in Asia: Trends, Impacts, and Reforms – Integrative Report*. Asian Development Bank: Mandaluyong. Available under a CC BY 3.0 IGO License.

Joshi, D. 2019. *Using Carbon Pricing to Support Sustainable Development in Malaysia*. Penang Institute: Penang.

Kanie, N, & Haas, P. 2004. *Emerging Forces in Environmental Governance* (N. Kanie & P. M. Haas, eds.). United Nations University Press: Hong Kong.

Keohane, NO & Olmstead, SM. 2016. *Markets and The Environment (Second Edition)*. Island Press: Washington, Covelo and London.

KASA. 2020. *Malaysia: Third Biennial Update Report to the UNFCCC*. KASA: Ministry of Environment and Water.

KeTTHA. 2009a. *National Green Technology Policy*. KeTTHA: Ministry of Energy, Green Technology, and Water.

KeTTHA. 2009. *National Renewable Energy Policy and Action Plan*. KeTTHA: Ministry of Energy, Green Technology, and Water.

Lackovic, M & Ruiz-Cabrero, J. 2021. *Growing champions: Malaysia's rooftop estate offers valuable solar potential*. The Edge Malaysia.

Levy, DL & Herst, R. 2018. *Financing Climate Resilience: Mobilizing Resources and Incentives to Protect Boston from Climate Risks*. Sustainable Solutions Lab, University of Massachusetts Boston: Boston, MA.

McAneney, J; Crompton, R; McAneney, D; Musulin, R; Walker, G; & Pielke Jr, R. 2013. *Market-based Mechanisms for Climate Change Adaptation: Assessing the Potential for and Limits to Insurance and Market-based Mechanisms for Encouraging Climate Change Adaptation*. National Climate Change Adaptation Research Facility: Gold Coast.

Metcalf, G & Stock, J. 2015. *The Role of Integrated Assessment Models in Climate Policy: A User's Guide and Assessment*. Discussion Paper ES 2015-68. Harvard Project on Climate Agreements, Belfer Center: Cambridge, MA.

MESTECC. 2018. *Third National Communication and Second Biennial Update Report to the UNFCCC*. MESTECC: Ministry of Energy Science, Technology, Environment and Climate Change.

MESTECC & UNDP. 2018. *Demand Side Management Preliminary Study*. MESTECC: Ministry of Energy Science, Technology, Environment and Climate Change. UNDP: United Nations Development Programme.

MGTC. 2020. *Greening the Future: Annual Report 2019*. MGTC: Malaysian Green Technology Corporation.

MGTC. 2021. *Energising Sustainability: Annual Report 2020*. MGTC: Malaysian Green Technology Corporation.

Millennium Ecosystem Assessment. 2015. *Ecosystems Human Well-Being: Synthesis*. Island Press: Washington, DC.

MNRE. 2009. *National Policy on Climate Change*. MNRE: Ministry of Natural Resources and Environment.

Muro, M & Saha, D. 2016. *Rooftop solar: net metering is a net benefit*. The Brookings Institution: Washington, DC.

Noraini, OC & Khairul, K. 2017. *Issues and Challenges in Disaster Risk Management in Malaysia: From the Perspective of Agencies*. Conference: Persidangan Geografi Dan Alam Sekitar Kali Ke-6 (PKGAS 2017). 26 & 27 September 2017, Sultan Idris Education University (UPSI).

OECD. 1994. *Managing the Environment: The Role of Economic Instruments*. OECD Publications and Information Center: Washington, DC.

OECD. 2015. *Disaster Risk Financing: A Global Survey of Practices and Challenges*. OECD Publishing: Paris.

Pal, Leslie. 2014. *Beyond Policy Analysis – Public Issue Management in Turbulent Times, Fifth Edition*. Nelson Education: Toronto.

Panayotou, T. 1994. *Economic instruments for environmental management and sustainable development*. United Nations Environment Programme's Consultative Expert Group Meeting, 1–72

Pauwelyn, J. 2012. *Carbon Leakage Measures and Border Tax Adjustments Under WTO Law*. Available at SSRN: https://ssrn.com/abstract=2026879 or http://dx.doi.org/10.2139/ssrn.2026879

Pérez, CI. 2006. *Payment for Environmental Services: What Can We Learn from Costa Rica?* In *Strategies and Financial Mechanisms For Sustainable Use And Conservation Of Forests: Experiences From Latin America And Asia*, Proceedings of an Inter-Regional Workshop, Chiang Mai, Thailand, 20-22 November 2006 (eds. S. Appanah, E. Mansur and R. Krezdorn)

Rao, T; & Mustapa, SI. 2021. *A Review of Climate Economic Models in Malaysia*. Sustainability, 13(1): 325.

Rasiah, R; Chenayah, S; & Al-Amin, A.Q. 2015. *Prioritizing Climate Change Mitigation: An Assessment Using Malaysia to Reduce Carbon Emissions in Future*. Environmental Science and Policy, 50: 24-33.

Rasiah, R; Ahmed, A; Chenayah, S; & Al-Amin, AQ. 2016. *Climate Change Mitigation: Comparative Assessment of Malaysian and ASEAN Scenarios*. Environmental Science and Pollution Research, 24(3): 2632-2642.

Rietbergen-Mcracken, J; & Abaza, H. 2000. *Economic Instruments for Environmental Management: A Worldwide Compendium of Case Studies*. In United Nations Environment Programme. Earthscan: London.

Ring, I & Barton, DN. 2015. *Economic Instruments in Policy Mixes for Biodiversity Conservation and Ecosystem Governance*. In *Handbook of Ecological Economics* (eds Martínez-Alier, J & Muradian, R), 413–449.

Roslan, A; Shaharuddin, NA; & Yahya, NC. 2019. *Determinants of the Intention to Purchase Flood Cover: An Empirical Evidence From a Flood-Prone Area in Malaysia*. Journal of Entrepreneurship and Business, 7(1): 60–68

Sanchez, G; Pfaff, A; Robalino, J; & Boomhower, J. 2007. *Costa Rica's Payment for Environmental Services Program: Intention, Implementation and Impact*. Conservation Biology, 21(5): 1165–1173

Sarkar, MSK; Al-Amin, AQ; & Filho, WL. 2019. *Revisiting the social cost of carbon after INDC implementation in Malaysia: 2050*. Environmental Science and Pollution Research, 26, 6000–6013.

Schröter-Schlaack, C et al. 2014. *Intergovernmental Fiscal Transfers to Support Local Conservation Action in Europe*. De Gruyter, 58 (1): 98–114.

SEDA. 2021. *Annual Report 2020*. Sustainable Energy Development Authority: Putrajaya, Government of Malaysia.

Shah, S; Mustaffa, Z; & Wan Yusof, K. 2017. *Disasters Worldwide and Floods in the Malaysian Region: A Brief Review*. Indian Journal of Science and Technology, 10.

Stavins, R. 2019. *Carbon Taxes vs Cap and Trade: Theory and Practice*. Discussion Paper ES 2019-9. Harvard Project on Climate Agreements, Belfer Center: Cambridge, MA.

Suruhanjaya Tenaga. 2016. *Submission of Bids – Large Scale Solar (LSS) Photovoltaic Plant for 2017/2018*. Suruhanjaya Tenaga: Putrajaya.

Suruhanjaya Tenaga. 2017. *Submission of Bids – Large Scale Solar (LSS) Photovoltaic Plant for 2019/2020*. Suruhanjaya Tenaga: Putrajaya.

Suruhanjaya Tenaga. 2019. *Submission of Bids – Large Scale Solar (LSS) Photovoltaic Plant for Commissioning in 2021*. Suruhanjaya Tenaga: Putrajaya.

Suruhanjaya Tenaga. 2021a. *Submission of Bids – Large Scale Solar (LSS) Photovoltaic Plant for Commissioning in 2022/2023*. Suruhanjaya Tenaga: Putrajaya.

Suruhanjaya Tenaga. 2021b. *Malaysia Energy Statistics Handbook 2020*. Suruhanjaya Tenaga: Putrajaya.

Susskind, L; Chun, J; Goldberg, S; Gordon, JA; Smith, G; & Zaerpoor, Y. 2020. *Breaking Out of Carbon Lock-In: Malaysia's Path to Decarbonization*. Frontiers in Built Environment, 6

UNDP. 2021. *A Guide to Carbon Pricing and Fossil Fuel Subsidy Reform*. United Nations Development Programme: New York, NY.

UNU-EHS. 2021. *Climate and Disaster Risk Financing Instruments: An Overview*. United Nations University Institute for Environment and Human Security: Bonn.

Verma, M; Negandhi, D; Mehra, S; Singh, R; Kumar, A; & Kumar, R. 2014. *High Conservation Value Forests: An Instrument for Effective Forest Fiscal Federalism in India*. Indian Institute of Forest Management: Bhopal.

Weitzman, M. 2017. *On a World Climate Assembly and the Social Cost of Carbon*. Economica, 84 (336): 559-586

World Bank. 2017. *Report of the High-Level Commission on Carbon Prices*. High-Level Commission on Carbon Prices, Carbon Pricing Leadership Coalition. World Bank: Washington, D.C., USA.

World Bank. 2021a. *State and Trends of Carbon Pricing 2021*. World Bank: Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO

World Bank. 2021b. *Weathering the Surge: Malaysia Economic Monitor (June)*. World Bank Group: Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO

Appendix

9.1 List of stakeholder consultations

Table 26: List of Stakeholder Consultations

#	Agency/Ministry/Organisation Consulted	Individual(s) Consulted
1	Ministry of Environment and Water	Anonymous
2	Ministry of Energy and Natural Resources	Anonymous
3	Khazanah Nasional	Anonymous
4	Sabah State Government	Anonymous
5	Malaysia Green Technology Corporation	Dr Gary William Theseira & Anonymous
6	Nature-Based Solutions Sdn Bhd	Anonymous
7	Climate Governance Malaysia	Anonymous
8	CEO Action Network	Anonymous
9	Pacos Trust	Anonymous
10	Bursa Malaysia	Anonymous
11	World Wildlife Fund (WWF) Malaysia	Anonymous
13	Malaysian Institute of Economic Research	Dr Hezri Adnan
14	United Nations Global Compact	Anonymous
15	Klima Action Malaysia	Ms Ili Nadiah Dzulfakar
16	Petroliam Nasional Berhad (Petronas)	Anonymous
17	Forever Sabah	Cynthia Ong
18	Universiti Kolej Yayasan Sabah	Anonymous
19	Sunway University	Anonymous