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Potential Harmonisation of Emission Trading Systems (ETS): China and Southeast Asia

Regional Project Energy Security and Climate Change Asia-Pacific (RECAP)

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Foreword

The implementation of the Paris Climate Agreement gains more and more importance with the announcement of CO_2 neutrality targets by numerous countries around the world. Even if a precise control and monitoring of these announcements has to be taken place to ensure they do not remain only an announcement, the development by itself is quit promising. The serious changes in the global climate do not allow “business as usual“.

This development is accompanied by the entry of climate and energy sciences wording into the public. Decarbonisation, greenhouse gases and CO_2 sinks are terms that are appearing more and more frequently in public. This also includes emissions trading or, more generally, CO_2 pricing. Political control of CO_2 emissions is today an important tool used by more and more governments around the world to achieve their respective climate goals. While emissions trading has already gone through several trading phases in Europe, many countries in Asia are still in the exploration phase. The respective design can be very different.

A particularly important development in this context is the planned national emissions trading in China, which is taking more and more shape and already includes more CO_2 emissions than its European counterpart. At the same time, it turns out that there are many countries in Southeast Asia that are also working on the introduction of emissions trading systems. The space for the free emission of CO_2 becomes smaller as a result. At the same time, the question of the extent to which CO_2 pricing could be harmonized between countries, especially with emissions trading systems, is gaining in importance. The very different approaches lead to goods being priced differently. Harmonizing the various approaches could reduce the costs of carbon pricing and set a uniform framework.

The following study aims to investigate this question using the new national emissions trading scheme in China and selected countries in Southeast Asia that are about to develop carbon pricing. I wish you an interesting read.

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Executive Summary

Emissions trading systems (ETSs) are becoming an ever more important tool to reduce carbon emission to achieve the goals of the Paris Agreement. China, as the world's largest emitter, has seen significant developments of its ETS in the past years and its ETS development is expected to influence climate action around the world, particularly for its neighboring countries. Against this backdrop, this report analyses whether China's climate ambition and ETS development can drive regional harmonisation of ETSs (e.g. in Southeast Asia) and how China's ETS would be possibly linked with other countries, in regard to political alignment as well as technical design.

By deriving success factors of ETS harmonisation from successful and unsuccessful ETS harmonisation case studies from Norway and the EU, Switzerland and the EU, Quebec and California and the Regional Greenhouse Gas Initiative (RGGI), as well as from the literature, this report develops a model for analysing ETS harmonisation in Southeast Asia. The factors that are analysed include domestic environmental, political, and economical motivation of respective jurisdictions, the relationship between jurisdictions, as well as ETS robustness, and system design of respective ETSs.

While currently ETS developments in the selected countries of China, Vietnam, Indonesia, Thailand, and the Philippines is still ongoing, the study finds several important parallels, but also relevant divergence in ETS developments in these jurisdictions, making future harmonisation challenging: China's national ETS is expected to be officially launched in 2021, while Vietnam recently adopted a revised law and created a mandate for ETS implementation; Indonesia and Thailand are still discussing and drafting ETS legislation, while ETS development in the Philippines needs further acceleration.

The results show that due to differentiated mitigation goals and different status of ETS development, the potential for harmonising the selected countries with China's national ETS over the next 5 years is limited. In contrast, the design of the ETS in Vietnam, Indonesia, and Thailand make them more likely to be linked to each other, based on similar reduction ambitions and ETS development status.

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1 Introduction

One hundred and ninety-five countries have pledged to take climate actions and reduce their carbon emissions as signatories of Paris Agreement since 2015.[1] Yet, emissions in many countries continue to accelerate, despite the increasing evidence of the threats of climate change to our societies.

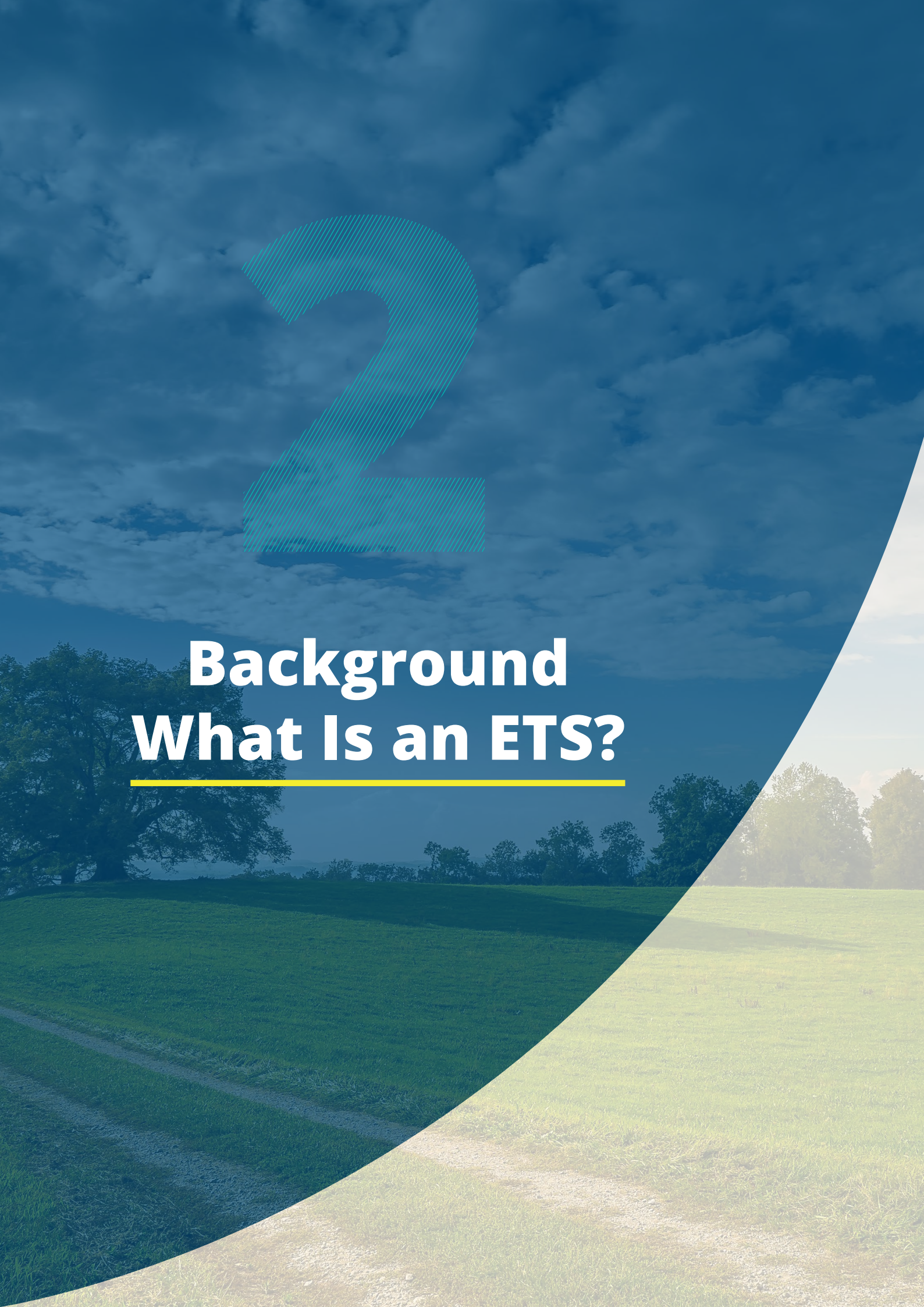
One important tool to reduce carbon emission is to put a price on carbon. A price on carbon would make it more expensive for companies to emit carbon emissions. Carbon taxes, carbon crediting mechanisms, emissions trading systems (ETSs), and results-based climate finance (RBCF) constitute the universe of carbon pricing mechanisms. Within an ETS, a market for carbon allowances is established that allows for companies with low emissions to sell their excess allowances to companies with high emissions surpassing their quotas. According to the World Bank, globally, 64 carbon pricing initiatives are already in operation (29 ETSs and 35 carbon taxes) in 2021, that cover about 11.65 gigatons CO_2e, or 21.5 per cent of global Greenhouse gas (GHG) emissions in 2021 — an increase of 6.4 per cent from 2020, which is largely due to the establishment of China's national carbon market.[2]

China, as the world's largest emitter, has seen significant developments of its ETS in the past years. China has been piloting emission trading schemes since 2013 in eight provinces/cities (e.g. Beijing, Shenzhen, Tianjin, Guangdong). In 2015 China announced the goal of a national-level ETS by 2017, at which time China launched a three-step plan for rolling out a national-level ETS by 2020. After the announcement by President Xi Jinping in September 2020, China's climate ambitions were given a new impetus: in October 2020, six Chinese ministries issued new climate finance guidance that raised China's ambitions for the launch of its national ETS,[3] by clearly identifying ETS as a crucial tool for incentivising climate investment. One month later, in November 2020, the MEE released three successive policy documents regulating carbon emissions trading, registration and settlement, and allowance allocation, again indicating the rollout of the national ETS. In December 2020 the framework for the ETS launch was published and further specified in the coming months. The goal was to start trading on the national carbon market in June 2021. In May 2021, the MEE published rules governing registration, trading, and settlement of ETS allowances for it national ETS. Albeit the effective date was not specified, these rules will be effective before the official launch of nationwide ETS in June 2021, and currently ongoing pilot programmes will be transitioned into the nationwide ETS.[4]

Due to China's size, its ETS is expected to influence climate action around the world, and particularly within its neighboring countries. Already an ever-increasing number of countries in China's vicinity and in China's Belt and Road Initiative (BRI) have implemented or considered to implement ETSs, such as Kazakhstan, Vietnam, Indonesia, Thailand, and the Philippines. By further integrating the economies, e.g. through the establishment of the Regional Comprehensive Economic Partnership (RCEP) on November 15th that formed a form of free trade zone among 15 countries including China, Australia, Japan, Korea, New Zealand, and 10 other ASEAN countries, it can be expected that strong economic relationships can enable further integration of ETSs.

Against this backdrop, this report analyses whether China's climate ambition and newly established ETS can drive regional harmonisation of ETSs (e.g. in Southeast Asia) and how China's ETS would be possibly linked with other countries, in regard to political alignment as well as technical design.

To analyse such harmonisation potentials, the report first provides a background on emissions trading systems (ETSs), which is followed by an analysis of successful (and unsuccessful) cases of ETS harmonisation in Norway/EU, Switzerland/EU, Quebec/California and RGGI in the third chapter. This provides the data for an analysis of the essential aspects of ETSs in the fourth chapter. In the fifth chapter, current developments of ETSs in China, Vietnam, Indonesia, Thailand, and the Philippines is analysed to evaluate their potential for harmonisation in the sixth chapter. Finally, this report will draw a conclusion about the possibility of regional ETS harmonisation in the last chapter.



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Background
What Is an ETS?

An emissions trading system (ETS) is a carbon pricing mechanism that puts a price on carbon emission. The World Bank defines an ETS as a policy instrument where covered entities face compliance obligations for their GHG emissions and can trade emission units — that is either buy emission units to remain within their obligations or sell any unused allowances. Commonly referred to as a carbon market, an ETS can also be understood as a market where permits for carbon emission (allowances) and contributions to carbon emission reduction (credits) can be traded and priced.

An ETS is defined by different elements:

- **Allowance:** a permit to emit one ton of carbon dioxide equivalent during a specified period, which shall be used or traded for the purposes of meeting required compliance obligations of certain ETS
- **Sector coverage:** sectors regulated under an ETS and for which allowances have been issued (e.g. fossil fuel energy, whole energy, transport, aviation)
- **Gas coverage:** greenhouse gas emissions covered by an ETS (e.g. CO_2, N_2O)
- **Legislative institution:** the competent authorities responsible for ETS legislation and regulation
- **Cap:** the total amount of covered gas permitted to be emitted by covered sectors in a jurisdiction for a time period
- **MRV:** a system for monitoring, reporting and verification of emissions
- **Allocation:** the way of allowances being distributed to covered entities, including free allocation and auctioning. For linked ETSs, allocation can be implemented either separately or jointly

To set a price for carbon emissions via an ETS, different systems have emerged at national and subnational levels. The two most important systems are cap-and-trade and baseline-and-credit:[5]

In a cap-and-trade system, an upper limit (a cap) is set for the total amount of certain greenhouse gases that can be emitted by installations covered by the system. The emissions units are either auctioned or allocated for free to regulated emitters. Regulated emitters must surrender adequate numbers of emissions units (allowances) to cover its emissions by the end of a compliance period to meet their obligations. If they fail to surrender enough allowances, heavy fines could be imposed on them. Depending on the cap-and-trade system, a limited amount of credits from international markets may be bought and used to offset obligations.

In a baseline-and-credit system, baseline levels are set for regulated emitters. Emitters with emissions above their baseline need to surrender credits for emission above their baseline. Emitters that have reduced their emissions below their baseline receive credits for these emission reductions, which they can sell to other emitters.

Most existing ETSs, like the European Union (EU) ETS, work on the cap-and-trade principle. Few ETSs, such as British Columbia, use the baseline-and-credit systems.

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ETS Harmonization

For an ETS to be efficient and successful, the size of the system and traded allowances matter as larger volumes allow for a more efficient and liquid market. In other words, if a national or even subnational ETS is too small to attract sufficient numbers of issuers and investors, it lacks the necessary liquidity of an efficient market to either set an optimal price of carbon, or does not allow investors to seamlessly buy and sell allowances due to lack of liquidity in the market.

To circumvent this problem, a number of jurisdictions have embarked on harmonising their ETSs across borders and thus create bigger ETSs: under specific circumstances, ETSs in different jurisdictions can be linked to create larger, more efficient, and more liquid markets for trading. Through linkage of ETSs, compliance instruments (allowances or credits) could become more available and more efficient as different regions can offer different mitigating pathways. This is also in line with Article 6 of the Paris Agreement, that promotes international cooperation of Parties in the implementation of their respective emission reduction targets within their nationally determined contributions (NDCs).

However, linking ETSs is complex, e.g., due to different system designs in regard to the allocation of allowances, the use of carbon credits, or the inclusion of different sectors/emitters and types of emissions into an ETS. To understand how harmonisation and linking of ETSs can be successful, the following sections analyse four cases of ETS harmonisation to draw lessons from successful or failed ETS harmonisation.

3.1 Norway and the EU ETS

Norway and the EU ETS harmonised their ETSs in 2009. With 11 years of history, it has become one of the more established harmonised ETSs.

The EU ETS was established in 2005 under EU Directive 2003/87/EC and became the world's first ETS. The EU ETS applies to all EU countries.

Norway (and similarly Iceland and Liechtenstein), however, is not an EU-member. Rather, it is integrated into the EU economy through the European Economic Area (EEA) signed in 1994. Under the EEA, the EU's single market is extended to Member States of the European Free Trade Association (EFTA). With the goal for Norway to integrate its ETS with that of the EU, Norway started designing its ETS to be compatible with the EU ETS. Similar to the EU ETS, Norway's ETS implementation was designed in three phases with gradual linking with the EU ETS.

Phase I (2005–07): trading between the two markets was one-way,[6] meaning that Norwegian installations could purchase European Union Allowances (EUAs) from the EU ETS, but EU installations could not purchase Norwegian allowances. So, the harmonisation between the two systems was not completed. In 2007, Norway amended its Greenhouse Gas Emissions Trading Act by extending the scope of the trading system and defined the framework for the allocation of allowances. This made the law more aligned with Directive 2003/87/EC.[7] In October 2007, the Joint Committee of EEA agreed to incorporate EU Directive 2003/87/EC (which established the EU ETS) into the Agreement of the EEA, which made the EU ETS naturally apply to Norway.

Phase II (2008–12): The Norwegian and the EU ETS systems were officially linked at the beginning of the second phase. In the second phase of the EU ETS, participating EU Member States should decide on the allocation of their emission allowances by composing a national allocation plan (NAP), and submit it to and have it adopted by the European Commission. Similarly, to join the EU ETS, EFTA states should also submit their NAPs to the EFTA Surveillance Authority (ESA). In 2008, Norway submitted the Norwegian ETS NAP to the ESA, amended several aspects of the NAP including allocation methodology, as required by the ESA,[8] and finally had its NAP approved in 2009. By becoming part of the EU ETS, Norway broadened the scheme to cover nearly 40 per cent of its GHG emissions, from only about eleven per cent in the first phase.

Phase III (2013–20): Starting from the third phase, Norway's ETS and the EU ETS were fully integrated. Instead of submitting an NAP for each country, the allocation methodology was harmonised across Europe. The aviation sector was also included in the scope of the ETS, expanding Norwegian's emissions coverage rate to about 50 per cent.[9]

Table 3-1 Key Information about the ETS harmonisation of Norway and the EU

	Norway	EU ETS
ETS launch year	2005	2005
Year of official linking	2009	
Type of allowances used	EUAs	
Sector coverage	Power and heat generation, energy-intensive industry sectors, commercial aviation	
Gas coverage	CO_2, N_2O, PFCs	
Legislative institution	The European Commission	
Cap in 2021	17 $MtCO_2e$/year (estimated)[10]	1,610 $MtCO_2e$/year[11]
MRV	Less rigorous	Rigorous
Allocation	Joint free allocation[12]	
Auction	Joint auctions[13]	

Important success factors for the Norwegian and EU ETS harmonisation were close political and economic relations, as well as Norway's long-term contribution to addressing climate change.

- **Political and economic relationship:** Under the EEA agreement, Norway was required to comply with EU laws relevant to the four freedoms (free movement of goods, capital, services, and people), along with those pertinent to flanking policies (i.e., transport, competition, social policy, consumer protection, environment, statistics, and company law).[14] As a result, the agreement has allowed Norway to fully participate in the European Single Market and develop strong economic relations with EU countries. With its trade dominated by the EU, Norway is highly incentivised and also equipped to link its ETS to the EU ETS to achieve more market liquidity.
- **Climate ambition:** Norway has pursued an active climate change policy since the late 1980s. Before setting up its national carbon market, Norway's first attempt in emissions reduction policy was a carbon tax implemented in 1991, which covered about 69 per cent of the CO_2 emissions in 2005. In 2001, Norway first released a white paper on ETS implementation. After that, the Greenhouse Gas Emissions Trading Act was released in 2004 and entered into force in 2005, which formed the legislative foundation for its ETS development.

3.2 Switzerland and the EU ETS

Different to Norway, Switzerland is not a member state of the EEA and thus the harmonisation process of Switzerland's and the EU's ETSs exhibits different characteristics.

Switzerland's climate policy has been based on the Federal Act on the Reduction of CO_2 Emissions ("CO_2 Act") released in 2000. Together with the CO_2 tax on fossil heating and process fuels, the Swiss ETS was introduced in 2008 as an exemption programme of the tax with a 5-year voluntary phase. Since 2010, the EU and Switzerland have been negotiating on issues regarding the harmonisation of the two systems, which led to revisions in 2011 and 2013 to the Swiss ETS to improve the prospect of linking it with the EU ETS. Due to political tensions between Switzerland and the EU as a result of the Swiss referendum over limiting immigration into the country, the negotiations were suspended in 2014. It took five more years until several revisions regarding terms, exemptions, sector coverage, registry, and so on were further made to the "CO_2 Act" and the "CO_2 Ordinance"[15] to make the two systems compatible.[16] In January 2020, the Swiss ETS was finally linked with the EU ETS.

When comparing Norway's ETS harmonisation efforts from the previous section with Switzerland's (which took 10 more years for ETS integration), several differences can be found:

- Switzerland and the EU had significant differences in climate policies, particularly in regard to CO_2 emission reduction ambitions for the year 2030. While Switzerland committed to reducing its GHG emissions by 50 per cent by 2030 compared to 1990 levels,[17] of which at least 30 per cent must be achieved by Switzerland itself,[18] the EU and its Member States were committed to a binding target of an at least 40 per cent domestic reduction by 2030 compared to 1990.[19]
- Switzerland was reluctant to include the aviation sector in its ETS. The linkage between the EU and Switzerland expanded the Swiss ETS coverage to civil aviation and fossil-thermal power plants (although Switzerland did not operate fossil fuel power plants).

However, despite the challenges above, the Swiss ETS was still successfully linked to the EU ETS at the beginning of 2020. The main success factors contributing to the linking include their respective strong climate ambitions, close relationship between Switzerland and the EU, as well as adequate maturity of the two systems:

- **Climate ambition:** Both Switzerland and the EU have issued climate laws for several decades and acted proactively in combating climate change. Although there were differences regarding their respective climate goal settings, which may lead to different levels of emergency being set as the threshold to take measures for emissions reduction, these differences could be negotiated.
- **Close relationship:** Although Switzerland is not a Member State of the EU, it is geographically inside the EU and politically associated with the EU through a series of bilateral treaties with deep ties and experiences in cooperation.
- **Adequate systematic** maturity: While the EU ETS started in 2005, the Swiss ETS entered its voluntary phase in 2008 and its mandatory phase in 2013, allowing for sufficient experiences in trading and allocation of emission allowances.
- **Other benefits:** ETS linking was seen as beneficial to both sides. For the EU ETS, the linking could expand its market scale, avoid carbon leakage, create political momentum with Switzerland in regard to emissions mitigation, and signal its potential for linking with other jurisdictions; for Switzerland, the linking could provide its domestic companies with more reduction options, increase its carbon prices to be closer to those of EU allowances, and benefit from the competitive conditions of the EU ETS.

Table 3-2 Key Information about the ETS harmonisation of Switzerland and the EU

	Switzerland	EU ETS
ETS launch year	2008	2005
Year of official linking	2020	
Type of allowances used	EUAs and Swiss allowances	
Sector coverage	Power and heat generation, energy-intensive industry sectors, commercial aviation	
Gas coverage	CO_2, N_2O, PFCs	
Legislative institution	Swiss Federal Office of the Environment	The European Commission
Cap in 2021[20]	4.79 $MtCO_2e$ (overall) 1.27 $MtCO_2e$ (aviation)[21]	1,610 $MtCO_2e$[22]
MRV	Less rigorous	Rigorous
Allocation	Joint free allocation	
Auction	Separate auctions	

3.3 Quebec and California (WCI)

Besides the ETS harmonisation in Europe, various ETSs in North America have undergone harmonisation. Compared to the inclusion of sovereign countries in the EU ETS, ETS harmonisation in North America is driven at the sub-national level. One reason is the higher climate ambitions of several states/provinces compared to the federal government and due to the para-diplomacy of Canadian provinces (and to some extent of U.S. states).[23]

The major harmonised ETS in North America is under the Western Climate Initiative (WCI). The WCI is a non-profit organisation initiated by five U.S. West Coastal states in 2007, aiming at developing a multi-sector, market-based programme to reduce GHG emissions.[24] By 2008, WCI had expanded to include two more U.S. states and five Canadian provinces, including Quebec.

In July 2010, the Design for the WCI Regional Programme was released under the cooperation of all 11 jurisdictions. Both California and Quebec introduced their cap-and-trade system for GHG emissions in 2012 and made amendments to their regulations to accept allowances and offsets in each other's jurisdictions. In 2013, California and Quebec signed the agreement on linking their systems, and on 1 January 2014, the two systems were officially linked.

The major concern in the process of linkage for California and Quebec was their different commitment levels in regard to transparency and enforcement. To make sure that both sides share the same responsibilities and benefits, they worked in close collaboration on the establishment of an MRV system as well as joint registry and joint consultant committee.

In January 2018, the Canadian province of Ontario joined the Quebec-California carbon market, but shortly after withdrew in mid-2018. Similar to Quebec, Ontario is also a member state of the WCI. However, due to the decision of the new premier, Doug Ford of Ontario, the province was decoupled from the trading programme quickly,[25] showing the importance of political support for international ETS harmonisation and integration.

Among the factors that allowed for the Quebec-and-California ETS linking to succeed, several stand out:

- **Climate ambition:** California has set significant climate reduction ambitions by releasing energy efficiency initiatives, e.g., in the Clean Energy and Pollution Reduction Act of 2015 (Senate Bill 350), the government called for a doubling in energy efficiency by 2030 compared to 1990.[26] In 2016 and 2018, California set its 2030 target of 40 per cent emissions reductions from 1990 levels and set its 2045 goal of statewide carbon neutrality, demonstrating its firm resolution in the battle against climate change.[27] Similarly, Quebec also set an ambitious 2030 target of reducing GHG emissions by 37.5 per cent compared with 1990 levels and a carbon neutrality goal by 2050.[28] All of their ambitious climate goals motivated them to look for a more effective measure of emissions reduction by ETS linking.
- **Relationship under the WCI:** California and Quebec had agreed on adopting a common approach toward addressing climate change under the WCI.
- **ETS design:** From 2007 to 2010, the WCI partners developed a GHG emissions cap-and-trade programme and released the Design for the WCI Regional Program, setting out the basic design elements for the WCI's cap-and-trade system. Based on the design, Quebec and California launched their respective ETSs and had them linked subsequently.[29]

Table 3-3 Key Information about the ETS harmonisation of Quebec and California

	Quebec	California
ETS launch year	2012	2012
Year of official linking	2014	
Type of allowances used	A single type of compliance unit	
Sector coverage	Electricity, industry, distribution and importation of fuels	
Gas coverage	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	
Legislative institution	The WCI board	
	Ministry of the Environment and the Fight Against Climate Change	California Air Resources Board
Cap in 2021	55.3 $MtCO_2e$[30]	320.8 $MtCO_2e$[31]
MRV	Similar	
Allocation	Separate free allocation	
Auction	Joint auctions[32]	

3.4 RGGI

Similar to the harmonised Quebec and California carbon market, the Regional Greenhouse Gas Initiative (RGGI) is a linked carbon market consisting of subnational jurisdictions. It is a regional programme among 11 states in the northeast of the United States. The 11 participating states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia (New Jersey withdrew from the programme in 2011 to rejoin it in January 2020).

The RGGI aims to cap and reduce GHG emissions from the power sector and forms a model for a market-based mandatory programme. The cornerstones for the RGGI's development are the "2005 RGGI Memorandum of Understanding" (MoU), which announced states' agreement to implement the RGGI and the "2006 RGGI Model Rule", which helps establish the individual CO_2 budget trading programmes. Based on the Model Rule, each state's CO_2 budget trading programme sets a limit on the amount of CO_2 emissions for the power sector through independent regulations, issues CO_2 allowances, and sells the allowances through the quarterly held regional auctions.[33] The RGGI cap is therefore comprised of all the allowances issued by all the RGGI states.[34] In terms of the form of linkage, regulated power plants can use a CO_2 allowance issued by any participating state to demonstrate compliance in any state.

To understand the success of the RGII, it is worth looking at the temporary withdrawal of New Jersey from the RGGI and its later return, which was based on political factors: in May 2011, former Governor Chris Christie of New Jersey declared the withdrawal of the state from the RGGI denouncing the programme as an ineffective way to reduce CO_2 emissions. On June 17, 2019, Governor Phil Murphy of New Jersey announced that New Jersey had reversed this decision and adopted rules to rejoin the RGGI.

In the case of the RGGI, the linked jurisdictions have shown their aligned environmental ambition, and shared ETS regulation basis through the MoU and the RGGI Model Rule, specifically:

- **Climate ambition:** The RGGI programme sets an annual cap on the region's aggregate CO_2 emissions form the electric power sector, which declines 2.5 per cent per year from 2015–2020,[35] limiting the total amount of CO_2 emissions in the region. Respectively, states under the RGGI are also addressing climate change by setting their climate goals. For example, New York set its 2030 goal of reducing its statewide GHG emissions to 40 per cent of 1990 levels and 85 per cent by 2050;[36] Massachusetts set goals to reduce emissions to 25 per cent below 1990 levels by 2020 and 80 per cent by 2050, etc.[37]
- **Shared ETS regulation basis:** Each RGGI state drafts its CO_2 Budget Trading Program based on the Model Rule, which is a set of regulations proposed by the RGGI states and revised periodically according to public comments.[38] Regulations must be adopted by each RGGI state before they come into force, guaranteeing that each state shares the same ETS regulations.

Table 3-4 Key Information about the ETS harmonisation of the RGGI

	RGGI
ETS launch year	2009
Type of allowances used	RGGI allowance
Sector coverage	Fossil fuel electric generating units
Gas coverage	CO_2
Legislative institution	RGGI Inc. Statutory and/or regulatory authorities of each RGGI state
Cap in 2021	108.9 million tons of CO_2[39] *
MRV	Emissions data are recorded in the United States Environmental Protection Agency (US EPA) Clean Air Market Division database, and then transferred to the electronic plat form of the RGGI CO_2 Allowance Tracking System.
Allocation/auctions	CO_2 allowances issued by each RGGI state are distributed through quarterly regional CO_2 allowance auctions.

* The 2021 cap included 24.7 MtCO_2 cap of new RGGI entrant Virginia.

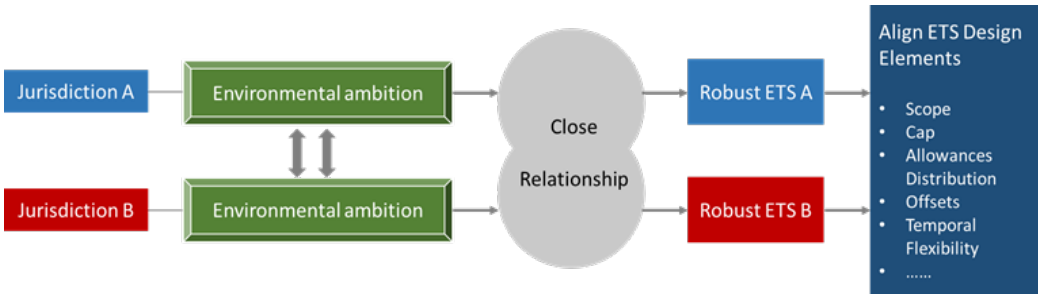
4

Essential Aspects of ETS Harmonisation

ETS harmonisation and integration is understood as the process of combining two separate carbon markets and aligning their design elements to build a harmonised joint market and avoid potential conflict or side-effects. As analysed in the previous chapter, ETS harmonisation tends to undergo several stages and depends on factors such as domestic environmental, political, and economic motivation of respective jurisdictions, relations between jurisdictions, as well as ETS robustness and system design of the respective ETSs (see Figure 4-1).

In this chapter, we provide an overview of the essential aspects that facilitate regional ETS harmonisation, building an analytical framework to assess the potential effect of China's ETS on regional harmonisation.

Figure 4-1 Process of ETS harmonization



4.1 Domestic Environmental ambition

The fundamental motivation for a jurisdiction to establish an ETS, as well as linking its system to another one is its environmental ambition for emissions reduction. Usually, the environmental ambition of a jurisdiction is highly correlated with its political standpoint. Without enough political support for climate legislation, it is highly unlikely to have a mandatory ETS in a jurisdiction. A good gauge for climate ambitions is a country's nationally determined contribution (NDC) for climate reduction under the Paris Agreement.[40]

However, the extent to which these jurisdictions are committed to dealing with climate change may vary with time. As shown in the previous case of New Jersey, a change of government can directly lead to the end of the linkage between the systems. Similarly, Australia also experienced an ill-fated ETS linkage proposal due to a government change. In September 2011, the former Prime Minister of Australia, Julia Gillard, released the Clean Energy Future Package, including the Clean Energy Act 2011 which introduced the Carbon Pricing Mechanism (CPM) with a fixed carbon price. The CPM was intended to develop into the Australian ETS and link with the EU ETS in 2015. However, after the Liberal-National Coalition won the Parliamentary elections in 2013, former Prime Minister, Tony Abbott, repealed the 2011 Clean Energy Act and dissolved the CPM.

Beyond that, the level of jurisdictions' environmental ambition also determines the design elements in the system, affecting for example the stringency of the cap, sector coverage, the offsets allowed, etc. Considering markets with different levels of emission reduction targets tend to have different designs of ETS, and these design features may largely influence the chances of two carbon markets being linked. Therefore, for potential systems to be linked, a similar level of environmental ambition of their jurisdictions is an essential pre-condition.

4.2 Relationship between linking partners

Previous examples show that the existing political relationship between jurisdictions is a crucial factor to support ETS harmonisation. Most ETS links to date have taken place between jurisdictions that are both geographically close and have close political as well as economic ties.[41] As per the cases above, such as the EU and Norway/Switzerland, or Quebec and California, the existence of cooperation agreements before the ETS linkage are also important: the EU, for example, had numerous political and economic agreements with Norway and Switzerland, while the jurisdictions of the RGGI and the WCI had previous agreements, such as under the Acid Rain Program (the first national cap-and-trade programme in the US to reduce sulfur dioxide (SO2) and nitrogen oxides (NOx)[42]). The existence of such cooperation agreements has allowed the parties to establish relevant negotiation channels and support trust-building, which are the foundations for ETS harmonisation.

However, relationships between jurisdictions are complex: political, economic, as well as environmental factors can change suddenly (e.g. through elections) and affect the foundations for cooperation on specific (environmental) targets. It seems that relationships built on joint economic benefits and political agreements are more robust, such as the EEA, which aims at increasing the economic efficiency of all participants.

Therefore, for jurisdictions to successfully establish harmonised ETSs, an important influential factor could lie in the alignment of parties' economic benefits and building ties between them through international free trade, political agreements, or environmental initiatives. This might also require somewhat similar stages of economic development as this tends to increase the willingness and benefits of cooperation (and environmental ambitions).

4.3 ETS robustness

Another aspect to be taken into consideration is the system robustness of the respective ETSs, which is ensured by clear designation of authorities with the regulators, the soundness of relevant legislation, and the robustness of MRV systems and the accounting rules. While environmental ambition and a good relationship between the linking partners provide the jurisdictions with the motivation to link their systems, the robustness of the systems determines the feasibility of the systems to be linked.

For example, within the EU ETS, the European Commission is the only institution with the power to initiate a legislative proposal to the EU ETS Directive, while also the EU ETS implementation is under the supervision of the Commission. If a Member State fails to comply with relevant laws, the Commission may commence infringement proceedings and ultimately refer the case to the European Court of Justice.[43]

A robust MRV system ensures that 1) all the participating entities follow unified monitoring, reporting, and verification principles, 2) the monitoring methods are appropriate and valid, and 3) the emissions data are accurate and well managed.

When a robust MRV system guarantees that the emissions are measured correctly, a robust accounting system makes sure that the transactions of allowances between entities have been accounted for correctly. This is especially important for flows of allowances or offsets between carbon markets as double-accounting of emission offsets continues to be a problem. In the words of Article 6.2 of the Paris Agreement: the "use of cooperative approaches requires transparent process and accurate accounting of emission reductions achieved."[44]

4.4 ETS design elements

Finally, for two ETSs to be linked, their design elements should be matched. As shown in the previous cases, Norway and Switzerland had been revising their ETS regulations to be compatible with the EU ETS before linking, as an essential component of ETS harmonisation. For other jurisdictions intending to link with another ETS, the ETS design steps outlined in the ETS Handbook[45] can be a relevant guide to assess the compatibility of their systems (see BOX 41). Although these 10 steps were initially set out to design an ETS, they could also work as a checklist for jurisdictions to define which stage the linking partner is currently at, and to evaluate the potential for their ETS harmonisation.

BOX 4-1 Checklist for the 10 Steps of ETS Design

Step 1: Decide the scope
Step 2: Set the cap
Step 3: Distribute allowances
Step 4: Consider the use of offsets
Step 5: Decide on temporal flexibility
Step 6: Address price predictability and cost containment
Step 7: Ensure compliance and oversight
Step 8: Engage stakeholders, communicate, and build capacities
Step 9: Consider linking
Step 10: Implement, evaluate, and improve

PMR & ICAP (2016).

Leading up to step 9 of "considering linking", the first eight steps are particularly relevant. As compliance and oversight have been emphasised through the assessment of ETS robustness, and step 8 is more about implementation, the following sections briefly describe the first six steps regarding the design elements of an ETS.

4.4.1 Scope

When linking ETSs, the relevant partners should align the scope of the ETSs, meaning which industry sectors are included in the ETSs and which gases are covered. The differences in sector and gas coverage demonstrate the scales of the systems, the jurisdictions' resolution to reduce emissions as well as the potential of respective systems to explore more cost-efficient abatement options.

Sector coverage: Most existing carbon markets include industrial and power sectors in their system, because for most jurisdictions, these two sectors account for about 40–50 per cent of total GHGs. Exceptions are the RGGI and China national ETS (under development), which only cover large fossil fuel electric generating units, and the Saitama and Tokyo carbon markets, which only cover fuel, heat, and electricity consumption in commercial and industrial buildings. For ETSs to be fully harmonised, their sector coverage must be aligned, to avoid carbon leakage (where business activities are transferred to those jurisdictions with laxer emissions constraints).

Gas coverage: Different ETSs include different kinds of greenhouse gases in the system, depending on a jurisdiction's local emissions profile and its capacity to monitor the GHG emissions from all sources. CO_2 is the only kind of GHG which is included by all the ETSs and takes up the largest portion of all the covered GHGs worldwide. Beyond this, methane sometimes also accounts for a significant portion of domestic emissions, especially for developing countries whose development largely depends on sectors such as waste management, fossil fuel extraction, or agriculture.

Other factors that influence the scope of an ETS include the point of regulation, meaning whether emissions are regulated at the point of carbon entry into the value chain (upstream) or at the point of release to the atmosphere (downstream), and thresholds for individual entities to be included, such as company size or emissions volume.

4.4.2 Cap

An ETS cap is usually set to correspond with the jurisdiction's emission reduction targets. For example, the EU during the EU ETS third phase (2013–2020) decreased its cap each year in line with a reduction factor of 1.74 per cent of the average total quantity of allowances issued in 2008–2012 (in line with the EU-wide climate action targets for 2020 to reduce emissions to levels 20 per cent below those of 1990 by 2020).[46] From 2021 onwards, the EU ETS will implement a linear cap reduction of 2.2 per cent annually to meet its NDC goal of 55 per cent domestic reduction in GHG emissions by 2030 compared to 1990.[47] For a linked ETS, the cap target is dependent on the integrated emissions reduction target of the linking partners. The method of synthesising different goals is crucial for the effectiveness of the system.

Lessons can be learned from the EU ETS, whose cap was once established bottom-up based on the aggregation of the National Allocation Plan (NAP) of each EU Member State. Due to a lack of historical data and former experiences, in Phase 1, each of the Member States submitted a national cap which was then proven to be overestimated. The oversupply of the allowances resulted in a gradual decline in carbon prices, decreasing from over 30 euro/ton in April 2006 to 0.1 euro/ton in September 2007.[48] In the second phase, the cap was still set very high using the bottom-up method, leading to a similar development pattern of the carbon price.[49] Starting from Phase 3, a single, EU-wide cap was set top-down for the Member States, and the carbon prices were finally stabilised within a range of around 7 euro/ton until 2008.

Similar to the first two phases of the EU ETS, the RGGI also established its cap bottom-up and experienced an oversupply of allowances between 2010 and 2012. After that, the RGGI announced a cap reduction and started in 2014 to include two interim adjustments to the RGGI cap, to account for banked CO_2 allowances accumulated in the first and second control periods.[50] Following these adjustments, the clearing prices of the RGGI allowance started to surge. Generally speaking, no matter which method is used to set the ETS cap

(bottom-up or up-down), the key is to ensure that the cap is stringent enough to urge participating entities to reduce emissions. As for potential linking partners, it should be ensured that everyone's cap setting has similar stringency, which should also be fully aligned with each jurisdiction's mitigation target.

4.4.3 Allowance distribution

Allowances can be distributed through auctioning or free allocation. Other than auctioning, three types of free allocation methods can be used: grandfathering, benchmarking, and output-based allocation (see Table 4-1). How allowances are distributed can determine, among the participating entities, who receives the benefits and who pays for the costs that originated from the emissions trading and reduction. The choice of allocation method is therefore pivotal for an ETS, and accordingly should be fully aligned at the point of the ETS linkage.

While free allocation reduces the resistance of covered sectors, selling allowances in an auction generates public revenue, which could be reinvested into climate-friendly projects and thus amplify emission reduction efforts. Historically, an early-stage ETS often distributes allowances for free to test the efficiency of the ETS, build the capacity of relevant stakeholders, and avoid resistance. For more established ETSs, free allocation and auctions are often used at the same time. In order to harmonise ETSs with different auction requirements and separate auction regulations, a common auction platform has to be chosen and joint auction should be implemented.

Table 4-1 Allocation types[51]

Types	Explanation
Auctioning	Allowances can also be auctioned, which provides the government with proceeds for investment.
Free allocation (grandfathering)	Allowances are distributed for free, based on historical emissions.
Free allocation (benchmarking)	Allowances are allocated for free, based on set performance standards based on the emissions intensity of a product or across the whole sector.
Free allocation (output-based allocation)	Regulated entities are given allowances based on a sector benchmark multiplied by their economic output, which is updated at the end of each successive year.

4.4.4 Offsets

Issues regarding offsets in the linked market can be divided into two aspects: quality restrictions and quantity restrictions. The quality restriction refers to the quality of offset credits that is allowed in the linked market. For example, to be linked with the EU ETS, the Swiss ETS revised its limits on credits to only accept international credits from projects in least developed countries (LDCs). Beyond that, the EU ETS also excluded credits from nuclear energy projects, afforestation or reforestation activities or projects involving destruction of industrial gases, which had to be applied for in the Swiss ETS.[52]

Quantity restriction refers to a percentage of compliance obligation that can be fulfilled by offsets. The EU legislation, for example, specifies maximum limits on the eligible international credits that can be used under the EU ETS for compliance:[53] the total use of credits for Phase 2 and Phase 3 may account for up to 50 per cent of the overall reduction under the EU ETS.[54] Because buying offsets is similar to providing extra allowances, it can distort the ETS caps. Consequently, differences between the linked ETSs in offset limits could cause problems for the ETS without offsets or with fewer offsets.

4.4.5 Flexibility

The flexibility of an ETS describes the extent to which banking and borrowing of allowances are allowed in the system, which should also be harmonised for a linked ETS. While banking allows the banked allowances to be used in the later compliance periods, borrowing allows the future allowances to be used in the current compliance period. In the EU ETS and the Swiss ETS example, banking within and across phases is allowed without limits, and borrowing is not allowed.

5

The State and Development Patterns of ETSs in China and Southeast Asia

China and Southeast Asian countries have made various attempts to price carbon, including establishing ETSs. China, for example, has tried ETSs since 2011 and its pilot carbon markets, along with the promised national ETS, have received worldwide attention — simply due to its massive size. Accordingly, China might play an important role to accelerate, steer, and dominate regional ETS development and harmonisation. At the same time, countries in the vicinity of China have also been working on ETS as an option to realise their NDC targets.

This chapter first gives an overview of China's development pathway towards its national ETS and the current states of ETS development of four Southeast Asian countries (Vietnam, Indonesia, Thailand, and the Philippines). The sections will analyse particularly the identified success factors of ETS harmonisation, where NDCs are an indicator of each country's environmental ambitions.

5.1 China's ETS

5.1.1 Overview of China's climate change goals and policies

As the world's largest economy with a population of more than 1.4 billion, China has declared its responsibility and willingness to combat climate change by setting its 2030 climate goal in its NDC, namely:

- to achieve the peaking of carbon dioxide emissions around 2030 and make the best efforts to peak early;
- to lower carbon dioxide emissions per unit of GDP by 60 to 65 per cent from the 2005 level;
- to increase the share of non-fossil fuels in primary energy consumption to around 20 per cent; and
- to increase the forest stock volume by around 4.5 billion cubic meters compared to the 2005 level.

To achieve these goals, the philosophy of China's climate change policies is to adhere to the joint role of market mechanisms and other policy tools. Under China's "13th Five-Year Work Plan for Greenhouse Gas Emission Control", it was specified that the market should play a decisive role in addressing climate change, while associated policy tools were introduced to secure the government's role. ETS is one of the most important vehicles for realising this market-oriented approach. Beyond that, policy tools such as dispatch reform in the power sector, and caps for fossil fuel consumption continue to be implemented to contribute to emission reduction goals. In 2020, China's eight ETS pilots were still operating, while new policies have been released successively regarding the national ETS system design — raising hopes for a national ETS launch in 2021.

5.1.2 Eight pilot markets

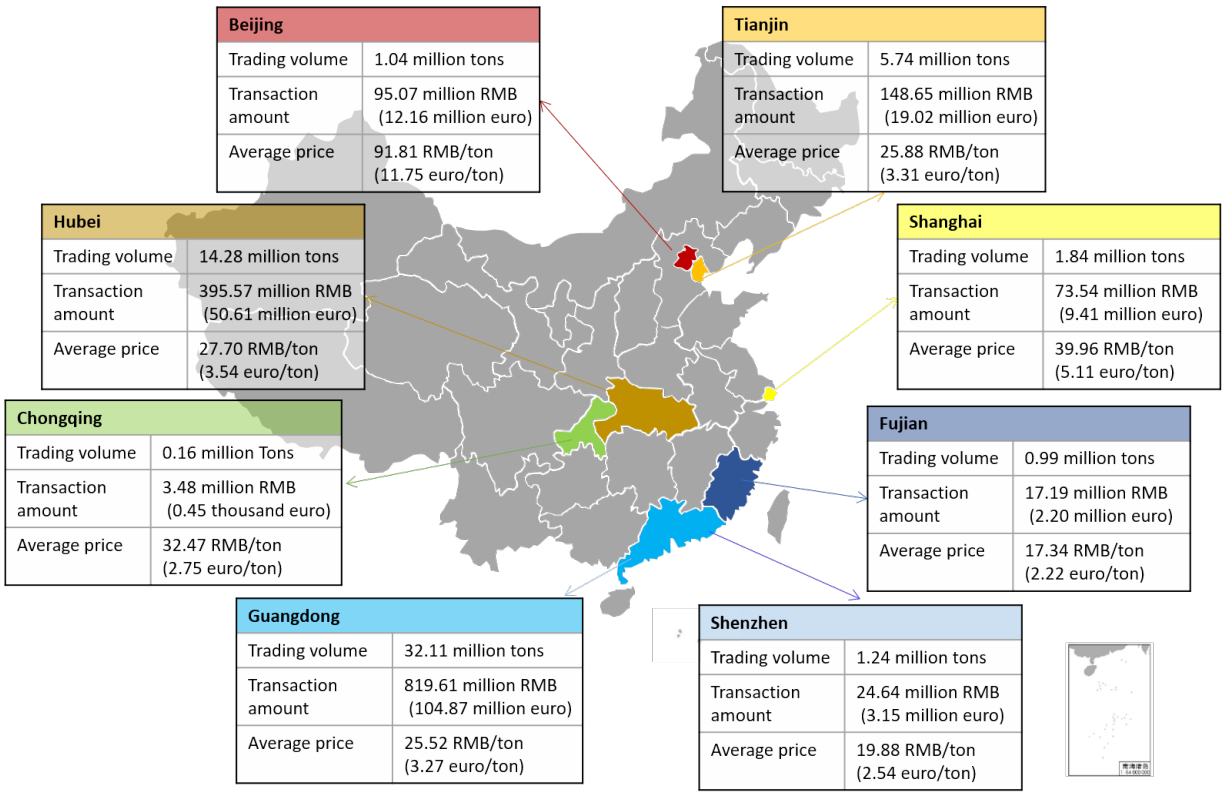
China's pilot carbon markets started in October 2011, when the National Development and Reform Commission (NDRC) passed a proposal for the ETS pilot project in seven cities and provinces, including Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong and Shenzhen. The seven pilot markets started trading in 2013 and 2014. In December 2016, two new pilots in Sichuan and Fujian were launched, with Sichuan operating as a voluntary market.

With the goal to pilot different system designs to be adapted nationally, the regulations for each pilot market share similar elements, but also retain their characteristics according to different local situations. Similarities include the form of allowance distribution is mainly free allocation, supplemented by auctions or sales at a fixed price. In the process of allowance allocation, the relevant authorities reserve a certain percentage of allowances for the purpose of market stability. In addition, all the pilot markets have adopted crediting mechanisms, which introduce possibilities for regulated entities to use offset credits such as the China Certified Emission Reduction (CCER)[55] to offset part of their emissions. However, the levels of stringency are different for the markets in terms of permitted offset ratios and offsetting requirements. Beyond that, while carbon trading is mainly based on spot transactions for all the markets, some pilots have introduced carbon derivatives and innovative carbon-related financial instruments.

By 2020, the product variety and trading volume of the pilot markets have been limited:[56] the eight markets' emissions trading volume totaled 57.4 millions in 2020, accounting for less than five per cent of the provinces' total emissions. The accumulated transaction revenue in 2020 reached about RMB 1.57billion (about EUR 200 million).[57] Among them, Guangdong, Hubei and Tianjing were the three largest pilot markets in China in terms of transaction amount, whereas Chongqing, Fujian and Shenzhen were the smallest ones with transaction revenues of less than RMB50 million (EUR6.4 million). Prices for carbon emissions also varied: Beijing and Shanghai's annual average carbon prices in 2020 were the highest, respectively at 91.81 RMB/ton (11.75 euro/ton) and 39.96 RMB/ton (5.11euro/ton) (see Figure 5-1).

Despite the limited trading volume of the pilot markets, the eight pilot ETSs have been evolving in terms of sector coverage and allocation method. For example, Beijing released a notice in March 2020 to include 14 airlines in its ETS; Tianjin expanded in 2019 to cover enterprises from the building materials, papermaking, and aviation sectors; Hubei further covered water supply companies in 2019. Beyond that, allocation methods have become increasingly stringent for the covered entities since 2019, for example with lowering benchmarks for companies participating in Beijing's pilot ETS, larger number of allowances to be auctioned in Guangdong and increase in the cap reduction factor in Chongqing. With ETS coverage expanded to other sectors in the pilot jurisdictions, MRV systems are continuing to be established for these sectors. More stringent allocation methods also led to higher carbon prices, significantly increasing the efficiency of respective pilot markets.

Figure 5-1 Trading volume, transaction amount, and average transaction price of each pilot market in 2020



5.1.3 The national ETS

The official document signaling the launch of China's national ETS was released in 2017. On December 18, 2017, the NDRC issued the Work Plan for Construction of the National Emissions Trading System (Power Sector),[58] which clarified the main principles and procedures of China's carbon market construction. The Work Plan forms the foundation for the development of China's national carbon market.

According to the Work Plan, the construction of China's national ETS would go through three major phases:

- First phase — the infrastructure construction phase, lasting for about one year. The main task in the first phase is to complete the construction of a unified national data reporting system, registration system, trading system, and carbon market management system.
- Second phase — the simulation phase, which also lasts about one year. In this phase, simulated trading is carried out in the fossil power sector, to comprehensively test the effectiveness and reliability of the market elements, to strengthen the market risk warning and prevention mechanism, and to improve the market management system and support system.
- Third phase — the optimisation phase, which starts at the beginning of the national carbon market. During this period, spot trading of allowances is firstly conducted in the power sector. When the market starts to show some stability in its running, its coverage will be expanded to more sectors and more kinds of products will be included in the market, such as CCER. (see Figure 5-2)

According to its initial design, the Chinese national carbon market would cover the fossil power sector. The reason for this choice was the availability of historical data of the power generation industry.

Within this plan covering 2,225 power sector enterprises, China would have become the largest carbon market in the world, simply due to the volume of emissions (about 3 billion tons of CO_2e per year) generated by China's fossil fuel power generation sector. It would have accounted for one-third of the country's carbon emissions.

At the end of May 2021, the national carbon market was still under development. The newly organised Ministry of Ecology and Environment (MEE) took the ETS-related responsibilities from the NDRC in 2018, while the national registration system was set up in Hubei, and the corresponding trading system in Shanghai. Moreover, policy documents and draft legislation have been released to outline the allocation principles, management measures, MRV requirements and other necessary rules and design regarding the launch of ETS. Box 5-1 shows the timeline of China's national carbon market progress.

BOX 5-1 Progress of China's national carbon market	
2017	Work Plan for Construction of the National Emissions Trading System (Power Sector)
29 Mar 2019	A draft of the "Interim Regulations on the Management of Carbon Emission Trading" for public consultation[59]
25 Sep 2019	Series of training courses on the allocation and management of carbon market allowances Implementation Plan of Carbon Emission Allowance Allocation for Key Emitters in the Power Generation Industry (including Captive Power Plant and Co-generation) in 2019 (trial version)[60]
25 Dec 2019	Interim Provisions on Accounting Treatment of Carbon Emission Trading[61]
27 Dec 2019	2019 Annual Carbon Emission Report and Verification and Submitting the List of Key Emission Units in the Power Generation Industry[62]
12 Mar 2020	Expert review meeting on the construction plan of the nationwide ETS registry system and trading platform[63]
2 Nov 2020	National Measures for the Administration of Carbon Emissions Trading (Trial)[64]
20 Dec 2020	2019–2020 National Carbon Emission Trading Cap Setting and Allowance Allocation Implementation Plan (Power Generation Industry) The List of Key Emitters under the Management of 2019–2020 National Carbon Emission Trading
5 Jan 2021	National Measures for the Administration of Carbon Emission Trading (Trial)
26 Mar 2021	Guidelines for Enterprise Greenhouse Gas Verification (Trial)
29 Mar 2021	Notice on Strengthening the Management of Enterprise Greenhouse Gas Emissions Reporting
30 Mar 2021	A draft of "Interim Regulations on the Management of Carbon Emission Trading" for public consultation
14 May 2021	Administrative Measures for the Registration of Carbon Emission Allowances (Trial) Administrative Measures for the Trading of Carbon Emission Allowances (Trial) Administrative Measures for the Settlement of Carbon Emission Allowances (Trial)

On 20 November 2020, the MEE released an updated version of the draft allocation plan for the power sector, determining that the national ETS would continue to use benchmarking as the allocation method. On 30 December 2020, the final version of allowance allocation plan was determined and published, along with a list of companies to be covered under the national ETS. Allowances allocated to each covered entity could be calculated per the following equation:

Allowances = Benchmark for Electricity Production * Actual Electricity Production * Adjustment Factor + Benchmark for Heat Production * Actual Heat Production

where Benchmark for Electricity Production is set in the document for each type of power plants (conventional coal plants below and above an installed capacity threshold of 300 MW, unconventional coal plants such as coal gangue, coal slime, and coal water slurry, and natural gas plants). The new benchmark factors were set lower for conventional power plants than the ones in the previous year, indicating an overall more stringent allocation plan for the upcoming national ETS (see Table 5-2). Actual Electricity Production equaled 70 per cent of electricity. The Adjustment Factor can be factors adjusting for different types of facility (different colling mode) or different operational status (percentage of heating supplied or capacity utilization rate). Finally, when allowances are determined for each facility, the total amount of the allowances constitute the cap of China's national ETS.

Among the above documents, the National Measures for the Administration of Carbon Emission Trading (Trial) published in January 2021 signaled the start of the first compliance period of the national carbon market. In this document, assignment of responsibilities regarding allowance allocation, MRV, market regulation, penalties etc. was tentatively determined, setting the basis for the launch of the national market. (see Table 5-1) As for the ETS-related legislation, in March 2021, the MEE drafted the "Interim Regulations on the Management of Carbon Emission Trading" for public consultation, which is a State Council-level regulation on the national ETS. Two months later, the MEE released three new policy documents related to emission allowance registration, trading and settlement. These three rules elaborate how trading participants can actually operate in the market and how national registry and trading platform should fulfill the function of allowances registration, trading and settlement. As further regulations regarding offsetts and others are finalised and released, China's national carbon market can be expected to be launched soon, by the end of June 2021.

Table 5-1 Key Information about China's national ETS (Trial)

	China's national ETS
Governance structure	The Ministry of Ecology and Environment (MEE), including its provincial and municipal-level subsidiaries National Carbon Allowance Registry Authority National Carbon Trading Authority
Covered sector	Coal plants, unconventional coal plants (such as coal gangue, coal slime, and coal water slurry), and natural gas plants
Covered entities	Enterprises or other economic organisations from the covered sector whose annual greenhouse gas (GHG) emissions reach 26,000 tCO_2e (comprehensive energy consumption of around 10,000 tons of standard coal) and above
Allowance allocation	Free allocation in the initial phase, auctions will be introduced in later phases
Market stability rovisions	The MEE may reserve some allowances for market stability, major project development, etc.
Offsets	CCER and other allowed offsets are permitted to be used for offsetting up to five per cent of the entities' verified emissions
Trading	Covered entities and eligible institutions and individuals can participate in the national ETS
Penalties	Failures in reporting are subject to a fine of RMB 10,000 to 30,000 (~1,300 euro – ~3,900 euro), while failures in compliance are subject to a fine of RMB20,000 to 30,000 (~2,600 euro – ~3,900 euro)

Table 5-2 Benchmarks of China's national ETS

	Benchmark for electricity production (tCO_2 per MWh)		Benchmark for heat production (tCO_2 per GJ)	
	New*	**Old****	**New**	**Old**
Conventional coal plants above 300 MW	0.877	1.015	0.126	0.135
Conventional coal plants below 300 MW	0.979	1.015	0.126	0.135
Unconventional coal	1.146	1.120	0.126	0.135
Natural gas	0.392	0.382	0.059	0.059

* released in November 2020

** released in September 2019

5.2 Vietnam

Vietnam is among the most vulnerable countries worldwide to the effects of global climate change, and has become one of the countries in the world which have shown the greatest willingness to respond to climate change. Already in 1994, Vietnam's government had ratified the UNFCCC and signed the Kyoto Protocol in 2002. To combat climate change, Vietnam has released national policies and undertook concrete GHG mitigation and climate change adaptation measures in the past decades. To achieve its goal of emissions reduction, Vietnam is considering the establishment of an ETS.

5.2.1 ETS Development

To lay the foundations for an ETS, Vietnam participated in the Partnership for Market Readiness (PMR) in 2014, which is a project funded by the World Bank to establish carbon markets in developing countries.[65] The PMR project aimed at supporting Vietnam to design and pilot market instruments in the steel, solid waste, and power sectors, and establish a GHG registry and MRV system. According to the PMR project implementation status report,[66] by April 2018 most activities were still ongoing, including GHG emissions data collection, reporting, and developing guiding principles for the registry and MRV system. The revised Law on Environmental Protection is set to enter into force on 1 January 2022.

In 2020, The Ministry of Natural Resources and Environment (MONRE) released a new Draft Law on Environmental Protection to replace the current 2014 Law on Environmental Protection, as environmental issues have become increasingly urgent in Vietnam. On November 17, 2020, Vietnam's National Assembly adopted the revised Law on Environmental Protection, which forms a legal mandate for MONRE to design a domestic ETS and MRV system.[67]

Furthermore, a draft Decree on the roadmap for GHG emission reduction has been undergoing preparation, whose objective is to highlight the management of GHG mitigation by carbon credits through a carbon pricing system. Under this draft Decree, MONRE has proposed to form and develop a domestic carbon credit market and is preparing to enter the international carbon credit market in 2021.[68] A pilot system is planned to start by 2025 while full operation will be commenced by 2027.

5.2.2 NDC

Vietnam submitted its first NDC in November 2016 and updated it in September 2020. According to the updated NDC, Vietnam would have reduced its GHG emissions by nine per cent compared to the Business as Usual (BAU) scenario by 2030 with its own domestic resources. This contribution can be raised up to 27 per cent with international support through bilateral as well as multilateral cooperation and the implementation of new mechanisms under the Paris Agreement.[69] Detailed information about the baseline, timeframe, and coverage is listed below (see Table 5-3).

In the updated NDC, GHG reductions in the case of unconditional contribution were increased in both amount and ratio compared to BAU by 2030. The industrial processes (IP) sector was newly included and the emission reduction target is increased from 62.7 $MtCO_2e$ to 83.9 $MtCO_2e$, showing Vietnam's growing ambition to address climate change. With international support, the contribution ratio is also increased, from 25 per cent to 27 per cent, increasing the reduction target from 198.2 $MtCO_2e$ to 250.8 $MtCO_2e$ by 52.6 $MtCO_2e$.

Regarding Vietnam's emissions reduction contribution by sector, most of the reduction amount was expected to be realised in the energy sector, both under the condition of with or without international support. Specifically, the energy sector should achieve a reduction of 51.5 $MtCO_2e$ compared to the BAU scenario by 2030 to meet the target, which could be raised up to 155.8 $MtCO_2e$ with international support, equaling 62.1 per cent of the total contribution. This demonstrates Vietnam's determination to take firm measures to increase its energy efficiency and change its energy structure. Beyond that, contribution with international support accounted for 66.5 per cent of the total reduction, leaving space for bilateral and multilateral cooperation as well as the implementation of new mechanisms under the Paris Agreement to help Vietnam reduce its sector emissions (Table 5-4).

Table 5-3 Accompanying information of Vietnam's NDC

Baseline:	BAU scenarios of emission projection started in 2014 (BAU2020: approx. 528.4 $MtCO_2e$, BAU2030: approx. 927.9 $MtCO_2e$)
Time frame:	2021–2030
Sector coverage:	Energy, agriculture, LULUCF[70], waste, and the industrial processes (IP)
Gas coverage:	CO_2, CH_4, N_2O, HFCs

Table 5-4 Vietnam's emissions reduction contribution by sector

Sector	Contribution with domestic resources		Contribution with international support		Total contribution with both domestic resources and international support	
	Compared to BAU scenario (%)	Reduction amount ($MtCO_2e$)	Compared to BAU scenario (%)	Reduction amount ($MtCO_2e$)	Compared to BAU scenario (%)	Reduction amount ($MtCO_2e$)
Energy	5.5	51.5	11.2	104.3	16.7	155.8
Agriculture	0.7	6.8	2.8	25.8	3.5	32.6
LULUCF	1.0	9.3	1.3	11.9	2.3	21.2
Waste	1.0	9.1	2.6	24.0	3.6	33.1
IP	0.8	7.2	0.1	0.8	0.9	8.0
Total	9.0	83.9	18.0	166.8	27.0	250.8

5.2.3 Legislation and robustness

Pursuant to the Bali Action Plan concluded at the Conference of the Parties (COP) 18 in Doha, developing country Parties would take Nationally Appropriate Mitigation Actions (NAMAs) in the context of sustainable development, which may refer to policies or actions that aim at reducing emissions.[71] MONRE was assigned as focal point for NAMA in Vietnam. The Vietnam's state management structure on climate change is shown in Figure 5-3:

Over the last decades, Vietnam has introduced legislation to raise the awareness of climate change and put forward actions to mitigate as well as adapt to climate change. In 2011, Vietnam released the National Climate Change Strategy, which outlined the country's objectives for 2011 through 2050 and identified measures to respond to climate change, but still focused on adaptation. In 2012, the Vietnam Green Growth Strategy was introduced and specified the nation's mitigation targets for three periods from 2011 to 2050, namely to reduce energy consumption per unit of GDP by 1–1.5 per cent per year to 2020, reduce annual GHG emissions by 1.5–2 per cent per year from 2020 to 2030, and reduce GHG emissions by 1.5–2 per cent per year to 2050. Notably, the document mentioned using market-based instruments to realise the national targets, and included regulations on linking with international carbon market, which was Vietnam's first attempt at introducing a carbon market.[72] Other than these strategies set out to address climate change and persevere green growth, Vietnam has also promulgated many policies about energy efficiency, forestry, renewable energy, natural disaster prevention and control, and so on (see Table 5-5).

Figure 5-3 Vietnam's state management structure on climate change[73]

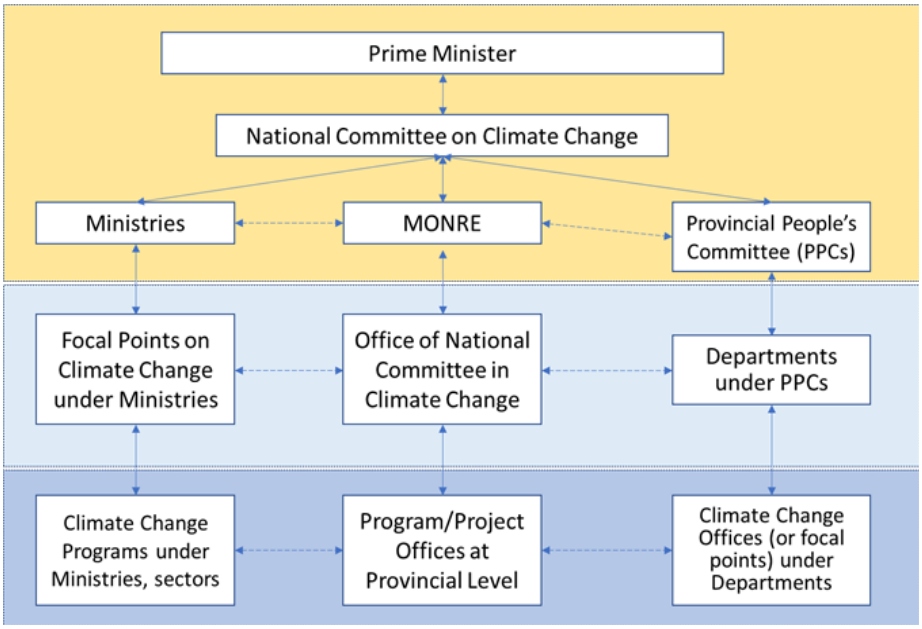


Table 5-5 Vietnam's policy framework supporting implementation of GHG reduction targets

Categories	Name	Time
Mitigation-related legal documents	Law on Energy Efficiency	2011
	Law on Water Resources	2012
	Law on Natural Disaster Prevention and Control	2013
	Law on Environmental Protection	2014
	Forestry Law	2017
Mitigation-related strategies	Vietnam Forestry Development Strategy 2006–2020	2007
	National Energy Development Strategy to 2020 with a vision to 2050	2007
	National Strategy for Natural Disaster Prevention, Response and Mitigation	2007
	Socio-Economic Development Strategy	2010
	National Climate Change Strategy	2011
	Vietnam Green Growth Strategy	2012
	Vietnam Transport Development Strategy to 2020 with a vision to 2030	2013
	Vietnam Renewable Energy Development Strategy to 2030 with a vision to 2050	2015
Programs, plans, and schemes related to mitigation	National Target Programme to Respond to Climate Change	2008
	National Action Plan on Green Growth	2014
	Revised National Power Development Plan for 2011–2020 with a vision to 2030	2016
	Plan for Implementation of the Paris Agreement	2016
	Support Programme in response to Climate Change	2017
	National Action Plan for Implementation of the 2030 Agenda for Sustainable Development	2017
	Target Programme for Climate Change Response and Green Growth for the period 2016–2020	2017
Mitigation-related policies	Resolution of Vietnam's Central Committee of the Communist Party of Vietnam on proactively responding to climate change, strengthening natural resources management and environmental protection	2013
	Conclusion of the Politburo on promoting active climate change responses, strengthening natural resources management and environmental protection	2019
	Resolution of the Politburo of the Central Committee of the Communist Party of Vietnam on the orientation for the National Energy Development Strategy to 2030 with a vision to 2045	2020

5.3 Indonesia

As the fourth most populous country in the world with low-lying and small island areas, Indonesia is vulnerable to climate change, particularly rising sea levels and extreme climate events. While this should give Indonesia strong motivation to combat climate change, Indonesia also continues to focus economic efforts on alleviating poverty, with about ten per cent of its population still living below the poverty line.[74] Therefore, Indonesia's climate change strategy is to seek a balance between its current economic development target for poverty alleviation, and the emissions reduction target for its future development.

5.3.1 ETS Development

Indonesia joined the PMR project in 2013. According to the PMR project implementation status report, Indonesia has completed outlining the emissions profiles in the target area, estimated the abatement cost of mitigation actions in power- and energy-intensive industries, and finished the design of an MRV system in the power and industry sectors. Besides, an online reporting system for GHG Emission for power generation was completed by the Ministry of Energy and Mineral Resources (MEMR) in June 2018 under the support of the PMR project. Pilot MRV systems have been implemented in Java, Madura, and Bali Grid for the power sector and in the areas of cement and fertiliser for the industry sector.[75]

In 2019, after navigating through various market-based instrument options, an ETS for the power and industry sectors was selected by Indonesia's government, which is expected to be implemented in stages beginning with a voluntary appraisal and then applying a relatively loose emission cap. The Ministry of Environment and Forestry (MOEF) indicated that the relevant legislation had been discussed within the Cabinet Secretariat and the State Secretariat in 2020. The MOEF is currently also drafting regulations for the pilot system. Accordingly, it was decided that a carbon market would be established under the newly-created Environment Fund Agency, which would be supervised by the Ministry of Finance. A presidential regulation providing a framework for carbon pricing instrument is to be decided in early 2021. Simultaneously, a limited ETS pilot project for the power sector is planned to be implemented in 2021.[76]

5.3.2 NDC

Indonesia submitted its first NDC in November 2016. According to the NDC, Indonesia has voluntarily committed to an unconditional reduction of 26 per cent of its greenhouse gases against the BAU scenario by the year 2020, and 29 per cent of its greenhouse gases emissions against the BAU scenario by the year 2030. Subject to the availability of international support for finance, technology transfer, and development and capacity building, Indonesia could increase its contribution up to a 41 per cent reduction of emissions by 2030.[77] Detailed information about the baseline, timeframe, and coverage is listed below (see Table 5-6).

Indonesia's forestry sector represents the largest portion of the country's GHG emissions, accounting for about 48.5 per cent in 2010, showing that land use change and peat and forest fire had been the main reason for GHG emissions in Indonesia. For its future development, Indonesia's GHG emissions and the expected emissions reduction would largely come from the energy sector. The energy sector should achieve a reduction of 314 $MtCO_2e$ compared to the BAU scenario by 2030 with solely domestic resources, and 398 $MtCO_2e$ with international support. International support would mainly contribute to emissions reduction in the forestry sector through REDD+,[78] amounting to about 150 $MtCO_2e$ in the sector by 2030 (see Table 5-7).

Table 5-6 Accompanying information of Indonesia's NDC

Baseline:	BAU scenarios of emission projection started in 2010 (BAU2030: approx. 2869 $MtCO_2e$)
Timeframe:	2021–2030
Sector coverage:	Energy, Waste, Industrial Processes and Product Use (IPPU), Agriculture, Forestry
Gas coverage:	CO_2, CH_4, N_2O

Table 5-7 Projected BAU and emission reduction from each sector category[79]

Sector	GHG Emission Level 2010*	GHG Emission Level 2030			GHG Emission Reduction ($MtCO_2e$)		% of Total BAU		Annual Average Growth BAU (2010–2030)
	$MtCO_2e$	BAU	CM1[80]	CM2[81]	CM1	CM2	CM1	CM2	
Energy*	453.2	1,669	1,355	1,271	314	398	11%	14%	6.70%
Waste	88	296	285	270	11	26	0.38%	1%	6.30%
IPPU	36	69.6	66.85	66.35	2.75	3.25	0.10%	0.11%	3.40%
Agriculture	110.5	119.66	110.39	115.86	9	4	0.32%	0.13%	0.40%
Forestry**	647	714	217	64	497	650	17.20%	23%	0.50%
TOTAL	**1,334**	**2,869**	**2,034**	**1,787**	**834**	**1,081**	**29%**	**38%**	**3.90%**

*Including fugitive
**Including peat fire

5.3.3 Legislation and robustness

Indonesia has promulgated relevant legal and policy instruments in regard to environmental protection and management since 2009 (see Table 5-8). In Law No. 32/2009 on Environmental Protection and Management, climate change was first included as a threat to Indonesia. In 2011, the Action Plan on National Emissions Reduction was to provide a national guideline for emissions reduction covering 70 programmes.[82] As a component of the Action Plan, PR 71/2011 further established a guideline for GHG inventory, to facilitate calculating and reporting emissions at the sectoral level, which formed the basis for Indonesia's MRV system.[83]

In the National Energy Policy released in 2014, Indonesia set its national targets for energy transformation, including new and renewable energy shares of at least 23 per cent in 2025 and at least 31 per cent in 2050, while oil should be less than 25 per cent in 2025 and less than 20 per cent in 2050. In 2017, the Indonesia government issued Government Regulation No. 46 of 2017 on Environmental Economic Instruments, which provided a reward for any party that preserves and protects the environment, and on the other hand, punishment/liability for any party that causes pollution or damage to the environment (see Table 5-8).[84] With the Environmental Economic Instruments, support or finance for national green development through carbon pricing is expected to be facilitated,[85] which is a relevant ingredient for Indonesia's national ETS development as the Regulation sets a mandate that an emission permit trading system is to be implemented in 2024.

The responsible ministries for the environment are manifold. The Coordinating Ministry for Economic Affairs (CMEA) was responsible for planning and policy coordination and served as the focal point for Indonesia's PMR project. After President Joko Widodo took office in 2015, responsibilities related to climate change moved from the National Council on Climate Change to the Ministry of Environment and Forestry (MOEF). The MOEF, under the Director General of Climate Change, started to formulate national policies, strategies, programmes, and activities on climate change control, as well as formulating a mechanism for setting policies and procedures for carbon trading and many other government affairs.[86]

Table 5-8 Indonesia's policy framework supporting implementation of GHG reduction targets

Categories	Name	Time
Climate change and overall environment	Law on Disaster Management	2007
	Law No. 32 of 2009 on Environmental Protection and Management	2009
	Indonesia Climate Change Sectoral Road Map	2010
	Presidential Regulation No. 61 year 2011 on the National Action Plan on GHG emissions reduction	2011
	Presidential Regulation No. 71 year 2011 on the National Action Plan on GHG inventory	2011
	National Action Plan on Climate Change Adaptation	2014
	Ministerial Regulation No. P.33/2016 on the Guideline for the development of a National Adaptation Plan	2016
	Government Regulation No. 46 of 2017 on Environmental Economic Instruments	2017
	Presidential Regulation No. 77 of 2018 on the Management of Environmental Funds	2018
Energy sector	Presidential Regulation No.5/2006 on National Energy Management	2006
	Government Regulation No. 70/2009 on the Conservation of Energy	2009
	MEMR Regulation No. 14/2012 on Energy Management[87]	2012
	Government Regulation No. 79/2014 on National Energy Policy	2014
	Electricity Supply Business Plan 2016–2025	2016
	National Energy Plan	2016
AFOLU sector[88]	National Forestry Plan 2011–2030	2011
	Government Regulation No. 37/2012 on Watershed Management	2012
	Law No. 37/2014 on soil and water conservation	2014
Waste sector	Government Regulation No. 81 year 2012 on the Management of Domestic Solid Waste	2012

5.4 Thailand

Thailand is the second-largest country in Southeast Asia, and is among the countries most exposed to climate change.[89] As a littoral country with diverse ecosystems, Thailand is highly vulnerable to floods, drought, rising sea levels, and many other extreme weather events.

5.4.1 ETS Development

Thailand launched the Thailand Voluntary Emission Reduction Program (T-VER) and the Thailand Carbon Offsetting Program in 2013. The V-VER was a domestic GHG crediting mechanism for projects on a baseline-and-credit system.[90] As of October 9, 2020, 225 projects had registered in the system and are expected to reduce emissions by about 6 $MtCO_2e$ GHG per year.[91]

Thailand also participated in the PMR with the Thailand Greenhouse Gas Management Organization (TGO) having developed an MRV system, and finalised policy recommendations on the legal and institutional framework to establish an ETS. In 2015, the TGO launched the Thailand Voluntary Emission Trading Scheme (Thailand V-ETS), which was designed to serve as a pilot to set up the infrastructure for an ETS. In its first phase (2015–2017) and second phase (2018–2020), the MRV system was tested, allowances were allocated to covered facilities, and a registry and trading platforms were built up. In 2020, the MRV system was under development for another three industrial sectors and capacity-building activities were carried out with stakeholders.[92] TGO collaborate with the Eastern Economic Corridor Initiative (EECI) in developing a strategic plan for ETS implementation in EECI region in Thailand. The plan includes the implementation of a pilot ETS with its key features and trading platform.[93]

5.4.2 NDC

Thailand submitted its first NDC in September 2016 and updated it in October 2020. According to the updated NDC, Thailand intends to reduce its greenhouse gas emissions by 20 per cent from the projected BAU level by 2030. The level of contribution could increase by up to 25 per cent, subject to adequate and enhanced access to technology development and transfer, financial resources, and capacity building support. As indicated in its NDC, Thailand has integrated market-based mechanisms to enhance the cost-effectiveness of its mitigation actions, and will continue to explore the potentials of bilateral, regional, and international market mechanisms.[94] Detailed information about the baseline, timeframe, and coverage is listed in Table 5-9.

Table 5-9 Accompanying information of Thailand's NDC

Baseline:	BAU projection from the reference year 2005 in the absence of major climate change policies (BAU2030: approx. 555 $MtCO_2e$)
Time frame:	2021–2030
Sector coverage:	Economy-wide (inclusion of land use, land-use change, and forestry will be decided later)
Gas coverage:	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6

5.4.3 Legislation

In Thailand, the Office of National Resources and Environmental Policy and Planning (ONEP) is the national focal point for coordination with regard to the UNFCCC and the Kyoto Protocol. The ONEP is also responsible for coordinating climate change cooperation at national and international levels. To provide technical support for the National Committee on Climate Change Policy (NCCC), Thailand set up the Thailand Greenhouse Gas Management Organization (TGO) in 2007, which also serves as a focal point for the Kyoto mechanism. Under the PMR project, the TGO works at promoting CDM and voluntary crediting mechanisms, facilitating carbon markets, enhancing the capacity building of GHG management, and so on. Both the ONEP and TGO are under the Ministry of Natural Resources and Environment as shown in Figure 5-4.

Following its NDC submission in 2016, Thailand has compiled many sectoral plans to achieve its NDC target (see Table 5-10), such as the Thailand Power Development Plan (2015–2036), the Alternative Energy Development Plan (2015–2036), the National Waste Management Master Plan (2016–2021), etc. On July 14, 2016, the National Climate Change Master Plan (2015–2050) was approved by the Cabinet and for the first time refers to a carbon market as a mitigation measure.[95] This document also mentions potential practical economic mechanisms such as carbon taxation or emission certificates trading, and indicates that a domestic market could be created and linked to international carbon markets. In September 2016, the 12th National Economic and Social Development Plan (2017–2021) was introduced, again mentioning the development of a GHG mitigation mechanism[96] (see Table 5-10).

To encourage all sectors to engage in addressing climate change, the National Reform Plan on Natural Resources and Environment released in 2018 suggests the setting of an overall GHG threshold for each manufacturing sector, through mechanisms such as a cap-and-trade system. It is expected that Thailand will introduce a Climate Change Act in 2021, which would include more detailed information about specific instruments for carbon emission reductions.[97]

Figure 5-4 Thailand's state management structure on climate change[98]

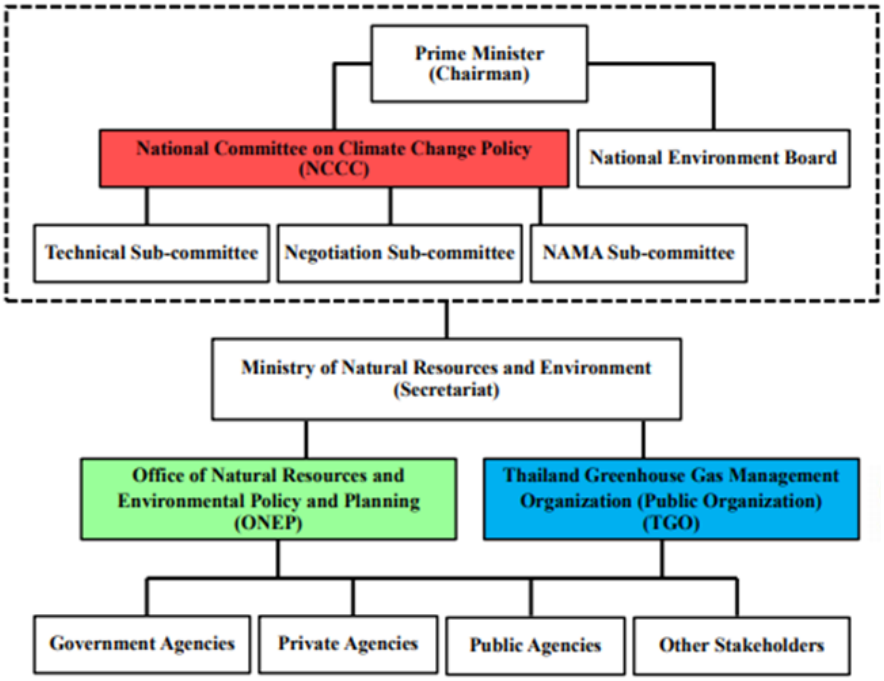


Table 5-10 Thailand's policy framework supporting implementation of GHG reduction targets

Categories	Name	Time
Climate Change and Overall Environment	National Strategy on Climate Change	2008 – 2012
	National Environment Quality Management Plan	2012 – 2016
	National Climate Change Master Plan	**2015 – 2050**
	National Economic and Social Development Plan	2017 – 2021
	12th National Economic and Social Development Plan	**2017 – 2021**
	National Reform Plan on Natural Resources and Environment	**2018**
Energy Sector	Energy Efficiency Development Plan	2011 – 2030
	Thailand Smart Grid Development Master Plan	2015 – 2036
	Thailand Power Development Plan	2015 – 2036
	Alternative Energy Development Plan	2015 – 2036
Transport Sector	National Transport Master Plan	2011 – 2015
	Environmentally Sustainable Transport System Plan	2013 – 2030
Industry Sector	National Industrial Development Master Plan	2012 – 2031
Agricultural Sector	National Agricultural Development Plan	2012 – 2016

5.5 The Philippines

The Philippines with its over 7,000 islands is highly vulnerable to climate risks and has been experiencing extreme weather events which put its property and infrastructure at physical risk. The Philippines has put efforts into establishing legal and institutional frameworks to adapt to and mitigate the impacts of climate change, as well as a cap-and-trade system to reduce GHG emissions. However, mobilising resources to combat climate change needs to balance with economic development goals — particularly as 16.6 per cent of the population of the Philippines lived below the national poverty line in 2018.[99]

5.5.1 ETS Development

In 2020, House Bill No. 2184 for the promotion of the "Low Carbon Economy Act" proposed to establish a GHG emissions cap-and-trade system in the industrial and commercial sector with clear guidelines about the setting of caps, allowances, allowances allocation, trading system, and MRV system.[100] This bill has been conditionally approved by the Filipino House of Representatives Committee on Climate Change, and continues to be evaluated by a newly established technical working group. Accordingly, the specific timeline to prepare for or launch an ETS remains uncertain.[101]

Besides, under the United Nations Development Programme (UNDP) Low Emission Capacity Building Programme, the Philippines has made progress in developing a national MRV system on two major initiatives, namely the development of an overarching governance framework and a national database system.[102] The Philippines' MRV system development is currently still ongoing under the UNDP's NDC Support Programme.[103]

5.5.2 NDC

As shown in the NDC Registry, the Philippines had not yet updated its NDC to the UNFCCC by November 2020. The current INDC is the one communicated to the UNFCCC in October 2015. In the NDC, the Philippines intended to undertake GHG emissions reduction of about 70 per cent by 2030 relative to its BAU scenario of 2000–2030. Reduction of CO_2e emissions would come from the energy, transport, waste, forestry, and industry sectors. The mitigation contribution was conditioned on the extent of financial resources, including technology transfer, and capacity building.[104] However, in its INDC, the Philippines did not define a BAU pathway, rendering the emissions reduction target uncertain. Besides, the INDC was conditional on many premises, rendering the INDC itself inefficient.

5.5.3 Legislation

Apart from signing the UNFCCC in 1994 and Kyoto Protocol in 2003, the Philippines has also been developing its own climate change policies since 2009. In 2009, the Climate Change Act of 2009 established the Climate Change Commission (CCC) under the Office of the President, which became the principal climate policymaking authority thereafter. In 2010 and 2011, the CCC developed respectively the National Framework Strategy on Climate Change and the National Climate Change Action Plan, to generate mitigation and adaptation measures for the country to combat climate change. These two documents laid the foundation for the Philippines' further climate policies, and provided the blueprint for the country's pathway to achieve climate change adaptation and mitigation. Beyond that, complementary sectoral laws have also been promulgated (see Table 5-11).

Table 5-11 The Philippines' policy framework supporting implementation of GHG reduction targets

Categories	Name	Time
Climate Change	**Climate Change Act**	2009
	National Disaster Risk Reduction and Management Law	2010
	National Framework Strategy on Climate Change	2010
	Philippine National REDD Plus Strategy	2010
	Disaster Risk Reduction and Management Act	2010
	National Climate Change Action Plan	2011
	Amended Climate Change Act	2014
	Philippine Green Jobs Act	2016
	Philippine Development Plan for 2017–2022	2016
	House Bill (HB) No. 2184	2020
Other Sectors	Philippine Clean Air Act	1999
	National Solid Waste Management Act	2000
	Biofuels Act	2006
	Renewable Energy Act	2008

6

Analysis of the Regional ETS Harmonization Potential of China and Southeast Asian Countries

6.1 Similar but differentiated environmental ambitions

A jurisdiction's environmental ambition is key to its ETS implementation, as well as the potential ETS harmonisation thereafter. An environmentally ambitious government would endeavor to find solutions for a green economy and regard an ETS as a necessary instrument of emissions mitigation, whereas governments with less environmental ambition would see ETS as a detriment to economic development as it fears negative influence on emission-intensive companies. As discussed in the last chapter, China and the Southeast Asian countries have shown ambitions to address climate change and have taken steps to develop domestic ETSs. However, the degree of their ambitions and the corresponding factors affecting their political decisions still vary for each country.

Table 6-1 summarises the domestic ambitions relevant for ETS establishment in the five selected countries. As can be seen, all countries but the Philippines have an ETS in planning, but the reduction ambitions are more aligned between the Southeast Asian countries due to their absolute emission goals in their NDCs as compared to the intensity-based CO_2 emission target of China.

China's announcement at the Climate Ambition Summit 2020 to reduce CO_2 emissions per unit of GDP from the 2005 levels by 65 per cent by 2030 has further confirmed China's intensity-based target. Correspondingly, China's national ETS is also designed to allocate allowances based on an intensity-based method at the very early stage and gradually transform to a mass-based method at later stages, which conforms with its 2030 goal to hit peak emissions before 2030. For ETS harmonisation, forms of targets and ETS designs should be fundamentally aligned among linked jurisdictions; otherwise there might be conflicts of interest between participants from different jurisdictions. Although ETS elements have not been established and determined by the ASEAN countries, some countries such as Thailand and Vietnam have also set carbon emission or energy intensity targets, which might imply a choice of an intensity-based ETS for these countries in the future.

Potential solutions for ETS harmonisation:

- Establish absolute emission reduction targets as early as possible in all jurisdictions.
- Support other countries to better align their emission targets with the common Paris Agreement to become climate-neutral by 2050 to limit global warming to significantly less than 2°C.
- Include social aspects of development, **as climate actions are often weighted against continuous economic development, industrialisation, and increasing urbanisation that bring about increased energy consumption and GHG emissions.**
- Cooperate in international economic and technological forums to facilitate carbon efficiency or energy efficiency improvement.
- Increase the support from developed countries to increase emission reduction targets (e.g. through NAMA).

Table 6-1 Domestic ambitions relevant for ETS establishment and harmonisation

	Country		China	Vietnam	Indonesia	Thailand	The Philippines
Domestic ambitions	ETS	National ETS established	x				
		National ETS in planning		x	x	x	
		National ETS proposed					x
	Carbon credit market	Carbon credit market established	x			x	
		Carbon credit market in planning		x			
	Reduction ambitions (e.g. in their NDCs)	Relative	CO_2 emissions per unit of GDP				
		Absolute		GHG emissions	GHG emissions	GHG emissions	GHG emissions
		Baseline	2005 level	BAU scenario	BAU scenario	BAU scenario	BAU scenario

6.2 Close relationship between China and ASEAN countries

China and ASEAN countries have established relations since 1991 and both sides have become each other's most important economic partner. China started to have official dialogues with ASEAN in 1991. In 2002, China and ASEAN signed the Framework Agreement on Comprehensive Economic Cooperation, marking the start of their economic and trade cooperation. In January 2010, the ASEAN-China Free Trade Area (ACFTA) was fully established, reaching a new era of ASEAN-China relationship. Trade between ASEAN and China has been increasing over the years. According to the Ministry of Commerce of China, the two-way trade between ASEAN and China reached USD297.89 billion in the first half year of 2020, growing by 2.2 per cent over the previous year, with ASEAN countries replacing the EU as China's largest trading partner,[105] and China remaining the top trading partner for 11 consecutive years for ASEAN countries.[106] In November 2020, the RCEP agreement was newly signed by 15 member countries, including China and 10 ASEAN countries. The RCEP agreement is going to create the biggest trade bloc in history, reduce tariffs, and stimulate economic growth of member countries, again helping to develop deeper relationships between China and other ASEAN countries. Furthermore, China's engagement through its Belt and Road Initiative (BRI) has provided some form of collaboration between all the selected countries.

Other than economic and trade relations, ASEAN-China cooperation has expanded rapidly to environmental, political, and many other areas. Already in 2003, China and ASEAN have signed the Joint Declaration on Strategic Partnership for Peace and Prosperity, which emphasised the strengthening of cooperation through "more exchanges in science and

technology, environment, education, culture, personnel". From 2009 onwards, China and ASEAN have been continuously formulating and adopting the "ASEAN-China Strategy on Environmental Protection Cooperation" and "ASEAN-China Environmental Cooperation Action Plan." Under the framework of cooperation strategies and action plans, ASEAN and China have implemented various cooperation activities including cooperation on high-level policy dialogues, ASEAN-China Environmental Cooperation Forum, ASEAN-China Green Envoys Program, biodiversity and ecological conservation, environmental industry and technology, and joint research, etc. Beyond that, the China-ASEAN Environmental Cooperation Center was established in 2010, which has served as a focal point for environmental cooperation between China and ASEAN thereafter.[107]

However, despite the close economic relationship between China and ASEAN, there remain potential sources of conflict, such as the South China Sea disputes. Territory disputes have long occurred in Southeast Asia, with multiple countries including China, the Philippines, and Vietnam claiming the South China Sea as part of its territory. To resolve the problem, relevant parties have been working to build a rules-based framework in the South China Sea through codes of conduct. Until the end of 2020, the Code of Conduct for the South China Sea was still under discussion.

Potential strengthening of relations relevant for ETS harmonisation:

- Accelerate discussions and cooperation using existing forums, such as ASEAN, RCEP and BRI to include stronger environmental targets.
- Include relevant authorities for ETS harmonisation in these forums (e.g. China-ASEAN Environmental Center and the annual ASEAN-China Environmental Cooperation) to strengthen cooperation between ministries, central government, and local governments, discussing possible solutions for the development of a joint carbon emissions trading system.
- Setting integrated climate goals for ASEAN and China to intensify regional environmental cooperation.

Table 6-2 Relationships between selected countries

Country		China	Vietnam	Indonesia	Thailand	The Philippines
Relationship	RCEP member	x	x	x	x	x
	ACFTA member	x	x	x	x	x
	BRI country	x	x	x	x	x

6.3 ETS robustness and design elements of possible ETSs

As the region's first and largest ETS, China's national ETS is expected to provide the basis for regional ETS harmonisation and should be fully developed before any further linkage. China is the first among the selected countries to launch a national ETS. The future performance of China's ETS will directly determine whether China's ETS could function as an efficient instrument of emissions mitigation and can be feasible for ETS linkage just like the EU ETS. China needs to maintain its ETS robustness by ensuring complete legislation, a solid MRV system, and clear accounting rules. Furthermore, to avoid the situation of limited liquidity and low carbon prices, China's ETS needs to expand to cover more sectors and set more stringent caps to stimulate market trading. Before China's ETS matures to the stage that it is efficient enough to determine the actual price of mitigation, any linkage to China's ETS should be reconsidered.

Because ETS development in Vietnam, Indonesia, Thailand, and the Philippines is still at an early stage, ETS harmonisation in the region is not expected to happen in the near term (e.g., five years or more). However, actions could now be taken to help them to develop their ETSs which are more capable for future linkage. As Vietnam just proposed to develop a domestic carbon credit market, Indonesia is still carrying out pilot projects for ETS development, Thailand recently finalised policy recommendations on an ETS, and the Philippines only has one proposal of ETS development, it seems that in the next 10 years, a mandatory ETS would not be a core driver for these four countries to achieve their climate goals by 2030. In spite of this, actions still need to be taken to form a legal framework for emissions reduction and construct a robust MRV system for GHG data collection. This could not only contribute to the future development of mandatory ETSs in each country, but also support the development of local crediting programmes which may also provide another way of international cooperation and generate credits which may be traded in international carbon markets.

Looking at Table 6-3, we see that all the countries have established a regulatory system for national affairs regarding the environment and climate change, with a ministry (department) responsible for general environmental affairs, a special regulator responsible for climate change, and several other regulators for affairs at regional or other levels. However, to establish an ETS, only China and Vietnam have released relevant legislation or regulations and constructed a national MRV system, building a solid foundation for ETS development.

According to the NDCs of these countries, their respective climate ambitions give a clear indication of their potential technical ETS design-elements. All five countries have similar sector coverage of emissions reduction, all setting goals for the energy, LULUCF, waste, and industry sectors. The major difference lies in the fact that China and Thailand have not specified which sectors to cover, but have set economy-wide mitigation goals, which may lead to an emphasis on specific sectors when actually running an ETS. For instance, China's national ETS contains specific coverage on the power sector. In terms of gas coverage, all of the selected countries aim at GHG reduction with different extents of coverage, not only CO_2. Differences in both sector coverage and gas coverage would impede the process of ETS harmonisation, and need to be negotiated and compromised before the potential linkage.

Potential solutions for ETS harmonisation:

- Active participation in, e.g. the World Bank PMR project or close cooperation at ministerial level to take an integrated approach to developing ETSs and the related policies.
- Adoption of international standards and best practices to construct an MRV system in each country.
- Establishing ETS funds to support the establishment of ETSs in ASEAN countries.
- Deepening China and ASEAN cooperation on ETS development, formulation of general principles for each country, and holding training events or forums for related shareholders.

Table 6-3 ETS robustness and design elements of possible ETS based on NDCs

Country			China	Vietnam	Indonesia	Thailand	The Philippines
ETS robustness	Responsible regulator	Environmental ministry	Ministry of Ecology and Environment	Ministry of Natural Resources and Environment	Ministry of Environment and Forestry	Ministry of Natural Resources and Environment	Department of Environment and Natural Resources
		Special regulator	National Leading Group for Climate Change, Energy Conservation and Emissions Reduction	National Committee on Climate Change	Directorate General of Climate Change	National Committee on Climate Change Policy	Climate Change Commission under the Office of the President
		Several regulators	National Carbon Allowance Registry Authority, National Carbon Trading Authority	Provincial People's Committees	National Development Planning Agency, Ministry of Finance, Ministry of foreign affairs	ONEP, TGO and other agencies	Regional Environment and Natural Resources Offices
	Relevant legislation or regulation		x	x	x (under development)	x (under development)	
	MRV system		x	x	x (pilots)	x	x (under development)
Design element (based on NDCs)	Sector coverage	Energy	Economy-wide	x	x	Economy-wide (exclude LULUCF)	x
		Agriculture		x	x		
		LULUCF		x	x		x
		Waste		x	x		x
		Industry		x	x		x
		Transport					x
	Gas coverage	CO_2	x	x	x	x	GHG (not identified)
		CH_4	x	x	x	x	
		N_2O	x	x	x	x	
		HFCs	x	x		x	
		PFCs	x			x	
		SF_6	x			x	

7

Summary

This report has looked at the potential of ETS harmonisation between China and selected ASEAN countries (Vietnam, Thailand, Indonesia, and the Philippines). The report analyses selected successful and unsuccessful case studies of ETS harmonisation, and several factors have been found to be essential for ETS harmonisation, particularly political ambitions for climate reduction, close political and economic relations between the jurisdictions considering harmonisation, and ETS design elements (in lieu of an existing ETS, the NDC ambitions can be used to explain the technical design-elements of emission reductions).

In our analysis of the status of ETS development and climate ambitions in the five countries, we found that China is currently the most advanced country in this region in developing a national ETS, having already established several pilot markets and finalised the related policy documents. Vietnam recently adopted a revised law and created a mandate for ETS development, while Indonesia and Thailand are still discussing and drafting ETS legislative documents. In addition, Vietnam and Thailand are also developing carbon credit markets, which may create potential for international ETS linkage. All the countries are part of the World Bank's PMR project to support ETS readiness. Similarly, when analysing climate goals, relevant differences emerged which further challenge ETS harmonisation: compared to the absolute emission targets of the ASEAN countries (as shown in the NDCs), China's emission reduction targets lack a short-term absolute emission reduction goal, but focus on emission intensity (in terms of CO_2 emissions per unit of GDP). This difference in climate goals may largely influence the design elements of ETSs to be developed by respective countries. Furthermore, when analysing the NDCs of the countries, the relevant sectors for emission reduction (as a yard stick for an ETS) differ, which may inhibit ETS linkage. In summary though, we found several important alignments of political ambitions, as well as significant differences relevant for ETS harmonisation at this time.

Looking at the current cooperation between the countries as a driver of ETS harmonisation, the recent signing of the RCEP free trade agreement has further solidified the existing cooperation among the countries. As the potentially largest trading bloc, ETS harmonisation could become relevant, also as current development statuses (e.g. in regard to GDP per capita) are mostly comparable between the selected countries. Including further RCEP countries in ETS harmonisation would theoretically grow the market size of an ETS, but due to large development gaps between, for example, highly-developed Japan and some less-developed ASEAN countries, broad ETS harmonisation in the RCEP seems less likely. Other forms of cooperation that these countries engage in include the Chinese Belt and Road Initiative (BRI). Within this initiative, China seeks to develop a new governance system for the world, which could also foster ETS harmonisation.

Finally, the design elements of an ETS should be considered for harmonisation. In lieu of existing ETSs, NDC ambitions were used to analyse design elements, by analysing the included sectors, the included greenhouse gases, etc. It quickly became obvious that the current design elements are mostly non-congruent, with different sectors and gases covered.

In summary and based on the analysis, we see that ETS harmonisation is possible between Vietnam, Indonesia, and Thailand, with unlikely near-term harmonisation with the Philippines (due to less-developed ETS legislation). China, despite being further developed in establishing its national ETS, is currently less likely to have a harmonised ETS with these countries due to its intensity-based emission reduction target (see Table 7-1).

In order to further accelerate ETS harmonisation, both environmental cooperation between the selected countries (e.g. through ASEAN and BRI forums) should be strengthened, as well as international support to drive climate ambitions (e.g. through technology transfer and financial support), as well as further technical support in establishing ETSs including stringent MRV and accounting systems which should be accelerated. Furthermore, by establishing a more international carbon trading system and finally reducing the risk of double counting of carbon credits, global incentives for harmonisation could be set which in turn would provide the relevant incentives for national ETS establishment.

Table 7-1 Evaluation of the ETS harmonisation potential between China and ASEAN Countries over 10 years

	China	Vietnam	Indonesia	Thailand	The Philippines
China					
Vietnam					
Indonesia					
Thailand					
The Philippines					
Explanation	Low potential				High potential

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