

REPORT

Roadmap to a Northeast Asian Carbon Market

Dr. Jackson Ewing



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ABBREVIATIONS

ADB	Asian Development Bank
ASPI	Asia Society Policy Institute
BCA	Border Carbon Adjustments
CCER	Chinese Carbon Emissions Reduction
CDM	Clean Development Mechanism
CO2	Carbon Dioxide
ETS	Emissions Trading Scheme
EU	European Union
EU ETS	European Union Emissions Trading System
GHG	Greenhouse Gas
ICAP	International Carbon Action Partnership
ICJ	International Court of Justice
IETA	International Emissions Trading Association
INDC	Intended Nationally Determined Contributions
IT	Information Technology
ITMO	Internationally Transferred Mitigation Outcomes
JCM	Joint Crediting Mechanism
JPY	Japanese Yen
JVETS	Japanese Voluntary Emissions Trading System
KETS	Korea Emissions Trading Scheme
KRW	South Korean Won
MoU	Memoranda of Understanding
MRV	Measurement, Reporting, and Verification
NAFTA	North American Free Trade Agreement
NDRC	National Development and Reform Commission
OECD	Organization for Economic Co-operation and Development
PMR	Partnership for Market Readiness
tCO2e	Tons of CO2 equivalent
TMG ETS	Tokyo Metropolitan Government Emissions Trading Strategy
UNFCCC	United Nations Framework Convention on Climate Change

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FOREWORD

FACING UP TO CLIMATE CHANGE IS A KEY CHALLENGE OF OUR TIME. We are on pace in 2016 to again record the warmest global temperatures ever measured; a distinction that now appears to be an annual occurrence. Weather is becoming less predictable, storms more intense, and drought and flooding more pervasive. This destroys livelihoods, impedes economic progress, and undermines the sustainable development gains we are working hard to achieve.

Slowing down and ultimately reversing climate change requires us to lower our greenhouse gas emissions. And effectively pricing carbon emissions is a vital place to start.

Pricing carbon through markets creates incentives, sets clear rules, and encourages regulated organizations to lower emissions in flexible ways that work for them. Like much in the current climate change arena, the main action on carbon markets is happening beneath the global scale.

After years of chasing global mechanisms to price and trade carbon emissions credits, the landmark Paris Agreement of December 2015 both recognizes and provides political and policy space for efforts at local, state, and regional levels. The relevance of carbon markets is growing apace; almost doubling in scale since 2012 with forty states and twenty-three cities, regions, and provinces pricing emissions worth some \$50 billion.

The major economies of Northeast Asia—China, Japan, and the Republic of Korea (hereafter Korea)—are part of this movement. China has launched pilot markets in five major cities and two key provinces, creating the second largest carbon market coverage in the world behind the European Union.

Japan has experimented with carbon markets for decades, develops credits from emission-reducing projects in developing countries, and now runs linked trading schemes in Tokyo and Saitama Prefecture.

Korea has moved from rapid emissions growth during the 1990s and 2000s to some of the most progressive climate change policies in the world, with a 2010 green growth plan guiding the first national carbon market operating in the region.

This Asia Society Policy Institute report, authored by Dr. Jackson Ewing with inputs from senior regional officials and leading thinkers, argues that China, Japan, and Korea should work toward linking their respective carbon markets. Linking Northeast Asian markets would expand the emissions-reduction options in each country, lessen price shocks from unexpected events, and erode the influence of individual large companies. It would share administrative burdens, help countries avoid duplication, and reduce the impetus for companies to move high-emitting activities around the region in search of less strict climate change policies.

Linking carbon markets in Northeast Asia may also pay regional diplomatic dividends, and build confidence in the ability of China, Japan, and Korea to work together to address a complex international challenge.

Globally, market linkage offers these Northeast Asian states the chance to show climate change leadership, and would help build momentum toward global climate mitigation goals. Given that China,

Japan, and Korea collectively account for over a quarter of global emissions, linking carbon markets would have enormous material impacts by helping the region fundamentally shift its emissions profile.

These countries are currently focused on developing their domestic markets, and the period between 2015 and 2020 is set to usher in the next generation of their carbon market approaches. It is precisely because China, Japan, and Korea are in this formative phase that now is an ideal time to build the foundation for regional carbon market links.

My ASPI colleagues and I are invested in helping drive actions to create these links, and we offer this report as a part of the pathway forward.

The report contains five key recommendations. It argues that China, Japan, and Korea will not develop uniform carbon markets, but they can and should develop markets with enough in common to make future linkage possible. It proposes linking incrementally by forming initially loose and informal market connections. It promotes building a community of experts across sectors in the three countries that exchange information, co-create projects, and seed ideas to Northeast Asian policymakers. The report suggests piloting city-level market links as a way to give governments a laboratory of cross-border connections. And it implores China, Japan, and Korea consciously to employ international market principles and approaches to help them develop common ground.

This ASPI report results from exploratory work throughout 2016, and stems from dialogue with regional leaders in the field who see opportunity in carbon market cooperation. It has benefitted from the input of a wide range of people and organizations.

Particular thanks is warranted for our partners at the World Bank Carbon Pricing Leadership Coalition and Networked Carbon Markets Initiative. These tireless organizations, and their leaders Tom Kerr, Vikram Widge, Christian Grossman, and Bianca Sylvester, co-convened a high-level roundtable alongside ASPI on the side-lines of the 2016 global Carbon Expo in Cologne. This roundtable brought together architects of carbon markets around the world, leading thinkers on designing market links, and builders of carbon markets in Northeast Asia. Special thanks goes to all roundtable participants, including the regional representatives Duan Maosheng, Zhou Jian, Wu Qian, Kazuhisa Koakutsu, Ken'ichi Matsumoto, and Hyungna Oh. This report would not be possible without their insights. I also wish to thank the Children's Investment Fund Foundation for their partnership and support.

This is the very beginning, rather than the culmination, of this project. ASPI will continue to work throughout Northeast Asia to help build carbon market connections, and steer timely and pragmatic policy ideas toward those in a position to make this vision a reality.

As President of ASPI, I think linking carbon markets in Northeast Asia would help us rise to the climate challenge. I hope that this report makes a useful contribution to this end.

The Honorable Kevin Rudd
President, Asia Society Policy Institute
26th Prime Minister of Australia

EXECUTIVE SUMMARY

THE GLOBAL CLIMATE CHANGE CHALLENGE REQUIRES MAJOR REDUCTIONS IN GREENHOUSE GAS (GHG) emissions in major economies around the world. Few regions are as critical for this task as Northeast Asia, where China, Japan, and the Republic of Korea account for more than one-fifth of the global economy and over a quarter of global emissions. They have pledged to curtail these emissions and are using carbon markets as tools for doing so. These markets incentivize emitters to emit only what they are allowed and compel them to buy “allowances” for emitting beyond their limit. They create tradeable units, in which emitters falling below their limits sell permits to those that exceed them. When effective, carbon markets provide flexible options for lowering emissions at reduced costs. This report contends that China, Japan, and Korea should work cooperatively to link these domestic markets to make them more economically efficient, environmentally impactful, and strategically valuable.

The report proceeds across four primary issue areas: (1) carbon markets’ place in evolving international responses to climate change; (2) the ways carbon markets can link across political jurisdictions; (3) how China, Japan, and Korea could benefit from linking markets; and (4) the specific steps these countries might take to realize market linkage. It draws from prevailing literature, as well as the findings of the High Level Roundtable, “Toward a Northeast Asian Carbon Market,” convened by the Asia Society Policy Institute (ASPI) and World Bank Group on the sidelines of the 2016 global Carbon Expo.

Attention is turning to China, Japan, and Korea as potential global leaders in carbon market cooperation and connectivity.

NORTHEAST ASIA IN THE GLOBAL CARBON MARKET LANDSCAPE

The Paris Agreement, reached in December 2015, is based on flexible and nationally determined commitments to reduce GHG emissions. Its Article 6 provides a foundation for how Parties can voluntarily cooperate via market connections to meet these commitments. The article does not attempt to create a global carbon price or an international market but rather supports and offers guidance to markets being crafted, managed, and linked around the world.

This international context bolsters carbon market linkage prospects in Northeast Asia, and attention is turning to China, Japan, and Korea as potential global leaders in carbon market cooperation and connectivity. Given the scale of their economies and emissions profiles, successfully linking these markets would substantially impact international climate change mitigation efforts.

DEFINING LINKAGES

Linked carbon markets recognize tradeable emissions units across political jurisdictions. They take many forms. *Indirect linking* allows liable entities to be credited with reducing their emissions by a separate system that acts as a common international mechanism, and offers only loose market-to-market connections. *Incremental linking* recognizes the difficulty of harmonizing different market designs and approaches, and it seeks gradual convergence on facets of carbon markets needed to make direct linkage possible. *Restricted linking* constrains the amount or type of foreign credits that are acceptable in a domestic market, and may

use exchange and discount rates to determine how emissions units are valued. *Reciprocal linking* bypasses the barrier of negotiating legally-binding bilateral or multilateral treaties, and creates less formal agreements by which two jurisdictions recognize each other's emissions-reduction units. *Formal direct linking* forges internationally negotiated policies that determine legal frameworks, define the carbon units that are eligible for use, and map the technical rules for the market's operation.

Connecting carbon markets in China, Japan, and Korea will require strategic decisions about what part of the linkage continuum is most appropriate for the region.

international linkages through its Joint Crediting Mechanism. Korea is in a formative phase of carbon market development, during which it is set to progressively accept growing numbers of foreign carbon units. This report calls for incremental, reciprocal linkages that avoid the barriers of legally-binding treaty construction and cater to the heterogeneous markets of Northeast Asia.

THE CASE FOR CARBON MARKET LINKAGE IN NORTHEAST ASIA

Linking carbon markets in Northeast Asia would pay economic, environmental, and strategic dividends, and the time to work toward market linkage is now.

Economically, linking can reduce emissions-reduction costs by expanding the number of unit buyers and sellers in ways that increase market liquidity and efficiency. This growth in market scale can reduce carbon price volatility by lessening the influence of powerful individual players and assuage competitiveness concerns by creating a more coherent regulatory environment across the region.

Environmentally, linkage can minimize the leakage of emitting activities from one jurisdiction to another, which occurs when strict emissions regulations in one place cause emitters to shift their activities to areas with less stringent policies. Linking carbon markets would bring environmental co-benefits as lowering GHG emissions also reduces multiple conventional pollutants that impact Northeast Asia in interconnected ways. By making emissions reductions more efficient and affordable, linked markets would also encourage China, Japan, and Korea to set more ambitious reduction targets in the future.

Strategically, linking Chinese, Japanese, and Korean markets would provide a confidence-building measure for wider Northeast Asian relationships and would demonstrate global climate change leadership through the region's commitment to long-term multilateral actions that are impactful and nuanced.

Evidence from carbon market linkages around the world demonstrates the value of early-stage dialogue and cooperation among stakeholders. It is because China, Japan, and Korea are in formative phases of carbon market development, not in spite of it, that now is an ideal time to set the foundation for regional carbon market links.

Connecting carbon markets in China, Japan, and Korea will require strategic decisions about what part of the linkage continuum is most appropriate for the region. Each regional carbon market has unique designs and underlying principles and goals. China's national market stems from a seven-market pilot phase that has yielded varying design models, all of which are based on reducing China's energy intensity. Japan has decades of experience with carbon market experimentation and currently has linked markets in Tokyo and Saitama Prefecture along with

Mechanism. Korea is in a formative phase of carbon

market development, during which it is set to progressively accept growing numbers of foreign carbon

units. This report calls for incremental, reciprocal linkages that avoid the barriers of legally-binding treaty

construction and cater to the heterogeneous markets of Northeast Asia.

ROADMAP TO LINKING CARBON MARKETS IN CHINA, JAPAN, AND KOREA

The report makes five recommendations to build a foundation for linking Northeast Asian carbon markets.

1. Create Linkage-Ready Carbon Markets

Northeast Asian carbon markets will not come to share all design characteristics, or have a completely unified emissions cap or carbon price. Rather, China, Japan, and Korea need to share aspirations toward future linkage, avoid domestic markets that lock out linkage possibilities, and create flexible markets that will be linkage-ready in the future.

2. Link by Degrees

China, Japan, and Korea should incrementally link their markets and work toward the reciprocal recognition of trading units. In the near term, they should not seek legally-binding treaties but rather create coordinated, often voluntary, networked governance structures that support cross-border emissions trading.

3. Build a Community of Experts and Practitioners across Sectors

Linking Northeast Asian systems requires regular cooperation across a range of experts and practitioners, and near-term efforts should include meetings and informational exchanges that are frequent, formal and informal, multistakeholder, and at both senior policy and technical levels. These exchanges are vital for co-creating regional partnerships that are acceptable across sectors and jurisdictions.

4. Pilot Sub-national Market Linkages

Piloting sub-national market linkages can build the technical and political foundation from which further market linkages extend and create economic, environmental, and strategic benefits along the way. Trial linkages among Beijing, Tokyo, and Seoul would provide national governments with a city-level laboratory for exploring linkages across borders and—given the scope of emitting activities within these jurisdictions—have significant environmental and economic impacts.

5. Selectively Employ International Design Principles

International agreements and institutions can help Northeast Asian countries commonly define principles, terms, and rules of operation. These markets will remain unique, but some deployment of international mechanisms and capacity-building resources will have a harmonizing effect across the region and will help build the foundation for carbon market linkage.

CONCLUSION

Internationally based capacity-building efforts must extend to political and diplomatic bridge builders that support linked markets in Northeast Asia. Non-partisan champions, including the Asia Society Policy Institute (ASPI), have an essential role to play in convening international and regional stakeholders across sectors in organized and targeted dialogues leading to tangible outcomes.

For its part, ASPI will continue to work with regional and international stakeholders as Northeast Asian markets evolve between 2016 and 2020. It will bring together architects of carbon markets in China, Japan, and Korea to map out how to build political will, and progressively harmonize targeted standards and practices across regional jurisdictions. ASPI will promote and help foster experimental near term pilot efforts to link markets at sub-national levels and across limited sectors. It will explore simulations of

regional market linkages with regional trading exchange partners, and garner private sector participation in hypothetical trading exercises in real-time on actual exchanges. It will commission and conduct research into aspects of linking Northeast Asian markets that require further analysis, including those highlighted by the recommendations of this report. Throughout these efforts, ASPI will bring international experts and experienced practitioners who are familiar with linking efforts from outside the region, and in doing so help China, Japan, and Korea learn from the successes and avoid the failures of their international peers.

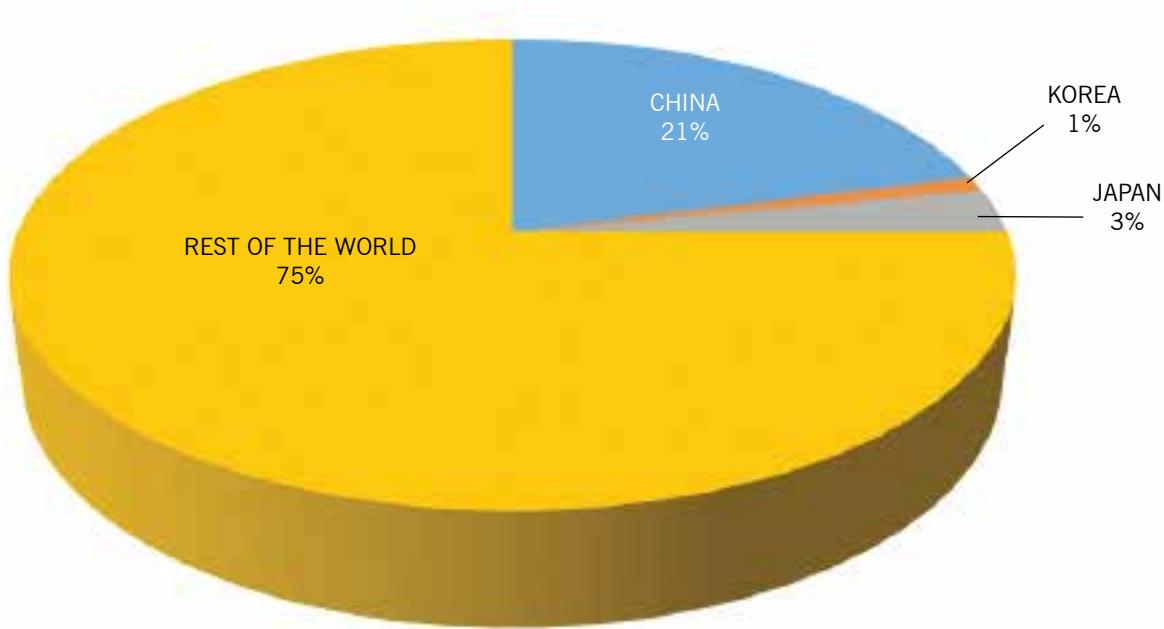
Carbon market linkage in Northeast Asia has great potential, and China, Japan, and Korea are well-placed to lead the global community into a new era of cooperative climate response efforts. Linkage considerations are also complex, multilayered, and have implications across sectors and jurisdictions. It will take consistent and action-oriented institutional and person-to-person connections to make regional market linkages a reality. As this report argues, the time for building these connections is now.

1. NORTHEAST ASIA IN THE GLOBAL CARBON MARKET LANDSCAPE

INTRODUCTION

FACING THE GLOBAL CLIMATE CHANGE CHALLENGE REQUIRES MAJOR REDUCTIONS IN GREENHOUSE GAS (GHG) EMISSIONS, and few if any regions are more important to this end than Northeast Asia. China, Japan, and the Republic of Korea (hereafter Korea) collectively account for more than one-fifth of the global economy and more than a quarter of global GHG emissions (see Figure 1). They have pledged to move toward a lower emissions future, and—like their international peers—are seeking cost-effective ways to reduce emitting activities. Pricing GHGs is an appealing strategy for these Northeast Asian powers: by placing a value on emissions, the countries will incentivize emitters to emit only what they are allowed or compel them to buy “allowances” for emitting beyond their limit. By making these allowances tradeable units, in which emitters that fall below their limits sell units to those that exceed them, these countries and industries can enjoy a flexible tool for reducing emissions over time in a cost-effective way. As such, China, Japan, and Korea have made carbon markets—or emissions trading schemes (ETSS)—key elements of their climate change mitigation strategies. This report argues that they should work to link these domestic markets, as linkage would make the markets more economically efficient, environmentally effective, and strategically advantageous.

FIGURE 1: NORTHEAST ASIA'S SHARE OF GLOBAL EMISSIONS (2005–2012)



Source: “CAIT Climate Data Explorer,” 2015. Washington, D.C.: World Resources Institute. <http://cait.wri.org>. CAIT data are derived from several sources, for full citations see: <http://cait.wri.org/faq.html#q07>.

This relatively simple concept belies a litany of complex considerations surrounding the development and management of linked carbon markets. Fortunately, Northeast Asia has a foundation to work from. Korea already operates the largest mandatory national ETS in the region and is building capacity in partnership with the European Union (EU) to increase technical cooperation between their respective schemes.¹ Japan has a history of experimentation with emissions trading, linked emissions trading systems in Tokyo and Saitama Prefecture, and international connections through its Joint Crediting Mechanism. China is deep into plans to launch a national system based on the results from seven pilot schemes by late 2017. This scheme alone is expected to lift the proportion of GHGs covered by carbon markets from 9 to 16 percent. It would be double the size of the EU ETS and be greater than all other existing carbon markets combined.² Linking these markets, which are detailed further in Section 2.3, would be a significant step toward connecting regional and international efforts to reduce global GHG emissions.

1.1 STRUCTURE OF THIS REPORT

This report proceeds across four primary topics. The remainder of this section provides the international context within which carbon market developments in Northeast Asia are situated. It focuses on the evolution of global climate change responses from top-down, international mechanisms to bottom-up efforts at sub-national, national, regional, and non-state levels. This shift is both enabling and responding to the growing trend of national and regional carbon market development. Section 2 details the characteristics of market linkages. It explores leading analysis on market linkage principles, reviews a continuum of linkage approaches, and provides an overview of the domestic markets in China, Japan, and Korea with an eye toward their linkage potential. Section 3 makes the argument for why these markets should link. It divides its analysis among economic, environmental, and strategic advantages that may come from linking, and contends that the time for working toward regional linkage is now. The final section offers a roadmap for how Northeast Asian carbon markets can link in practice. It gives five targeted recommendations that seek to build a foundation for future linkage and enhance climate change mitigation and diplomatic partnerships in Northeast Asia along the way.

The report draws from prevailing literature, as well as the findings of the High Level Roundtable, “Toward a Northeast Asian Carbon Market,” convened by the Asia Society Policy Institute (ASPI) and World Bank Group on the sidelines of the 2016 global Carbon Expo.³ While the analysis put forth during the Roundtable is unattributed, it made invaluable contributions to this report’s content.

1.2 THE NEW GENERATION OF CLIMATE CHANGE RESPONSES

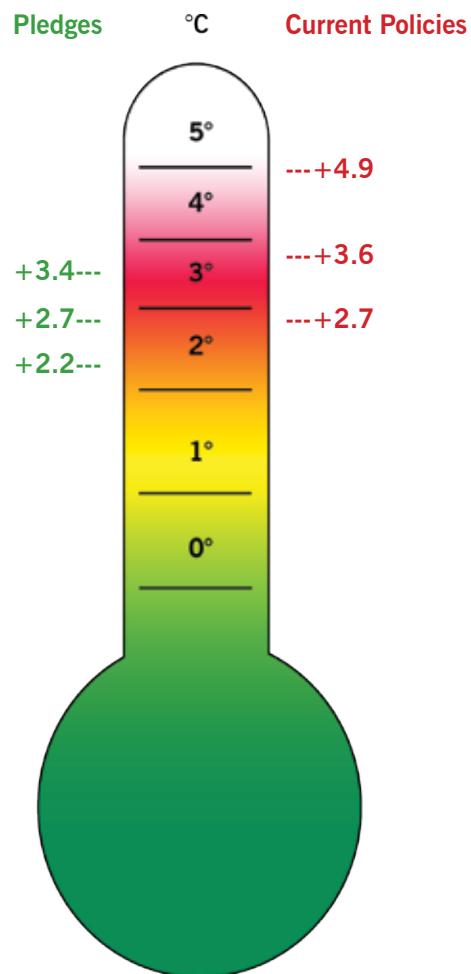
Since the negotiation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, climate change mitigation efforts have largely been conducted under the auspices of global agreements and protocols. Resulting climate change policies and international frameworks have become more complex and wide ranging but have continually struggled to slow climate change, and broad, ambitious international agreements have proven difficult to construct and implement. Therefore, despite the best intentions of Parties to the UNFCCC, international policy responses to climate change have been both top-down and fragmented.

The failure of Parties to the Copenhagen climate summit in 2009 to find the compromise they sought marked a turning point in attitudes to global coordination, and since then the Cancun Agreement of 2010 and the Durban Platform of 2011 have seen global climate change frameworks accelerate from top-down to bottom-up systems. Aspirations toward global targets and delineations between developed and

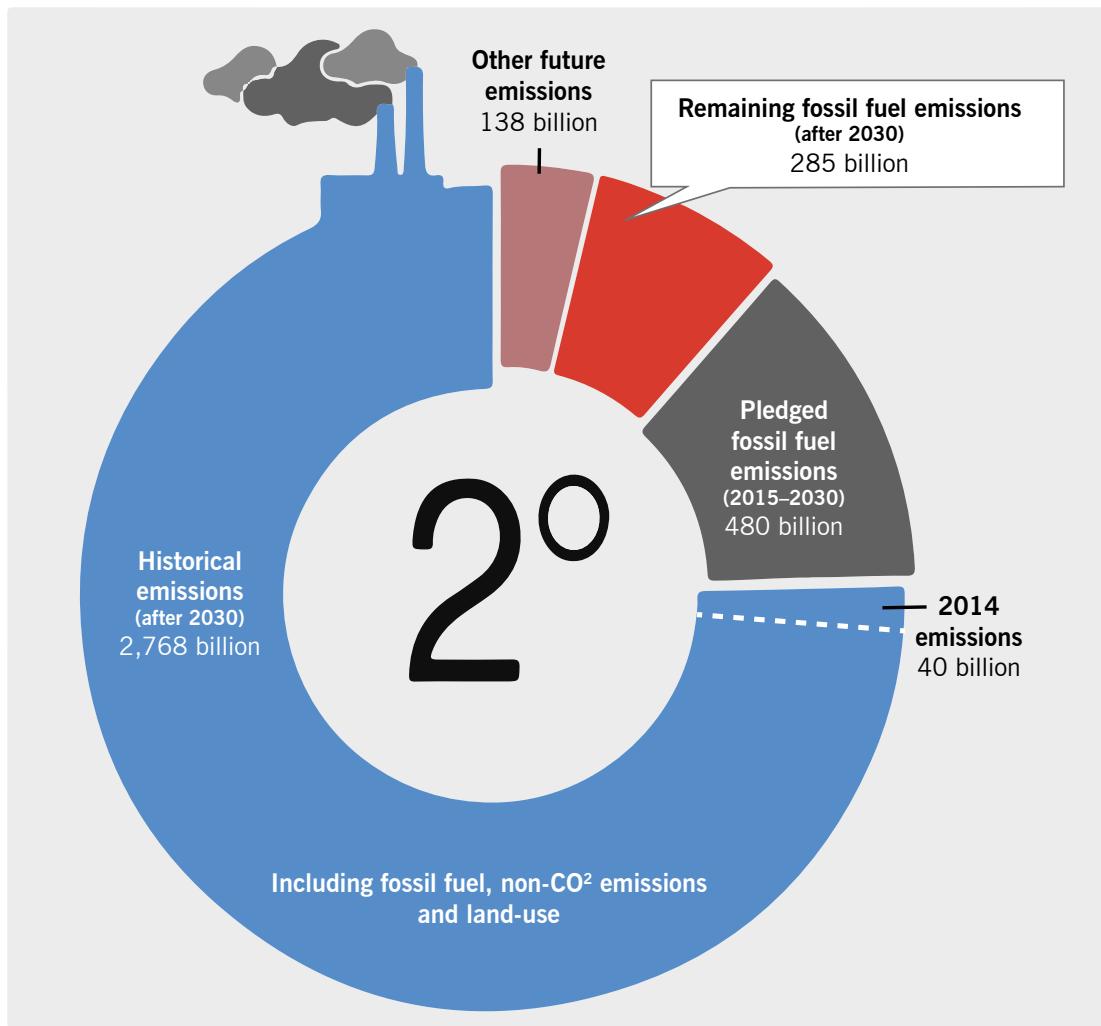
developing countries have given way to structures that encourage more fine-grained responses to climate change and cater to the specific political, economic, and physical circumstances of individual Parties. This shift culminated with the adoption of the Paris Agreement in December 2015, which offers flexible, nationally-determined commitments to reducing GHG emissions.

These commitments coalesce around a clear goal: keep the global temperature increase below 2 degrees Celsius above pre-industrial efforts, and make efforts to keep this increase below 1.5 degrees Celsius. Countries across the world submit plans—known as intended nationally-determined contributions (INDCs)—for how they will reduce their emissions, and combined, these plans represent the trajectory of global climate mitigation efforts. Figure 2 shows the path that aggregated INDCs place the world on now, charting predicted global temperature increases under current policies and under a scenario in which all INDC pledges are met. Figure 3 shows the historical emissions that leave small future margins.

FIGURE 2: GLOBAL COMMITMENTS FALL SHORT OF TEMPERATURE TARGET



Source: Adapted from "Climate Action Tracker." www.climateactiontracker.org

FIGURE 3: HISTORICAL EMISSIONS AND THE CLIMATE CHALLENGE (IN TONS)

Source: Adapted from Jeyaratnam et al., 2015. "The Paris climate agreement at a glance." *The Conversation*, December 12. <https://theconversation.com/the-paris-climate-agreement-at-a-glance-50465>

These figures reveal that while the INDCs are putting the world on a lower emissions trajectory, they still fall short of our declared temperature target. Moreover, the room to maneuver toward this target is slight. This reality makes the need for effective emissions-reducing tools and policies all the more pronounced.

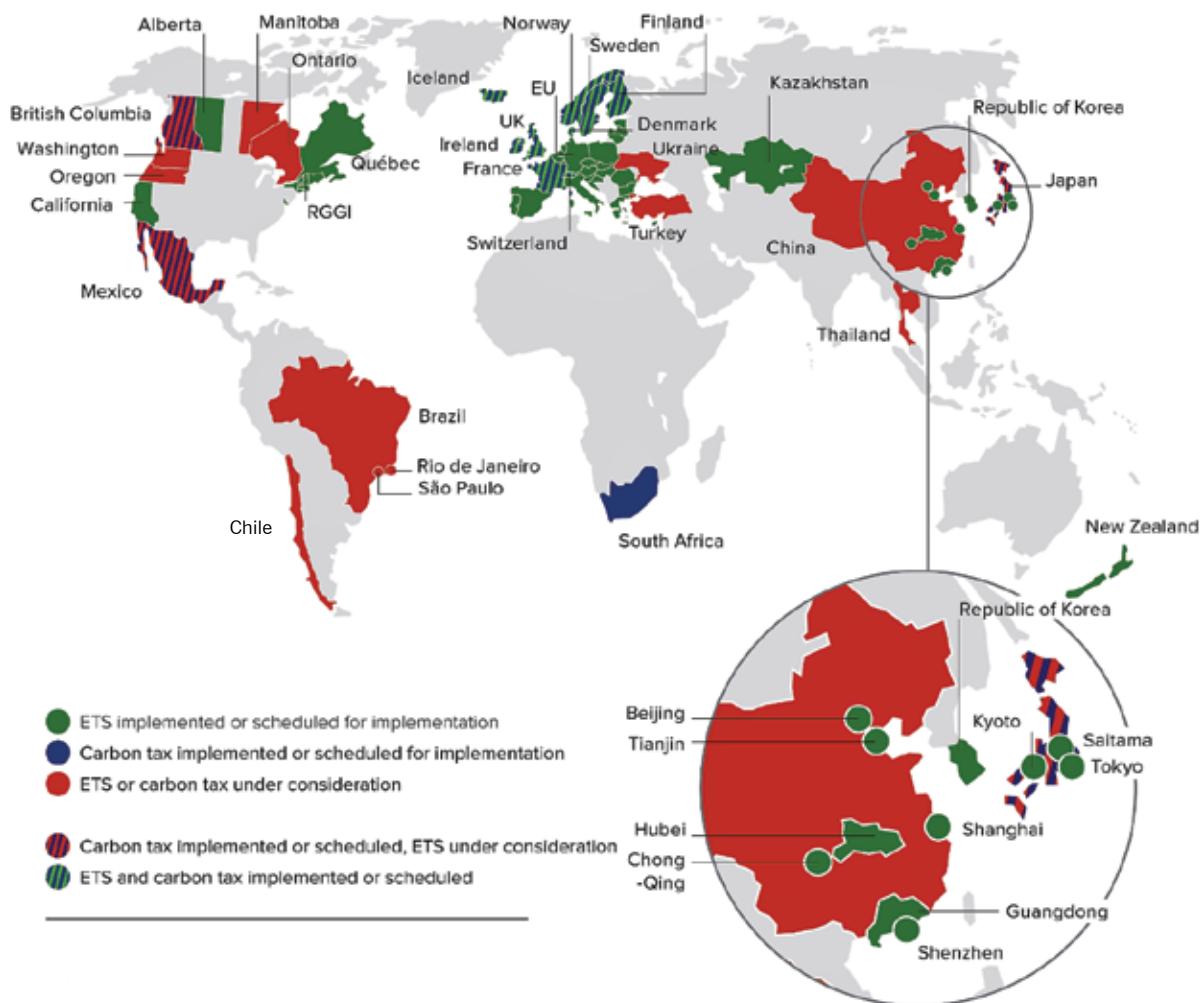
1.3 DEVOLVING CARBON MARKETS

Ninety governments expressed through their INDCs the intention to employ carbon pricing mechanisms to meet their intended greenhouse gas reductions.⁴ Carbon markets are designed to efficiently and effectively establish prices, and enable actors to find innovative and cost-effective ways to reduce their emissions profiles. In a post-Paris world, carbon markets are evolving to what Andrei Marcu, founder of

the International Emissions Trading Association (IETA), referred to as “Greenhouse Gas Markets 2.0”—that is, markets that encompass a more diverse suite of carbon pricing approaches based on national circumstances and political feasibility.⁵

This context deemphasizes the place of a formerly-sought after global carbon market and renders linkage between regional, national, and sub-national carbon markets both more palatable and more achievable. As Jeff Swartz, director of international policy at IETA, points out: “the momentum for harmonizing carbon pricing mechanisms is growing [and] well-designed carbon pricing systems that are able to expand by linking with other systems over time will both advance environmental objectives and reduce costs.”⁶ Figure 4 captures this global picture, and Northeast Asia’s place within it.

FIGURE 4: GLOBAL AND REGIONAL CARBON PRICING REGIMES



Source: Adapted from World Bank, 2014. *State and Trends of Carbon Pricing 2014*. Washington, D.C.: World Bank.

The Paris Agreement contains no mention of the words “markets” or “emissions trading.” However, the future architecture of carbon markets—specifically linked carbon markets—has support in its Article 6, one of the last points of contention negotiated at the conference. Article 6 presents a broad foundation for how Parties may voluntarily cooperate via market or non-market approaches to meet their INDCs and lays the institutional groundwork for future carbon market linking.

Article 6 recognizes that multilateral cooperation would “allow for higher ambition” in mitigation and adaptation actions. For carbon market connections, it introduces “internationally transferred mitigation outcomes” (ITMOs) as a cooperative tool. ITMOs are essentially carbon mitigation units similar to those in instruments such as the Clean Development Mechanism that underwrote the previous generation of carbon markets. While ITMOs may emerge as a new class of internationally traded units, there is no requirement or guarantee that carbon markets or other mitigation mechanisms around the world will use them.⁷ ITMOs were joined in the Paris Agreement by the “Sustainable Development Mechanism,” under which a broad range of cooperative and often ad hoc mitigation efforts can likewise be situated. While these

With the rise of emissions trading schemes in the region’s major economies, eyes are naturally turning to China, Japan, and Korea, as harbingers of future carbon market connectivity.

statements do not, of themselves, create a global international convergence on the core processes by which interested Parties may do so.

The market provisions within Article 6 of the Paris Agreement support the development, operation, and expansion of linked carbon markets. They also currently have limited relevance. The creation of sub-nationally, nationally, and internationally-linked carbon markets does not depend on and is not beholden to the negotiated outcomes of the UNFCCC. Rather, this international and institutional context gives support to linkage efforts that fit regional preferences and characteristics. And no region is more important to mitigating climate change than Northeast Asia. With the rise of emissions trading schemes in the region’s major economies, eyes are naturally turning to China, Japan, and Korea as harbingers of future carbon market connectivity. The success of such connectivity may well prove essential to global efforts to combat climate change.

2. DEFINING LINKAGES

2.1 BASIC CHARACTERISTICS OF CARBON MARKET LINKAGE

MOMENTUM SURROUNDING TARGETED CARBON MARKET LINKAGES HAS ARISEN OUT OF PRAGMATISM.

Global solutions have proven elusive despite nations' increased recognition that action against climate change is a shared global responsibility. National and sub-national emissions trading schemes are filling the void created by the absence of a global market and are evolving in unique and often promising ways. Linking these carbon markets to create larger markets, with more participants and emissions-reducing activities, will catalyze deeper and more widespread emissions reductions and could incrementally lead to a real or de facto global emissions trading system over time. Regardless of the direction this longer-term global outlook takes, however, carbon markets beneath the global level are already impactful and linkage is the most viable short-term pathway for their expansion.

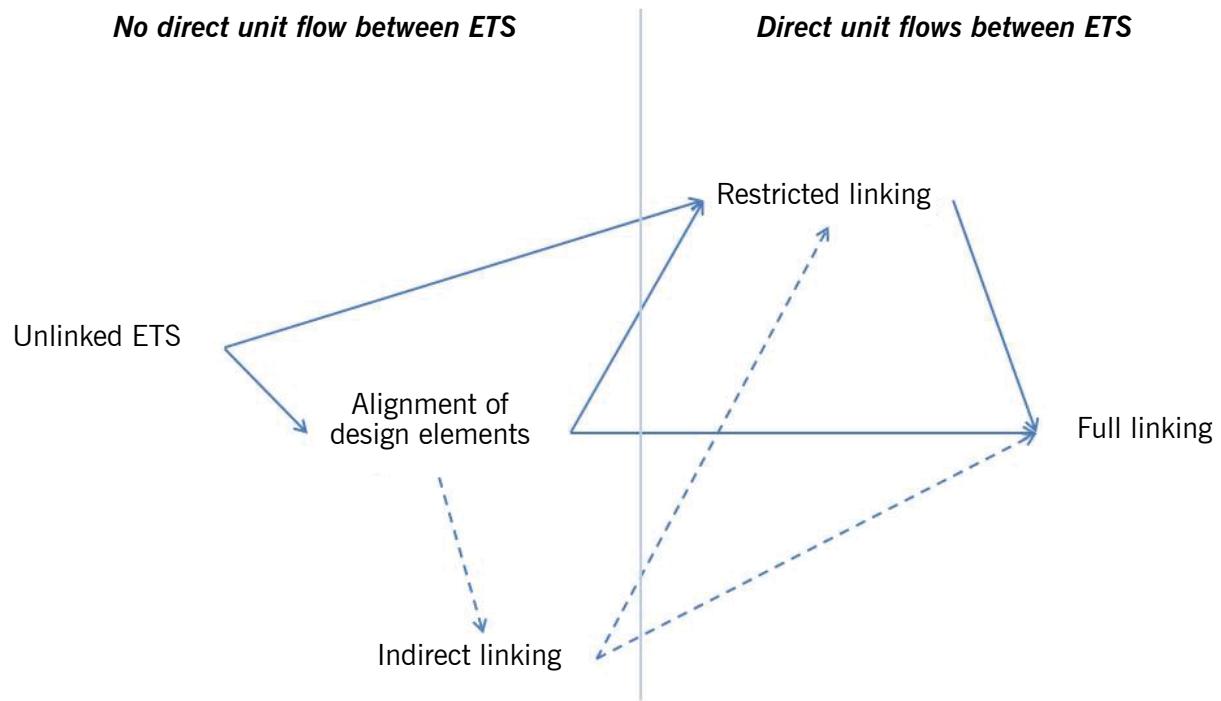
Linked carbon markets recognize tradeable emissions units across jurisdictions. Carbon markets allow liable entities with excess permits—those that are emitting less than their allowance—to sell these permits to an entity emitting more than its allowance. In a linked carbon market, jurisdictions agree that such permits can be traded between entities operating in different jurisdictions, including in some cases across national boundaries. Such markets provide flexibility without compromising the environmental benefit of their emissions trading schemes, as emissions reductions are still realized, albeit outside of the scheme's geographical boundary.

Linkages take many forms,⁸ and this section focuses on the continuum of linkage options for connecting carbon markets in a regional context.

National and sub-national emissions trading schemes are filling the void created by the absence of a global market.

2.2 CONTINUUM OF LINKING APPROACHES

Linking carbon markets takes technical expertise, strategic vision, and diplomatic energy. Assembling and aligning the necessary expertise and political leadership takes time, and incremental approaches are needed to achieve progress and gather momentum toward fully linked carbon markets (see Section 3.5). Increasingly, research around carbon market linking focuses on alternative approaches to the full harmonization of design options.⁹ In other words, linking markets of varied designs is the key challenge of the day. A variety of linkage approaches ranging in difficulty and scope, from an alignment of program elements without mutual unit recognition through to full linkage with unrestricted unit recognition and the complete fungibility of tradeable allowances, are explored in this section. As Figure 5 shows, these different linkage approaches can be interactive and multi-directional rather than mutually exclusive.

FIGURE 5: LINKING PATHWAYS

Source: Adapted from Michael Lazarus, et al., 2015. "Options and Issues for Restricted Linking of Emissions Trading Systems." International Carbon Action Partnership.

Indirect Linking

Indirect linking occurs when two or more carbon markets allow liable entities to achieve emissions reductions in jurisdictions outside their “home” market through a third system that acts as a common crediting mechanism. By having a common third system, the jurisdictions remain only indirectly linked as there is no mutual unit recognition. These mechanisms can be distinguished from cap-and-trade systems through several features. Crediting systems are entirely voluntary, they do not impose additional obligations on liable entities, and they ensure additionality by relying on agreed-upon baselines from which they calculate their emissions reductions.¹⁰ As such, they are essentially a loose connection that provide firms with options for meeting their emissions commitments.

Indirect linking is already in place with flexible mechanisms such as the Clean Development Mechanism (CDM) of the Kyoto Protocol and Japan’s Joint Crediting Mechanism (JCM). Both of these schemes facilitate the funding and implementing of emissions-reducing activities in developing economies by entities seeking to meet their own emissions commitments. These projects go through rigorous design and approval processes, with the CDM working through UNFCCC regulations and the JCM through joint committees of practitioners from the Japanese government and the government of the receiving country. Once implemented, the emissions reductions from a given project are calculated and allocated as

credits: to the project architects and funders in the case of the CDM and between Japanese and recipient country entities in the case of the JCM. These carbon reduction systems therefore connect actors across jurisdictions but fall far short of formal market linkages on a traded platform.

These types of crediting mechanisms avoid some of the challenges of direct linking. With direct linking, many design elements may be “propagated” from one scheme to the other in ways that receiving jurisdictions find problematic.¹¹ For example, in formally-linked systems the effects of banking and borrowing emissions credits in one system effectively transfer to the other—requiring some advanced harmonization efforts.¹² Indirect linking presents entities that are compelled to lower their emissions with more options, greater flexibility, and ideally lower aggregate emissions-reduction costs—all without broaching some of the difficult harmonization issues that attend more formal linkages. They are also often beholden to international systems—such as the CDM—that are becoming vestiges of the past generation of carbon markets.

Incremental Linking

Recognizing that full harmonization of ETS design elements has many challenges, incremental alternatives that focus on “linking by degrees,” are gaining traction.¹³ These approaches allow for the tentative alignment of key program design elements prior to a formal linking agreement and before enabling the full trading of units.

Incremental linking can enable policymakers and scheme designers in different jurisdictions to assess the impacts of a link before the architecture is formalized. Scheme designers could manage a staged alignment of program elements, and progressively assess and address their effects. Incremental approaches, when effective, can support the administration of existing programs, reinforce program ambitions, allow the celebration of “small wins” as benefits are realized, and help build momentum toward more formal and comprehensive linking.¹⁴

Restricted Linking

Restricted linking is direct but adds a degree of partial, conditional, or restricted unit recognition among different jurisdictions.¹⁵ The most common such constraint is to establish quantity limits on how many foreign credits are accepted in a domestic market. This can be attractive as it allows policymakers to retain a degree of control over the workings of their domestic market that they may lose with greater connectivity. There is precedent for these restrictions, most notably through the EU ETS limiting the use of credits from the CDM and more recently through quota limits on foreign credits in the linked markets of California and Quebec. Exchange rate and “discount rate” stipulations offer other pathways toward restricted linking. The costs of credits across different monetary systems is contingent on exchange rates between them, making the cost-effectiveness and environmental impact of a linked ETS highly sensitive to the value at which an exchange rate is set.¹⁶ Establishing exchange rates brings about a number of questions and potential restrictions, and systems become more complex the more currencies that are involved. Mechanisms must be in place for setting the rates—which will reflect the policy impact sought—and for updating them. The result is often a form of restriction in which different numbers of emissions-reduction units in jurisdiction A are required to equal the number of units brought forward from jurisdiction B.

Recognizing that full harmonization of ETS design elements has many challenges, incremental alternatives that focus on “linking by degrees” are gaining traction.

Discount rates are a further form of restriction that could make linking less stringent and as a result more economically and politically palatable in certain contexts. Discount rates track the monetary value a system is willing to dedicate to preventing future climate change impacts now.¹⁷ Since individuals, societies, organizations, and states are concerned with their immediate resources, discount rate theory suggests that they will be willing to spend less than a dollar today to prevent a dollar's worth of future climate impact.¹⁸ The discount rate is the percentage by which a short-term expenditure is reduced from its projected future cost—in this case measuring the financial impacts of climate change. These reduced costs can be justified on the ground that investing in climate change mitigation is only one means toward preparing for climate impacts, and that investing the same resources in other areas—which can help future societies be wealthier and more adaptable—may provide equal or greater overall societal returns. In practice, discount rates can be used flexibly in linked systems to address perceptions about valuing emissions differently across jurisdictions,¹⁹ and to provide tools for finding credit valuation systems that are acceptable to all stakeholders in the system.

As with indirect linking, restricted linking through quota limits and exchange and discount rates can provide a near-term pathway for establishing links that are politically feasible. They may provide a foundation for more extensive linking in the future, or continue in their own right if the system works effectively.

Reciprocal Linking

A further pathway to linkage short of legally-binding formal treaties operates through mutual recognition. An emissions trading system can include a design clause that dictates the conditions under which it will recognize specific foreign units. The system from which those foreign units are sourced can include a similar clause that reciprocates the recognition of certain foreign credits and a process for accounting for them. Termed “reciprocal unilateral linkage,”²⁰ these clauses remain under the remit of the national jurisdictions that create and manage them, and can therefore be altered or terminated at any point. The link is a loosely formalized quid pro quo arrangement that stops short of a bilateral or multilateral treaty that legally compels the behavior of market participants. Where laws and legislation are enacted, they are done so domestically to establish the parameters and operations of foreign unit recognition.

Reciprocal unilateral links can reduce the time needed to establish some market connectivity by avoiding the lengthy and often difficult process of negotiating and entering into legally-binding international treaties. These links also remove some barriers inherent to the state-to-state architecture of international law, which typically exclude actors other than sovereign states. Links can be pursued at the outset through informal negotiations, and ramp up to Memoranda of Understanding (MoU)²¹ that detail accounting standards, degrees of system harmonization, and other facets of the operation of linked markets. These MoU declare a common intent and desired cooperative outcome but lack the binding power of more formal commitments and will remain operational only so long as parties wish to remain in the arrangement.²² This low level of formalization may well be reflected in the types of cross-jurisdictional coordination that creates and manages the linkage, and information exchanges and ad hoc consultations fulfill a coordinating role played by joint organizations in more formalized schemes.

This lack of formality and receptiveness to change—including sudden alterations—likely make reciprocal unilateral linkage easier to realize in the short term and more malleable in the long term. Countries can unilaterally alter their systems in ways that impact their linked partners, or remove themselves from

systems on short notice in potentially disruptive ways. Such actions can erode the confidence of emitting firms within the linked system, particularly as they plan their future strategies for buying and selling allowances across jurisdictions. But this flexibility also offers an attractive pathway for creating market linkages when the short-term barriers to more formalized linkage are too high. Technical collaboration on market design, the selective harmonization of standards and practices, and quantitative agreements on emissions accounting and trading principles can all be developed in the process of creating unilateral reciprocal links across jurisdictions. These connections can have the material benefits of carbon market linkages (discussed in more detail in Section 3), and provide valuable confidence-building mechanisms for creating more robust and binding market linkages in the future.

Formalized Direct Linking

Formalized direct linking is the deepest, most legally demarcated form of carbon market connectivity across jurisdictions. Such links are based on internationally negotiated policies that determine the characteristics of the linked market. The legal framework defines the carbon units that are eligible for use and maps the technical rules for the market's operation. These frameworks can be facilitated through a regional or supranational body, as is the case in the EU, or through a negotiated international treaty among the country participants. The treaties in this case must conform to international requirements, that is, be expressions of voluntary state sovereignty governed by international law across their validity, interpretation, application, and enforceability. Once established, failure to observe the terms of the treaty represents a breach of international law and can result in consequences defined by the treaty or other avenues of the international legal canon.²³

Such international treaties offer concrete, transparent, and predictable frameworks for developing and managing linked carbon markets. The expectations of participants are spelled out clearly, and the treaty provides a foundation for responding to or adjudicating problems. These treaties may also lead to the highest degree of market integration. Carbon markets are often riled by volatility tied to political changes and regulatory uncertainty. The structure and predictability afforded by a legally binding international treaty can—when effective—lend the link the perception of permanence across stakeholders, which in-turn improves confidence that it will continue to function into the future.²⁴ Treaties also provide a foundation for governance structures, including multilateral clearinghouse institutions, that can manage the operation of the linked market and facilitate its expansion to new jurisdictions.

Such legally binding treaties are difficult to realize. Carbon market negotiation processes are often mired in complexity, and differing interests across jurisdictions can preclude the level of harmonization, institutionalization, and constriction that define international treaties. Links bound by clearly demarcated international treaties are currently largely aspirational or in some cases discarded relics of past failures.

The Linkage Continuum and Northeast Asia

Connecting carbon markets in Northeast Asia will require strategic decisions about what type of linkage is most appropriate for the region. This is explored in detail in Section 4, which maps out a pathway to

Reciprocal linking offers an attractive pathway for creating market linkages when the short-term barriers to more formalized linkage are too high.

incremental linkages that respond to regional characteristics. Before taking up this question, however, it is necessary to examine the domestic carbon markets in China, Japan, and Korea as they are and as they are likely to be in years to come. The shape of these markets, in concert with the economic, environmental, and strategic trajectory of these countries, will determine what type of linking is most appropriate.

2.3 NORTHEAST ASIAN CARBON MARKETS

China

China's considerable economic successes have led to external costs to the natural environment and to public health, which have become increasingly unpalatable to the populace and the central government.²⁵ Domestic recognition of the need to de-couple long-term economic growth from environmental degradation is accompanied by strong pressure in the global community, including within international climate change negotiations, for China to participate more fully in the global climate change effort.²⁶

The administrators of China's pilot emissions trading schemes were given considerable leeway to design their programs, which they optimized for their specific circumstances.

designating the municipalities of Beijing, Tianjin, Chongqing, and Shanghai, the provinces of Hubei and Guangdong, and the special economic zone of Shenzhen as China's first carbon market test beds.

Combined, these pilot trading systems make up the second-largest carbon market in the world. The selection of pilot schemes was well considered, reflecting municipalities and regions in various stages of development and with varied economic, commercial, and demographic profiles. They set the stage for a nationwide emissions trading scheme to be progressively brought online starting in late-2017.

Market Design

The administrators of China's pilot emissions trading schemes were given considerable leeway to design their programs, which they optimized for their specific circumstances. The broad variation in how pilots were engineered allowed for flexibility and innovation in market design and rules in line with the overarching goal of generating knowledge through experience for the transition to a national market.

These variations notwithstanding, there are broad synergies between the pilot systems, with differences in design elements providing national market designers with useful analogues to compare and contrast. Variations in market design have naturally led to varying numbers of covered entities and differing shares of emissions covered between the pilot systems (see Table 1), though compliance has generally been high.

Efforts underpinned by the 11th Five-Year Plan between 2006 and 2010 to transition to a less emissions-intensive economy through administrative command and control measures were partially effective, but they were also expensive and were ultimately eroded by stimulus measures responding to the Global Financial Crisis.²⁷ The National Development and Reform Commission (NDRC) responded by calling for the greater consideration of market-based instruments that led to the carbon market goals in the 12th Five-Year Plan. Tasked with forming carbon markets, the NDRC in October 2011 launched seven ETS pilots,

Japan

Japan has implemented carbon market mechanisms since a 1997 measure allowed companies to offset their emissions through a voluntary crediting system. Efforts later expanded to allow Japanese firms to earn offset credits by investing in emission-reducing projects in developing countries through the JCM. In 2005, Japan launched the Japanese Voluntary Emissions Trading System as a foundation for a mandatory nationwide carbon market, though shifts in domestic political and public sentiment set back plans for a national scheme.²⁸

Market Design

Sub-national schemes are being pursued in the absence of a national system (see Table 2). The Tokyo Metropolitan Government ETS (TMG ETS) was launched in April 2010 and is already in its second compliance period. In April 2011, the Saitama Prefecture, the fifth largest in Japan, followed suit. The two schemes have broad similarities, with some exceptions for compliance periods and compliance factors. These markets subsequently linked, and their operations reflect some of the possibilities of heterogeneous market connections.

Korea

After a period of industrialization that saw it record rapid emissions growth from 1990 to 2005, Korea has made consistent and considerable efforts to lower emissions and to contribute to global climate action. In 2010 it launched the Framework Act on Low Carbon Green Growth, setting the basis for its transition toward a lower-carbon economy with a target of 20 percent reduction in emissions by 2020 and culminating with the launch of a national carbon market in January 2015. Provided initial design issues are addressed, the Korea Emissions Trading Scheme (KETS) will be fundamental to Korea meeting its INDC target of reducing greenhouse gas emissions by 37 per cent below business as usual by 2030.

Market Design

The KETS is currently in Phase 1 of a three-phase program. KETS's design reflects stakeholder dialogues with businesses, experts, and civic groups that began in December 2013.²⁹ The establishment of the KETS was not supported by nationwide consensus or by a strong, competent authority, but driven by political leadership from the Lee administration that set out a robust legal base and governance framework (see Table 3), originally through the Framework Act on Low Carbon Green Growth in 2010 and then by the Emission Trading Act and its Enforcement Decree in 2012.³⁰

Despite becoming a large market by global standards, active trading in the KETS has been limited, with IETA reporting that only 19 trades were made in the market as of October 2015. This is likely the result of unconstrained banking, the relatively small number of entities covered, and limited access to domestic emissions-reducing activities. However, the purpose of the scheme is to achieve cost-effective emissions reductions—not emissions trading per se—and it remains too early to determine the level of emissions reductions attributable to the scheme.

TABLE 1: CHINA'S PILOT CARBON MARKETS – KEY CHARACTERISTICS

Cap-and-trade	Each pilot operated a cap-and-trade system with an absolute cap set in line with carbon intensity targets.
Compliance period	All schemes operated within the compliance period of 2013-2015.
Emissions coverage	Only CO ₂ emissions were covered by the schemes, with the exception of Chongqing, which included all gases covered by the Kyoto Protocol.
Sectoral coverage	Schemes covered direct emissions from a range of industries—including iron and steel, non-metal processing, petrochemicals, chemicals, oil and gas exploration, non-ferrous metals, textile and paper, and air transport—along with indirect emissions from the electricity sector.
Thresholds	Thresholds were set at entity level, with the lowest being set at 3,000 tCO ₂ e (tons CO ₂ equivalent) in Shenzhen for regulated entities. The remaining pilots covered industrial entities emitting more than 10,000 tCO ₂ e to 20,000 tCO ₂ e. Hubei set an energy consumption threshold at 600,000 tons of standard coal equivalent.
Allowances	Schemes allocated allowances for initial distribution, adjustments, new entrants, auctioning, and maintaining price stability. Allowances are allocated for free in pilots based on a benchmark or historical emissions from a baseline year (grandfathering) or both. Guangdong used auctioning to allocate 3 percent of its allowances at a set price, with the remainder allocated for free.
Stabilization	To limit price fluctuations arising from excessive speculation and emergencies, exchanges in each scheme set price limits referencing the previous day's closing price, and most pilots set a maximum volume an entity could hold as well as a requirement to report to the exchange if holdings reached a certain level.
Offsets	Pilots permitted entities to use Chinese Carbon Emissions Reduction (CCER) offsets, and set limitations on the use of CCERs as a proportion of total surrendered allowances, their geographic location, sector and date issued, and whether they came from their own activities.
Banking	All pilots with the exception of Hubei provided for surplus allowances to be banked to the next compliance period. Borrowing was not permitted.
Enforcement	Pilots have established systems of enforcement and punishment to varying degrees, including the use of fines, extensions and allowance deductions. Tianjin and Chongqing did not utilize direct penalties and instead withheld government subsidies and support in cases of non-compliance.

TABLE 2: JAPAN'S CARBON MARKETS – KEY CHARACTERISTICS

Cap-and-trade	A mandatory cap-and-trade system for covered entities with a set at the facility level and then aggregated to a prefecture cap. The Tokyo Metropolitan Government (TMG) sets compliance factors of 8 percent or 6 percent emissions reductions below business as usual (BAU) in the first compliance period and 17 percent or 15 percent in the second compliance period. The Saitama ETS sets lower compliance factors of 15 percent and 13 percent in the second compliance period. The higher compliance factors apply to office buildings and district and cooling plant facilities.
Compliance period	Two compliance periods of FY 2010–2014 and FY 2015–2019 for TMG ETS and FY 2011–2014 and FY 2015–2019 for the Saitama ETS.
Emissions coverage	Carbon dioxide emissions, approximately 20 percent of total emissions.
Sectoral coverage	Large offices and buildings and commercial and industrial facilities, with 1,325 covered entities.
Thresholds	An energy consumption threshold of facilities that consume more than 1,500 kiloliters (kl) of crude oil equivalent per year.
Allowances	Allocated based on grandfathering of emissions, based on average emissions between 2002 and 2007 and the relevant industry compliance factor. Allowances for new entrants are based on past emissions or emissions-intensity standards.
Stabilization	No set stabilizing mechanisms, although additional supply may be released for trading in the case of excessive price movement.
Offsets	Offsets are allowable from multiple sources. Emissions-reducing activities from small- to medium-sized non-ETS enterprises since FY 2010 are allowed, as are credits from activities outside Tokyo/Saitama from large facilities with energy consumption in excess of 1,500 kl crude oil equivalent per year, if the activity exceeds the 8 percent compliance factor. Renewable energy credits from solar, wind, biomass, geothermal, or hydropower may also be used and can be surrendered without a compliance limit. The Saitama ETS also allows forest credits from within the Saitama prefecture to be surrendered without limit.
Banking	Banking is allowed between compliance periods but borrowing is not permitted.
Enforcement	In cases of non-compliance in the TMG ETS, the governor will at the first instance order the facility to reduce emissions by the amount of the reduction shortfall multiplied by 1.3. Any facility that fails to carry out the order will be publicly named and subject to penalties up to Japanese Yen (JPY) 500,000 and surcharges of 1.3 times the shortfall. The Saitama ETS does not have enforcement provisions.

TABLE 3: KOREA'S NATIONAL CARBON MARKET – KEY CHARACTERISTICS

Cap-and-trade	A mandatory cap-and-trade system for covered entities with voluntary opt-in.
Compliance period	Three compliance phases, Phase 1 between 2015 and 2017 setting a cap of 1,687 MtCO2e, including a reserve of 89 million tCO2e for market stabilization measures, early action, and new entrants.
Emissions coverage	Covers all six Kyoto Protocol gases and both direct and indirect emissions, reflecting around 68 per cent of national emissions.
Sectoral coverage	Twenty-three sub-sectors including steel, cement, petro-chemical, refinery, power, buildings, waste, and aviation sectors.
Thresholds	Coverage entities have annual emissions of 125,000 tCO2 per year or greater and facilities with emissions greater than 25,000 tCO2 per year.
Allowances	All allowances were allocated for free, with baselines determined by average emission levels from 2011-2013. Phases 2 and 3 will introduce auctioning at 3 percent of total allowances in Phase 2 and more than 10 percent in Phase 3.
Stabilization	The Allocation Committee may implement price market stabilization measures in certain cases, for example when the market price of the past six months is at least three times higher than the average price of the previous two years. Measures may include setting a price ceiling or floor, additional allocation from the reserve, changes to the offset limit, or changes to the borrowing limit.
Offsets	Domestic credits external to the entity and implemented by non-ETS entities may be used for compliance in Phase 1 and Phase 2, up to a maximum of 10 percent of the entity's compliance obligation, provided it meets with international standards. Domestic CDM credits may also be used. Only activities implemented after April 14, 2010 are counted. In Phase 3, international offsets will be allowed.
Banking	A contentious element of the KETS is the lack of restrictions on allowance banking in order to avoid situations of unused permits exceeding a banking limit being surrendered unconditionally and disincentivize reduction activities. ³² Banking is not permitted, however, across compliance phases. Borrowing is also permitted up to maximum of 10 percent of the entity's compliance obligation, but is not permitted across compliance phases.
Enforcement	A penalty for non-compliance can be issued at no more than three times the average market price of the given compliance year or exceed Korean Won (KRW) 100,000 per ton.

Current Cooperation Deficit

The current carbon markets of Northeast Asia exist largely in silos, and have had only modest cross-pollination in ideas and design elements. The following section makes the case that this should change.

3. THE CASE FOR CARBON MARKET LINKAGE IN NORTHEAST ASIA

3.1 THE OVERARCHING PURPOSE

THE ULTIMATE GOAL OF LINKING CARBON MARKETS SHOULD BE LOWERING THE COSTS

of reducing emissions and providing flexibility for how these reductions are pursued. Firms operating in Northeast Asia want predictable carbon regulatory environments across the jurisdictions, and a range of options for meeting their emissions commitments. Linkage, while stopping short of fully harmonizing carbon markets in China, Japan, and Korea, makes progress toward this objective and can lead to more ambitious climate change targets in the region. Given the scope of regional economies and emissions profiles, market linkages would be highly significant for addressing global climate change, and for fueling sustainable growth in one of the world's most dynamic regions.

Linking carbon markets in Northeast Asia would have economic, environmental, and strategic benefits. Economically, linking could reduce the amount firms spend to reduce emissions, increase the number of buyers and sellers in ways that increase market liquidity, and reduce carbon price volatility by expanding market scope and lessening the influence of powerful individual players.

Environmentally, linkage can cut carbon price differentials across the region in ways that minimize the leakage of emitting activities from one jurisdiction to another and lower emissions-reduction costs in ways that lead to more ambitious climate change goals. In some cases, the reductions in GHG emissions driven by regionally linked markets may also promote cleaner local environments through reducing conventional pollution. Strategically, linking Northeast Asian markets would spread administrative burden sharing among multiple players, provide confidence-building measures for wider Northeast Asian relationships, and demonstrate global climate change leadership by signaling a commitment to long-term multilateral actions that are impactful and nuanced.

These potential gains from linking markets in Northeast Asia are made more significant by the scale of the region's economies. Models of direct and indirect ETS links across regions have found them to reduce the mitigation costs of carbon-intensive economies such as those in China, Japan, and Korea by nearly half.³³ Many of the benefits of linked emissions-trading schemes directly relate to the scope and size of the resulting market,³⁴ and with the three major Northeast Asian economies all implementing carbon market systems it is a propitious time for exploring such a high-reward possibility. Ultimately, linking Northeast Asian markets will require a combination of efforts from international and regional epistemic and policy communities, and a set of incremental steps that leads to market linkage. This report offers a roadmap for these steps in the final section. Here, a case is made for why carbon market linkage in Northeast Asia is a goal worth pursuing now.

Given the scope of regional economies and emissions profiles, market linkages in Northeast Asia would be highly significant for addressing global climate change.

3.2 ECONOMIC BENEFITS

Linkage allows emitting organizations to access the lowest-cost emissions-reducing options available across a larger pool than would be available to them domestically. This reduces the costs these organizations face in meeting their commitments and in turn lowers the costs a country faces in reducing its aggregate emissions.³⁵ The pathways through which linked markets can achieve these outcomes include improving market efficiency, increasing liquidity, and reducing market volatility.³⁶

Efficiency

The extent to which linked systems gain in efficiency depends on the variety of abatement options they offer. A bigger, more diverse system will likely have more options with different associated emissions-reducing possibilities. The combination of two or more systems expands the number of mitigation pathways and incentivizes firms to attain emissions reductions across linked systems at the least possible overall cost. For Northeast Asia, such linkages could yield significant opportunity, given the number and size of actors that are or will soon be compelled to mitigate and/or account for their emissions profiles (see Section 2.3).

Liquidity

Larger markets are also likely to be more liquid.³⁷ Liquidity refers to the degree to which an allowance can be bought or sold without impacting the market price, and positively correlates with increasing market activity and participants.³⁸ By bringing together more actors and more trading activity, linked markets can drive up the level of liquidity in a system, which will in turn help address market volatility concerns.

Volatility

The more allowance purchasers and sellers there are in a market, and the greater liquidity these actors bring, the lower the price-setting capacity is for each one individually. Thus, liquidity and expanding market participation helps reduce market volatility through eroding the ability of large entities to exert outsized market-manipulating power. Linked markets in Northeast Asia would cover a number of very large entities, and spreading the platform wider would lessen the price shocks resulting from their actions. It could also reduce price shocks from extreme weather and other abrupt and unanticipated events.⁴⁰

Competitiveness

Linked markets can assuage competitiveness concerns that arise from widely divergent carbon prices across different regional systems. This is particularly valuable for Northeast Asia, where major firms often work across jurisdictions and intra-regional trade volumes are among the highest in the world (see Figure 6). By encouraging more consistent and connected carbon prices, regional linkages can level the economic playing field in ways similar to competitiveness measures put in place through regional and international trade regimes. This relative price leveling can also have important environmental benefits through addressing the issue of leakage discussed in the following section.

3.3 ENVIRONMENTAL BENEFITS

Leakage

Carbon leakage results from emissions-reduction policies causing growth in the emissions of other jurisdictions that do not have similarly stringent carbon prices. In other words, the costs of complying with a carbon price lead to geographical shifts in production to other locations that, if undertaken extensively,

can lead to net increases in global emissions. Since emissions anywhere have impacts everywhere, leakage risks undermine the point of carbon pricing mechanisms.

Linking Northeast Asian markets would disincentivize the movement of emitting activities from one regional economy to another. This leakage of emissions leads to zero-sum improvements for the global climate, shuffling emissions around rather than reducing them in aggregate. When systems link their carbon prices converge,⁴¹ taking away an impetus to move operations to a cheaper jurisdiction and creating a more regionally coherent regulatory setting. Industries and firms vary in their levels and types of trade exposure and risk considerations, and the presence of a consistent (linked) versus variable (unlinked) carbon price will be only one factor in how they operate. However, carbon prices will become a major bottom-line consideration for many emissions-intensive sectors, and removing incentives for businesses in these sectors to move pollutive activities around the region in search of softer environmental regulations is a worthwhile goal. In addition to its environmental impacts, leakage prevention can reduce the flight of business and jobs to other markets.

Competitiveness and carbon leakage concerns can be addressed in different ways. The most efficient and cost-effective way to reduce leakage would be a global carbon price regime that comprehensively covers countries and sectors around the world. With such coverage and allowance trading systems in place, emissions reductions would take place in locations where they are most easily achieved, driving down costs while lowering global emissions.⁴² Such a system, however, is not in the offing.

In lieu of an international regime, collaboration on carbon prices across major economies becomes more valuable for linkage prevention. Other measures are available. Economists have shown that border carbon adjustments (BCAs) could use pricing measures on imports and/or exports to level the carbon price playing field on a commodity level.⁴³ However, these measures are technically, legally, and politically difficult and have not been shown viable to date.⁴⁴ Carbon pricing policies offer a more promising avenue for addressing leakage by facilitating price convergence, if not harmonization, and thus address the desires of domestic firms, politicians, and the public for a level economic playing field.⁴⁵

Ambition

The key argument for linkage from an international climate mitigation standpoint is that, by reducing costs, linkage allows countries to adopt more ambitious policies.⁴⁶ This is true of any tool—including domestic carbon pricing regimes—that provides cheaper emissions-reducing options than would be available without it. Emerging international climate response strategies depend on the ratcheting up of emissions reductions over time, lending tools that reduce costs in the short term with the potential to change the targets that policymakers deem attainable in the long term. Given the scope of Northeast Asia's contribution to global climate change, increasing regional ambition through effective market links would have pronounced global implications.

Linking Northeast Asian markets would disincentivize the movement of emitting activities from one regional economy to another.

Co-benefits

Local and transboundary air pollution and environmental stress plague Northeast Asia as they do many regions.⁴⁷ Reducing GHG emissions has the correlated effect of lowering conventional pollutants such as sulfur dioxide that cause air, soil, and water pollution. These “co-benefits” of emissions reductions will help stakeholders throughout the region by lessening certain transboundary environmental stresses and improving connected economic and social systems that are impacted by these stresses. To the extent that market linkage is effective, it warrants additional traction as a cooperative regional mechanism for reducing non-carbon pollution.

3.4 STRATEGIC BENEFITS

Trade

Pursuing regional linkages has strategic advantages. A key element of any linkage arrangement is a degree of harmonization around respective domestic market features and the creation of institutional frameworks and arrangements for its operation. Geographical proximity, and the economic integration that often accompanies it, provide building blocks for creating such linkage.⁴⁸ Prospective linking partners are likely to be regionally institutionalized, as in the EU; part of a trade bloc or agreement such as NAFTA; or, in the case of Northeast Asia, have trade ties that reveal deep economic integration (Figure 6).

FIGURE 6: REGIONAL TRADE INTEGRATION

Chinese Trade	<ul style="list-style-type: none"> Exports: Japan is 4th at 6.5%, Korea is 5th at 4.3% Imports: Korea is 2nd at 9.7%, Japan is 3rd at 8.3%
Japanese Trade	<ul style="list-style-type: none"> Exports: China is a close 2nd to U.S. at 18.3%, Korea is 4th at 7.4% Imports: China is 1st at 22.1%, imports from Korea would be higher if not for Japan's need to import raw materials
Korean Trade	<ul style="list-style-type: none"> Exports: China is 1st by a large margin at 26.1%, Japan is 4th at 6.2% Imports: China is 1st at 16.1%, Japan is 2nd at 11.6%

Source: Adapted from data from the World Trade Organization, 2016. “National Trade Profiles.” <http://stat.wto.org/CountryProfile/WSDBCountryPFHome.aspx?Language=E>

These trade volumes in Northeast Asia can both enhance the political will to build market links and provide a foundation of cooperation from which they extend. Trade volumes this significant for each country also make competitiveness concerns across these economies all the more pressing. If firms in the region were compelled to operate under carbon pricing regimes that vary greatly in their coverage and constrictiveness, competitiveness problems will be far more pronounced than if these schemes were coordinated and ultimately linked. Carbon prices in Northeast Asia are unlikely to become uniform in the near term, but regional cooperation toward market linkage could help spur price convergences that yield strategic dividends for all countries involved.

Regional Confidence Building

Linking regional carbon markets necessitates deep and consistent interaction among stakeholders across policy and business sectors. In Northeast Asia as in other regions, this would entail regular meetings with system architects and managers to share experiences and co-create policies. This cooperation can tangibly reduce administrative costs through pooling resources, spreading positive practices, and avoiding the duplication of effort. While these benefits may appear minor compared to others associated with linked carbon markets, they are the vital drivers of pragmatic outcomes.⁴⁹ The connections made and solidified through these processes can likewise pay diplomatic dividends by building confidence in the real and perceived ability of China, Japan, and Korea to work together to address a complex international challenge. Given the raft of geopolitical trials in Northeast Asia⁵⁰ and with diplomatic relationships and international institutions struggling to manage competing interests, convergence around climate change policy can provide countries with positive short-term outcomes. Linking regional markets would be the most prominent and impactful such convergence to date.

Linking regional carbon markets would signal a collective recognition of the significance of global climate change, and demonstrate a commitment to joint action.

Global Climate Change Leadership

Carbon market cooperation in Northeast Asia would also have positive international reputational implications. Linking regional carbon markets would signal a collective recognition of the significance of global climate change, and demonstrate a commitment to joint action.⁵¹ It would allow regional leaders to declare leadership in the global climate change effort by pursuing a collaborative mitigation strategy that is nuanced and sophisticated. It would also feed into international processes while avoiding being constrained by them,⁵² charting a regional path that speaks directly to unique Northeast Asian circumstances while still contributing to the international climate change responses pursued through the UNFCCC and elsewhere. Given the importance of Northeast Asia to these efforts, the creation of a functioning linked marketplace would encourage efforts to pursue innovative mitigation efforts globally.

3.5 TIME IS RIGHT TO SET THE LINKAGE FOUNDATION

China, Japan, and Korea are understandably and appropriately focused on developing their domestic carbon markets. As Section 2.3 showed, each is undergoing a formative period in its respective market development and the period between 2015 and 2020 is set to usher in the next generation of regional carbon market mechanisms. It is because these countries are in this formative phase, and not in spite of it, that now is an ideal time to set the foundation for regional carbon market links.

Building the Foundation

Existing relationships provide the basis from which linked markets will extend, and examples from outside the region suggest that prior economic and political connectivity is a favorable driver for linkage. The links between the EU and Norway, Iceland and Liechtenstein, for example, as well as the link between California and Quebec, each build on deep and multi-layered relationships.⁵³ While China, Japan, and Korea have fractious elements within their relationships, the trade flows and levels of diplomatic familiarity they enjoy will enable steps toward market linkage.

Linking markets also takes time and steady effort. The Norwegian market was conceived in the early 2000s, launched in 2005, and linked with the EU in 2008. Linkage was considered and worked toward from its early days of formulation, not just after its 2005 launch. California and Quebec likewise adopted many of the same market design principles and held frequent technical discussions during the years of their development to ensure a degree of harmonization across targeted rules and designs. This allowed them to link the markets just one year after launching operations. The EU and Switzerland meanwhile have been much slower to link as such harmonization was not fully considered during the design phase of the Swiss market.⁵⁴ They subsequently carried out six years of negotiations before successfully agreeing on key linkage principles in January 2016.

Positive Regional Signals

China, Korea, and Japan are also signaling an overall willingness to explore future regional market links. Japan was part of a ministerial declaration at the 2015 Paris climate summit pledging to work together to quickly develop standards and guidelines for international market mechanisms, and later joined the World Bank Carbon Pricing Leadership Coalition in May 2016. Its history of carbon market experimentation and current international linkages through the JCM (see Section 2.3) leave it well placed to embrace growing regional linkage efforts.

Korea's domestic system contains a stipulation (the Act on Allocation and Trade of the GHG Emission Allowances and Enforcement Decree) that it is open to linking systems in other jurisdictions provided they can achieve compatibility on issues of monitoring, reporting, and verification (MRV) consistent with the requirements of the UNFCCC. It has written into its three-phase plan that participants can use increasing levels of international offsets to reach commitments as the system matures. The Korean government is currently entertaining linkage discussions with New Zealand, the EU, and China.

China is likewise voicing openness to working with its Northeast Asian neighbors to develop harmonized rules for linking. It has listed linking as a design priority through its World Bank Market Readiness Proposal and singled out Korea specifically for potential linkage partnership.⁵⁵ Chinese officials are emphasizing the importance of developing flexible and linkage-ready systems (see Section 4.1) that will allow them to connect with other markets in the future—including those in China's regional orbit.

Trilaterally, China, Japan, and Korea are steadily scaling up technical and policy dialogues on market linkage. The previously-mentioned ASPI High Level Roundtable on the sidelines of the global Carbon Expo in May 2016 offered a foundational effort, as do the capacity-building efforts of the World Bank, IETA, the International Carbon Action Partnership (ICAP), and others. In September 2016, Tsinghua University held a meeting of experts and policymakers from each country to take this conversation still further.

It is vital that these efforts accelerate. Where potentially linked systems are aligned on key characteristics early in design stages, barriers to subsequent linking are reduced. The opposite is likewise true, and it is increasingly difficult to align vastly different systems once they have been made operational. It is therefore a critical time for ensuring that the major economies of Northeast Asia do not impede future linkage pathways, and rather redouble collaborations that make future linkage both feasible and desirable.

4. ROADMAP TO LINKING CARBON MARKETS IN CHINA, JAPAN, AND KOREA

CHINA, JAPAN, AND KOREA ARE FOCUSED on building market readiness, and developing, testing, adjusting, and improving their domestic carbon market systems. Full-scale market linkage is unlikely as these efforts continue to mature.⁵⁷ However, as Section 3.5 argues, the time is right for setting the foundation from which future linkage will extend and pursuing the incremental steps necessary to make linkage possible. The following recommendations offer such pathways, and are designed to seed tangible and impactful policy approaches for Northeast Asian leaders.

4.1 PROMOTE LINKAGE-READY MARKETS

Northeast Asian carbon markets will not become homogenous, share all design characteristics, or have a completely unified emissions cap or carbon price in the foreseeable future—or likely ever. The natural endowments, economic and political systems, and resulting climate change policies of these countries will continue to vary widely. This does not mean that their carbon markets cannot or should not be linked.

China, Japan, and Korea have carbon markets that open up the possibility of direct linkages—that is, agreements between their systems to accept allowance credits from one another for purposes of complying with their domestic caps. Such direct linkages do not mean that the systems will be fully connected or totally harmonious. Rather, these links require harmonizing some aspects of domestic markets, and designing the avenues of commonality needed to enable trading emissions allowances across different jurisdictions. Domestically, this means China, Japan, and Korea should develop linkage-ready markets.

Linkage-ready markets should begin with transparency around MRV rules and practices. These MRV systems need to be partially harmonized and clearly spelled out so that each jurisdiction can develop confidence that the credits being allocated by linked partners have a sound economic and environmental basis. It will take time to foster this MRV confidence on multilateral levels, and lines of communication and openness are vital.

Creating linkage-ready markets also requires clarity and partial harmonization around trade rules for banking and borrowing, recognized trading products, and non-compliance penalties. Finding common ground in these areas speaks to how linked systems will be governed and operated, which is essential for gaining the efficiency benefits of market cooperation discussed in Section 3.2.⁵⁸ A key element of these rules in Northeast Asia will be dealing with the different types of emissions caps present in the region. China's cap and attendant carbon market is tied to energy intensity goals, whereas Japan and Korea have absolute caps on GHG emissions. These countries must work out a way to create fungible trading units that can function across jurisdictions that respect these different approaches to greenhouse gas management. This is challenging but far from impossible. The systems could arrange exchange-rate or discount-rate mechanisms (see Section 2.2) for trading emissions units, implement trade restrictions that limit the number of external units a system will accept, or find new, innovative pathways for trading emissions units that speak to the region's unique characteristics.

The key is that these countries begin now to share aspirations toward future linkage, and not create domestic markets that lock out these possibilities. China, Japan, and Korea can develop markets now that provide the flexibility and breadth needed to find avenues of connectivity that work for their circumstances. This includes developing multiple trading products and creative approaches to managing the differences between the units in their respective domestic markets.

4.2 LINK BY DEGREES

China, Japan, and Korea should seek to incrementally link their markets, and the most promising pathway is through the reciprocal recognition of trading units. On the continuum of linkage approaches (see Section 2.2), Northeast Asian stakeholders should avoid indirect links and deemphasize the goal of formalized linkage through an international, legally binding treaty. They should rather focus on creating agreements

and systems that allow for some recognition of carbon credits across jurisdictions. This linked system would function through a loosely coordinated, largely voluntary, networked governance structure.⁵⁹

China, Japan, and Korea should seek to incrementally link their markets, and the most promising pathway is through the reciprocal recognition of trading units.

Such connections could take several forms.⁶⁰ The most basic exchange would allow one jurisdiction to accept credits from another on a one-to-one basis,⁶¹ which is unlikely in Northeast Asia given the differing caps and levels of ambition present there (discussed in Section 4.1). Therefore some form of exchange rate management or “top-up” fees that equalize allowance pricing is needed.⁶² Regional jurisdictions that link their markets could also create joint registries or create systems for units to be purchased from one national registry—where they would then be canceled—and registered in another.⁶³ No matter what form these connections take, the key is steadily finding mutually agreeable ways to recognize emissions units across jurisdictions, and in doing so afford system participants the economic benefits of having wider emissions-reduction options.⁶⁴

Mutual recognition of emissions units is the most politically and strategically viable pathway for market linkage in Northeast Asia because it allows for continuing national autonomy over domestic markets and does not require formalized legal treaties to be implemented. Rather, as discussed in Section 2.2, reciprocal recognition can be achieved through non-binding MoU that establish rules and system structures and are entered into voluntarily by participants. While such a system would not lend a Northeast Asian platform the same robustness and legalized predictability of a more formalized system, it would allow for many of the benefits of market linkage with lower real and perceived entry costs for regional policymakers.

4.3 BUILD COMMUNITY OF EXPERTS AND PRACTITIONERS ACROSS SECTORS

Linked Northeast Asian systems require regular cooperation across a range of practitioners. At an early stage of integration, cooperation may occur through informal networks geared toward an exchange of information, promotion of uniform approaches and standards, stakeholder involvement (including from the private sector), and outreach activities. Rather than adopt binding standards or recommendations, these networks would be largely limited to issuing recommendations and providing advice on the implementation and harmonization of trading schemes. Such a process would allow regulators to realize many of the political and institutional benefits of linking, along with the economic benefits gleaned from a partial linkage across jurisdictions.⁶⁵ More formalized agreements may come in the future, but these need not be the focus now.

Near-term efforts should include meetings and informational exchanges that are frequent, formal and informal, multi-stakeholder, and at both senior policy and technical levels. These exchanges are the key to co-creating regional partnerships that are acceptable across sectors and jurisdictions. They can set the foundation not only for initial linkage experimentation and early implementation but also for managing the changing conditions and uncertainties that are sure to arise. Adjustments will be needed in the MoU statutes, as well as in the technical and IT infrastructure underpinning system linkages that—while not politically contentious—are essential for implementation.⁶⁶ These technical connections can facilitate simulations that reveal the possible function and effectiveness of market linkages. Such simulations are already being explored by Enerdata in conjunction with the World Bank Networked Carbon Markets Initiative, as well as by the China Beijing Environmental Exchange, and can be deepened and extended to reveal a fuller picture of prospective market linkages in Northeast Asia. Such simulations, carried out in real time on actual exchanges using model value-less units, were essential for shaping the carbon markets in the United Kingdom and European Union and could similarly benefit nascent efforts in Northeast Asia.

In combination, these technical and policy exchanges are the medium through which incremental progress toward linkage should be pursued. As Section 3.5 demonstrated, non-binding cooperation over a period of years can seed future links and build essential confidence and trust among participants. Given the relatively fledgling nature of Northeast Asian carbon markets, these approaches to connectivity are apt and sorely needed.

4.4 PILOT SUB-NATIONAL MARKET LINKAGES

Piloting sub-national market linkages can have economic, environmental, and strategic benefits, while also building the technical and political foundation from which further market linkages extend. As argued in Sections 4.1 and 4.2, linkage in Northeast Asia will be a process and any measures pursued will necessarily be constructed, tested, and revamped over time. Sub-national pilot systems offer a practical strategy for developing initial linkages that foster experimentation in trading emissions units across jurisdictions.⁶⁷ The presence of sub-national systems already in operation in the region strengthens the basis for such piloted approaches. For example, China's seven-system national pilot experience and Japan's markets in Tokyo and Saitama (see Section 2.3) have fostered familiarity and expertise with sub-national markets that would be brought to bear in piloted regional linkages. Piloting sub-national connections in the region across a limited number of sectors and/or for a short initial test period would lower the entry barriers for regional market links and provide a test-bed for regional carbon market connectivity.

Locating these sub-national linkages in Beijing, Tokyo, and Seoul would offer the capital regions in each country the opportunity to widen emissions-reducing options for their business communities, provide national governments with a city-level laboratory for exploring linkages across borders, and—given the scope of emitting activities within these jurisdictions—have significant environmental and economic impacts. Such linkages will necessitate coordination across domestic and international levels of government. Each city would require consent from the national government to pursue an international linkage, and the pilots

Linking regional carbon markets would signal a collective recognition of the significance of global climate change, and demonstrate a commitment to joint action.

would be most successful and attain the widest relevance through city officials working with appropriate national ministries on linkage design and operation. Strategic technical and policy exchanges among these city and national level actors in each country should be pursued to test the willingness and capacities of regional stakeholders to pursue these sub-national linkages.

4.5 SELECTIVELY EMPLOY INTERNATIONAL DESIGN PRINCIPLES

The current international context is conducive to regional carbon market linkages (see Section 1). International accords, most notably Article 6 of the Paris Agreement, do not provide the substantive foundation of carbon market linkage in Northeast Asia nor do they attempt to. International agreements and institutions do have something to offer regional stakeholders, however, as they can help define key terms and provide default or model rules that countries may choose to adopt. These points of commonality can help market participants avoid duplication and help drive clarity around key market connectivity principles.

The international community likewise offers capacity-building opportunities. For example, the World Bank Partnership for Market Readiness (PMR) helps market architects in Northeast Asia and beyond access expert communities and experienced policymakers from other parts of the world. This capacity-building effort has a harmonizing effect through promoting best practices on issues such as MRV, cap setting, and emissions crediting that can make linkages easier in the future.⁶⁸ The EU meanwhile has invested in both the Chinese and Korean trading systems in an attempt to transfer the lessons learned from Europe to both systems. Such efforts, along with policy officials in China, Japan, and Korea promoting linkage-ready markets, could solidify the foundation of future market links. International expertise is also present in think tanks and academia, industry groups, and the private sector—each of which can positively feed into the technical construction of regional market linkages.

CONCLUSION

INTERNATIONALLY BASED CAPACITY-BUILDING EFFORTS MUST EXTEND to political and diplomatic bridge builders that are supportive of linked markets in Northeast Asia and free from any vested interest in the distribution of benefits that market linkage may create. Non-partisan champions, including ASPI, have an essential role to play in convening international and regional stakeholders across sectors in organized and targeted dialogues leading to tangible outcomes.

For its part, ASPI will continue to work with regional and international stakeholders as Northeast Asian markets evolve between 2016 and 2020. It will bring together architects of carbon markets in China, Japan, and Korea to map out how to build political will, and progressively harmonize targeted standards and practices across regional jurisdictions. ASPI will promote and help design experimental, near-term pilot efforts to link markets at sub-national levels and across limited sectors. It will explore simulations of regional market linkages with regional trading exchange partners, and garner private sector participation in hypothetical trading exercises in real-time on actual exchanges. It will commission and conduct research into aspects of linking Northeast Asian markets that require further analysis, including those highlighted by the recommendations of this report. Throughout these efforts, ASPI will bring international experts and experienced practitioners who are familiar with linking efforts from outside the region, and in doing so help China, Japan, and Korea learn from the successes and avoid the failures of their international peers. ASPI convenings will take place in the capital regions of each country, on the side-lines of international forums including annual UNFCCC summits and global Carbon Expositions, and at its offices in the United States. These dialogues will both support and be complemented by briefings from ASPI personnel and project partners to key regional decision makers and government institutions. In combination, these efforts seek to provide valuable policy feed-ins that yield quantifiable climate change mitigation outcomes.

Carbon market linkage in Northeast Asia has great potential, and China, Japan, and Korea are well-placed to lead the global community into a new era of cooperative climate response efforts. Linkage considerations are also complex, multilayered, and have implications across sectors and jurisdictions. It will take consistent and action-oriented institutional and person-to-person connections to make regional market linkages a reality. As this report argues, the time for building these connections is now.

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