

Linking emission trading systems

Prospects and issues for business



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This Carbon Trust report draws in part on research by Climate Strategies*, an international network organisation that develops and delivers rigorous, independent academic analysis to meet the needs of international climate change policymaking. The Carbon Trust is a founding supporter of Climate Strategies.

*Climate Strategies (2009): Türk, A., Sterk, W., Haites, E., Mehling, M., Flachsland, C., Kimura, H., Betz, R., Jotzo, F.: Linking emissions trading schemes. The individual studies of national emission trading schemes are carried in a Special Issue of the Climate Policy journal, Climate Policy volume 9 issue 4.

Preface

The idea of using emissions trading to cap and cut greenhouse gas emissions is becoming widespread. The Obama Administration is rapidly developing a domestic US programme, hard on the heels of concrete Australian and Canadian plans. There are pilot systems in Japan and Korea, and some developing countries are beginning to consider the idea.

A natural progression is to consider linking such systems, so that one system's trading units can be used, directly or indirectly, in another. Such inter-system trading would enlarge the carbon market by connecting otherwise isolated domestic systems, include more participants with more diverse sources and abatement options, and thereby improve market liquidity and efficiency.

Given these apparent benefits, linking is emerging as a major policy goal: the EU aims for an interlinked OECD market by 2015 leading on to a global carbon market. Indeed, linking appears to be such a simple and unambiguously sensible idea that one is tempted to ask, 'what's the problem?'

This study charts both the attractions and the problems. It emerges that there are quite formidable obstacles. These reflect numerous differences in national and regional circumstances, and in resulting designs and levels of ambition as detailed in this report. Government and business need to be prepared for a long transition, which will not provide 'quick fixes'.

The challenge is not so much to 'link' systems, as to ensure that emergent systems are designed in such a way that linking becomes *possible*: systems must be 'designed to dock'. The study thus emerges with a paradox: linking is likely to be slower than many hope, and yet it is more urgent to consider it now in the design of emergent systems, lest design differences start to pose insuperable obstacles further down the track.

The study is built in particular upon our earlier work on design of the EU Emission Trading System, and on the Global Carbon Mechanisms (see inside back cover for a list of publications). Like some of these earlier publications, it is based upon research carried out by the international research organisation Climate Strategies, whose project on linking convened experts in each of the major countries concerned. However, this report represents the independent conclusions and observations of the Carbon Trust.

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Executive summary

Emission trading systems are under development in many parts of the industrialised world, and under consideration more widely still. If all these plans proceed as independent systems, investments in different industrialised countries will face different regulatory structures, coverage and carbon prices, with ongoing uncertainties about how each system will be developed and influenced by others.

Linking: a solution with many benefits...

Linking these systems would in theory have many benefits, potentially including greater stability and predictability, higher economic efficiency, and reduced potential for competitiveness distortions; it would also greatly reduce the complexity for multinational companies in managing differences between systems. The EU has expressed a desire to establish, through linking, an OECD-wide carbon trading market by 2015 and to extend this to other developing country emitters by 2020.

...but it will be difficult

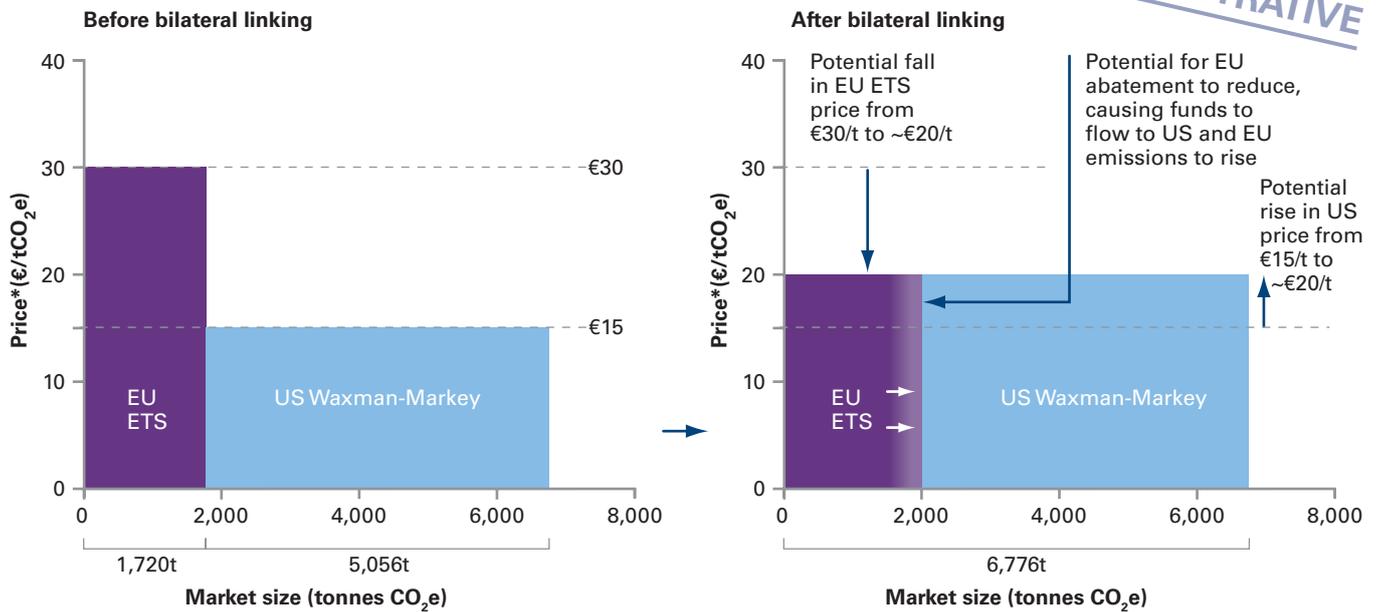
However, there are many serious obstacles to linking in practice:

- Linking systems with differing overall *levels of ambition* could tend to violate the politically negotiated objectives underlying *each* of the linked systems, and place key influences on pricing outside the political control of any specific national authority: one example, indicating the potential price and abatement impact of linking the EU ETS to an emergent US system is illustrated in *Chart 1*. If not carefully managed, linking systems with significant price differences could cause major funding flows to other regions which may be politically unacceptable. In the case of emerging systems, this risk could be mitigated by waiting for systems to go through a learning phase and reach equivalent levels of ambition and stability to more established systems.
- Different *enforcement* provisions between systems may erode confidence in the markets emerging from linking or otherwise reduce the stringency of enforcement in one region to levels it considers unacceptable.

- Differences in the *kinds and scale of offset credits* that are considered acceptable may create large barriers, if systems that have been designed to focus mainly on domestic efforts, or to preclude offset investments that are considered politically or institutionally problematic (such as the exclusion of nuclear or forestry credits in the EU ETS), are linked to systems that are much more open to offsets.
- Linking systems with *absolute to intensity-based* allocation (allowances allocated in proportion to industrial production) introduces many technical complexities and means that different sectors would face different carbon cost structures even at the same carbon price.
- Linking to systems with *cost containment measures* (such as price ceilings) would tend to act on all the linked systems, in the case of a price ceiling with resources flowing to the region with the lowest price ceiling.
- An initial decision to link has profound long-term implications for *governance*, since through linking, each system would also be exposed to decisions taken by its partners about further changes, development, links or other expansion through multiple chains of connections. When systems commit to linking it should be recognised that future decisions on further development of the system should be taken jointly or with full discussion.

Systems currently being developed around the world do differ radically in several of these characteristics, and this will pose serious obstacles to linking. The underlying challenge is not just to link, but rather to facilitate sufficient common elements that it becomes both technically *possible* and politically *acceptable* to 'dock' systems together. At present there is little sign of this and system designs are proceeding largely independently.

Chart 1 Illustrative impact of linking on price and abatement

ILLUSTRATIVE


*This is an illustrative example of price impact only. Obviously, if starting prices were reversed (EU ETS prices lower than US) then the price impacts of linking would be similarly reversed.

Source: Climate Strategies.

These factors will make it hard to establish extensive links within the next five to 10 years. Consequently, businesses may face an extended period with multiple trading systems of increasing regulatory complexity and uncertainty:

- The diverse array of separate emissions trading systems will lead to higher compliance costs for business compared to full linking among all systems.
- Business leaders should be prepared for carbon price differences between systems and differing cost containment measures, as well as differences in the allocation rules, strictness of emissions caps and core design features of different systems.
- Multinational companies will also need to become more informed about the idiosyncrasies of individual systems in order to be able to plan and act strategically, for instance when considering the impacts of trading systems on plant location and operational issues.

Business lobbying in different regions is one of the factors driving differences in emerging design features; multinational companies should review the consistency of their positions in different parts of the world in order to assist the process of linking, given that it is ultimately in businesses' long-term interest to achieve a single, stable, lowest-cost carbon price.

Governments for their part need to consider urgently the implication of currently preferred designs for the ability to link systems in the future. With the design of the US Waxman-Markey bill, the Australian system and others still being developed, and the possibility of aspects of the EU ETS being reviewed post-Copenhagen, there is a need for more consultation between regions. Particular areas of focus could be in the level of ambition of systems, approach to offsets and cost containment design.

A new international climate change agreement, reached at Copenhagen or elsewhere in the next few years, could improve the prospects for linking domestic systems by embodying or fostering a more comparable degree of effort and clarifying some common rules and procedures (for example, around offsets). But such an agreement is not essential to linking domestic schemes, nor can it ensure that a global carbon market does emerge. It could take many years – potentially decades – for such an agreement to be translated into a truly global carbon market.

1. Context

Emission cap-and-trade systems are emerging in many different regions. Directly linking such systems – so that trading units can be used by participants in other systems for compliance – has many attractions. But it also raises complex issues about the compatibility of the participating systems.

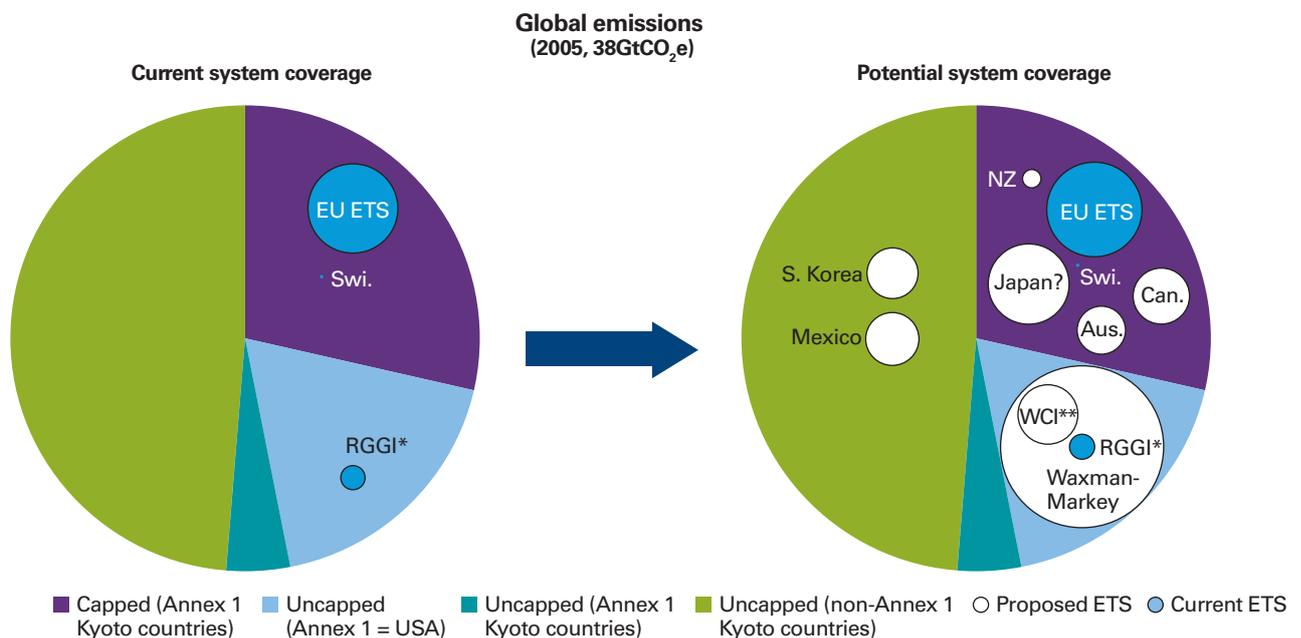
Emergence of cap-and-trade systems

Since the adoption of the Kyoto Protocol in 1997, establishing a global carbon market has been a goal of many governments and other stakeholders, and now forms a stated objective of EU climate policy. There are two key types of trading systems; country-level, based on the Kyoto framework and company-level, such as the EU Emission Trading System (EU ETS). The European Commission sees the EU ETS as the nucleus for creating a global company-level carbon market; it has proposed the establishment of an OECD-wide market by 2015, with integration of trading systems in economically advanced developing countries by 2020. This contrasts with the current situation, which is marked by the relatively small proportion of global emissions that fall under existing national caps or are otherwise included in a cap-and-trade system of some kind, as depicted in *Chart 2*.

National implementation policies like company-level cap-and-trade systems are unlikely to be created directly through top-down, global negotiations. However, a number of emission trading systems are emerging, as *Chart 3* indicates. Thus, the practical route to developing an international company-level carbon market needs to build upon such national or regional developments by establishing links between them.

As the first major step in this direction, the European Commission has advocated linking the EU ETS and a future federal-level US emission trading system, with preliminary planning to be undertaken by an EU-US working group on the design of carbon markets. Given their status as the two largest economies in the world, a transatlantic link between the EU system and a future federal US system would not only create political momentum toward the creation of a global carbon market, but it would also reduce – though not eliminate – competitive concerns between the two. If a combined EU-US market were established, it could provide the core for a more encompassing global climate regime.

Chart 2 Current capped and uncapped global emissions

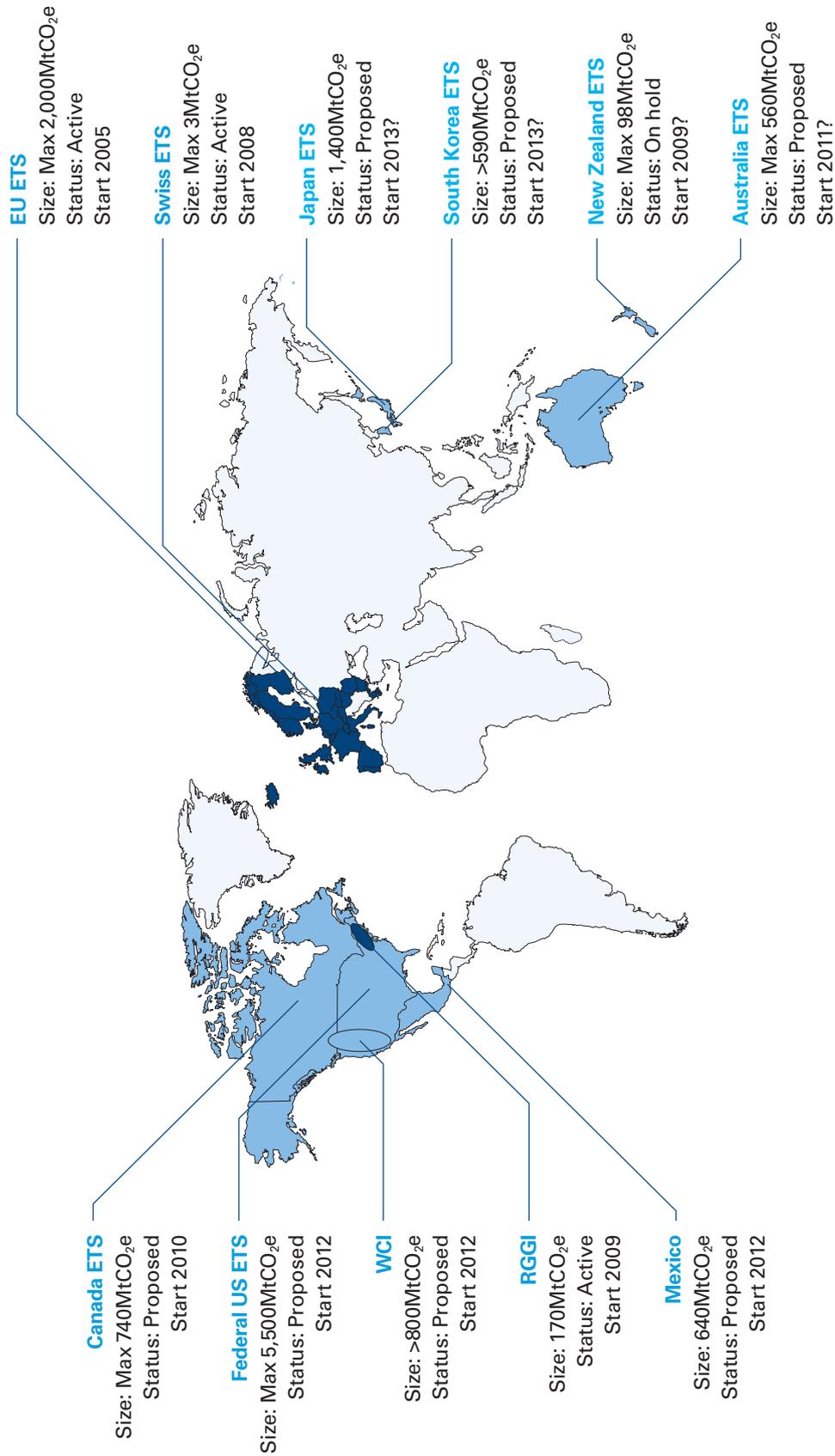


*RGGI: Regional Greenhouse Gas Initiative. **WCI: Western Climate Initiative.

Note: Size of bubbles are approximately to scale.

Source: Climate Strategies, Office of Climate Change.

Chart 3 Existing and emerging cap-and-trade systems



Source: Climate Strategies, Carbon Trust.

What is linking?

Linking means that one system’s allowances or other trading units can be used, directly or indirectly, by a participant in another system. Linking thus creates opportunities for inter-system trading; it enlarges the carbon market by connecting otherwise isolated domestic emission trading systems.

Linking is *not* the same as ‘design harmonisation’. Linking constitutes recognition and acceptance – mutual, in the case of bilateral linking – of units defined and generated in another jurisdiction. The systems being linked may still differ in terms of coverage, allocation, legal and institutional basis, and the use of offsets.

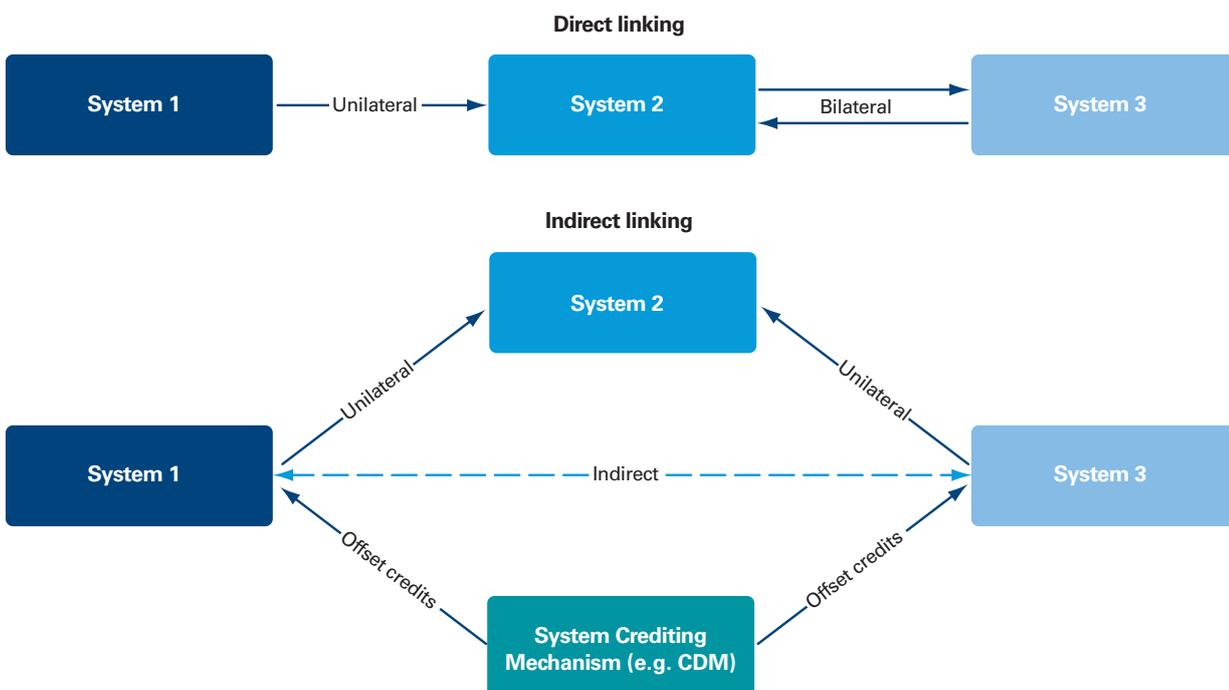
Possible forms of linking

Direct linking allows regulated entities to directly purchase and use allowances from another trading system for their own domestic compliance obligations. Direct links allow trade between different systems and can be distinguished by whether they allow trading in one or more directions:

- *Unilateral linking* is where entities in one system can purchase and use allowances from the other system for compliance, but not vice versa. An example is that Norway accepted Phase I EU allowances for compliance purposes, but the EU ETS did not accept Norwegian allowances.
- *Bilateral linking* provides that allowances can be freely traded between two systems and each system’s allowances are equally valid for compliance in both systems. If more than two systems participate, this becomes a *multilateral link*. It is hoped that the Swiss ETS will have a full bilateral link with the EU ETS. A bilateral link can either be adopted through a formal international treaty, which binds its partners to domestic implementation of the link, or through reciprocal domestic legislation accompanied by a memorandum of understanding or other negotiated expression of intent.

Indirect linking occurs when systems are not linked directly but join through a common third system. Most emerging emission trading systems will probably be indirectly linked through the Kyoto Protocol’s CDM (Clean Development Mechanism) or new crediting mechanisms, because most systems plan to allow regulated entities the use of CERs (Certified Emission Reductions) or other types of international credits (see *Chart 4*).

Chart 4 Types of linking



2. Existing and emerging emission trading systems

Emission trading systems that are already in operation or are under development exhibit a wide variation in a range of characteristics, including the sectors covered, approaches to price and ‘cost containment’, limitations on the use of offset credits, and emission reduction targets.

Even if linking does not require a harmonisation of all design elements, some variations in key features and domestic economic and political contexts pose difficult issues for any attempts at linkage. *Chart 5* summarises key design issues in terms of the differences in the elements of systems.

Differing economic and political circumstances drive different choices between the options depicted in *Chart 5*. Each national emission trading system, whether currently planned or proposed, is different because it is created within the context of unique economic and political circumstances.

The specific ways in which these design elements are incorporated or proposed in particular systems are indicated in *Chart 6*, in which the different choices in *Chart 5* appear in rows that define the different elements of system design.

Chart 5 Key types of differences in emission trading systems

Key differences between emission trading systems	
Coverage <ul style="list-style-type: none"> • Gases covered • Sectors covered 	Cap and allocation <ul style="list-style-type: none"> • Absolute vs. intensity/output-based • Reduction target • Allocation method (auction, free)
Offsets <ul style="list-style-type: none"> • Qualifying credits • Limits 	Trading boundaries <ul style="list-style-type: none"> • Approach to price control • Banking • Borrowing • Penalties

Chart 6 Comparison of existing and emerging emission trading systems*

	EU ETS	US regional: WCI	US regional: RGGI	US federal: Waxman-Markey
Status	In place	Proposed	In place	Proposed
Date of entering into force	2005	2012	2009	2012
Trading units	MtCO ₂ e	MtCO ₂ e	short tons CO ₂ e	MtCO ₂ e
Intensity/output based vs. absolute cap	Absolute cap	Absolute cap	Absolute cap	Absolute cap with output based adjustments
Max. size of market (CO₂e)	2,000Mt	800+Mt	188Mtons	5,500Mt
Coverage				
Gases				
CO ₂	✓	✓	✓	✓
N ₂ O & PFC	✓ (2013)	✓		✓
Other Kyoto		✓		✓
NF ₃				✓
Point of regulation				
Electricity	✓	✓	✓	✓
Energy intensive industries	✓ (excl. oil & gas production)	✓		✓
Agriculture & forestry				
Upstream oil & gas**		✓		✓
Cap and allocation				
Reduction target				
Base year	2005	2005	2009	2005
2020	21% (Phase III)	15%	10% (2018)	17%
2030+	50-90% (2050) based on trend			42% (2030) 83% (2050)
Allocation	Auctioning and free allocation. ~60% auctioning in 2013, increasing to 2020	Minimum 10% auctioning, increasing to 25% by 2020. Rest distributed by each partner jurisdiction as sees fit, may include further auctioning	25% min. of allowances for consumer benefit programs. Individual states choose how to allocate other 75%, but most states have auctioned nearly all allowances and used proceeds to support consumer benefits	Auctioning and free allocation. Estimated 85% free allocation, including to non-emitters (e.g. electricity retailers)

* Mexico and South Korea are not included because the details are uncertain.

** Combustion of oil and gas will be covered at point of refinement/distribution.

*** New Zealand government does not specify an overall cap for the NZ ETS. However, the allowances being issued in the NZ ETS will relate to the country's Kyoto commitment and any possible commitment established under a post-2012 regime.

Canada	Japan	Australia	New Zealand	Switzerland
Proposed	In discussion	Proposed	On hold	In place
2010	2010 <i>(potential pilot)</i>	2011 Trading in 2013	2009	2008
MtCO ₂ e	MtCO ₂ e	MtCO ₂ e	MtCO ₂ e	MtCO ₂ e
Intensity targets	Intensity targets for power companies	Absolute cap	Absolute cap	Absolute cap
740Mt	Est. <1,400Mt	560Mt	98Mt	3Mt
✓	✓	✓	✓	✓
	✓	✓	✓	
	✓	✓	✓	
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
		✓ (part)	✓	
		✓	✓	
2006	Unclear	2000	n.a***	2000
20%		5-25%		
Intensity-based free allocation	Auctioning and free allocation proposed	Auctioning with free allocation to emissions- intensive, trade-exposed industries such as aluminium, steel and LNG and coal-fired electricity generators	Auctioning and free allocation	Free allocation

Chart 6 Comparison of existing and emerging emission trading systems (cont)

	EU ETS	US regional: WCI	US regional: RGGI	US federal: Waxman-Markey
Offsets				
Qualifying				
Domestic		✓	✓	✓
CDM/JI not LULUCF [†]	✓	✓	✓	International credits expected to be used, qualification process to be confirmed
CDM LULUCF [†]		✓	✓	
AAU				
Limits	2008-2012: 20% of target remaining or max. 11% of 2008-2012 allocation	Up to 49% of target	Up to 3.3% of emissions during initial period. If average price exceeds US\$7/ton, up to 5% offsets can be used (stage 1 trigger). If average price exceeds US\$10/ton, up to 10% offsets can be used (stage 2 trigger)	Up to 2,000Mt (~30% of allocation), to be split evenly between domestic and international offset credits
Trading boundaries				
Approach to price control	Minimal (potential to determine timing of auctions to influence price).	No cost containment measures	Reserve price \$1.86/ton at first auction. After, reserve price will be the higher of \$1.86 (adjusted for inflation) or 80% of the market price	Cost-containment auctions in case of short-term price hikes
Banking	✓	✓	✓	✓
Borrowing	✓ (year-on-year overlap within trading period)			✓
Penalties	€100/t plus missing allowances next year	Three allowances per excess tonne	Three times excess plus potential state monetary penalties	Greater of US\$200/t or three times average market value in that year plus missing allowances next year

† Land Use, Land-Use Change and Forestry.

Canada	Japan	Australia	New Zealand	Switzerland	
✓	Unclear				
✓		✓	✓	✓	
				✓	
				✓	
Max 10% for CDM credits	Unclear	Unlimited	Unlimited	Up to 8% of target	
Contribution to Technology Fund caps price. Cap rises from C\$15/tCO ₂ e in 2010 to C\$20/tCO ₂ e after 2013	Administrative carbon market board, possibly cost containment measures	In 2011-12 – permits at a fixed price of \$10 per tonne Price cap for four years from 2012-13	Unlimited use of international credits, acting as a safety valve	No cost containment measures	
Unclear	✓	✓	✓	✓	
	✓ (up to 5%)	✓ (up to 5%)	✓ (up to 10%, repayable with 15% interest)	✓	
Unclear	Unclear	Either fixed amount or 110% of average auction price for previous year plus missing allowances next year	Monetary penalty plus 1.15 times missing allowances next year	SFR12-36/t paid as retrospective CO ₂ tax	

Different systems are marked by significant variations in many key design features. For instance, while most have absolute caps, some provide for intensity-based caps in which the emissions limit is adjusted according to industrial production levels. There are also significant differences in mechanisms for 'cost containment', and differences of sectoral coverage and the types and amounts of offset credits that are allowed. As a consequence, their traded allowances or other units are, in fact, not homogeneous commodities. Not only does the precise definition of credits differ, but also their prices are also likely to be quite different. This is despite the common numeraire of CO₂ or equivalent (CO₂e) which, superficially, makes them seem identical.

As indicated, these different design choices are tailored to achieve certain domestic or regional policy objectives, with each system reflecting domestic economic, political and natural resource circumstances. For instance, national circumstances are reflected in the scope and coverage of a system, e.g. inclusion of land-use related emissions, directly or via domestic or international offsets. Policy priorities are reflected through provisions concerning domestic impacts, e.g. the distributional effects from emissions leakage and changes in international competitiveness patterns. Linking thus needs to be understood in the context of a range of policy objectives; the desire to link to other systems will depend on the extent that these objectives are affected by linking.

Different views on the desired CO₂ price range also depend on the sectoral coverage. In systems with a large coverage, such as the planned federal US system, the price would feed through into transport and domestic fuel costs, so it may be politically more difficult to implement linkages that result in higher CO₂ prices. Systems may also be based on a clear vision of the distributional effects of a system, for instance on the share of free allocation and auctioning in the economy. By changing the CO₂ price, linking can affect these distributional choices, e.g. companies that have to purchase allowances at auction will be affected more strongly by a CO₂ price increase than companies that obtain their allowances for free, thus making linking politically more difficult. The distributional impacts of the price changes on firms depend, *inter alia*, on their ability to pass on allowance costs, and the recycling of revenues from the auction.

3. Economic impacts and trade-offs

At the global level extensive linking of systems would offer the prospect of greater efficiencies in the abatement of greenhouse gas emissions. But at the national level greater efficiencies from linking must be traded off against a loss of local control of system design and potentially lower (or higher) domestic abatement together with financial transfers to (or from) other systems.

Benefits of linking

Linking emission trading systems, by including more participants with a greater diversity of sources and more abatement options, should improve efficiency, with resources directed to least-cost abatement measures and lowering overall compliance costs. It should also improve market liquidity.

In the abstract, trading can take place until carbon prices are equalized within the linked systems. To the extent that this promise is fulfilled, greenhouse gas mitigation can be achieved more cost-effectively as emissions are reduced where reductions are least expensive, while also reducing competitiveness distortions arising from different carbon price levels. More specifically, when two emission trading programmes are linked, prices will rise in one of the programmes and fall in the other, as resources flow to the former. The extent and convergence level of prices depends on the type of link and the size of the systems. In addition, restrictions may constrain price convergence.

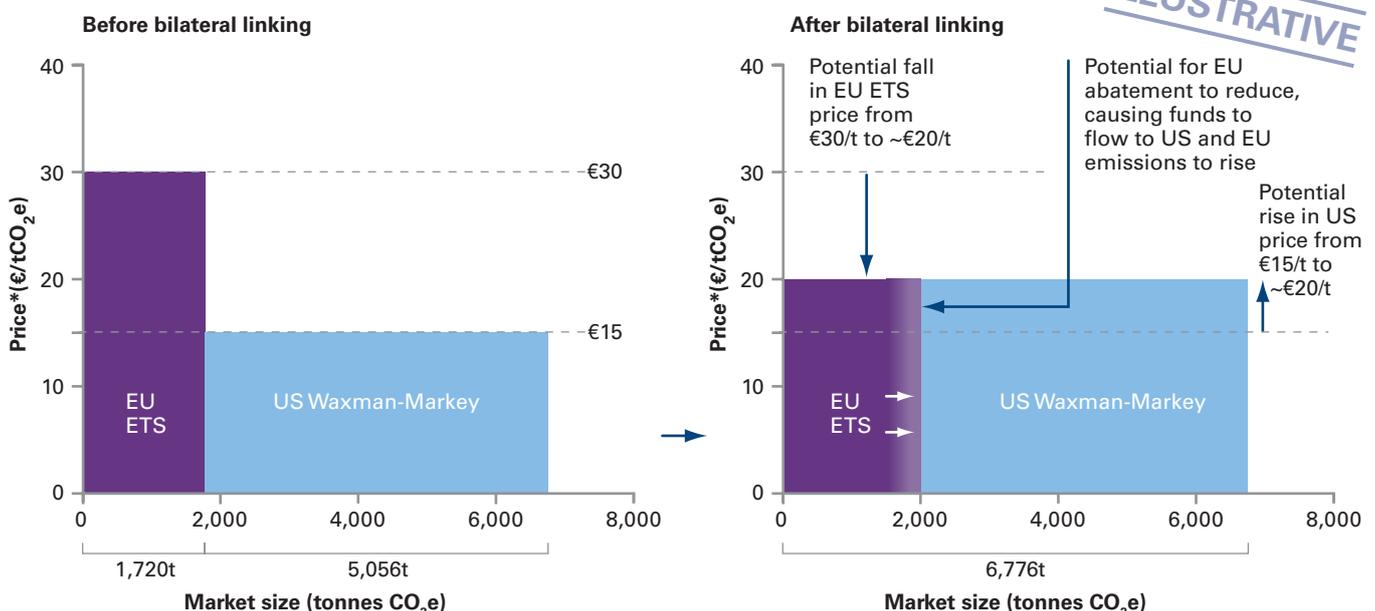
A trading link also creates larger, more liquid carbon markets, potentially reducing price volatility and limiting the potential for market abuse. At the same time a system can face price volatility from its linking partner system. However, in aggregate linking reduces concerns about market power of large companies – because the broadened market is less concentrated, there is more competition, and less potential for market manipulation.

The impacts and benefits from linking systems are dependent on a number of factors, including demand and the underlying cost (supply) curves of the systems being linked. As a result, impacts on buyers and sellers within these systems will be diverse.

Trade-offs

These aggregate gains obviously involve trade-offs for the individual participants. The basic economic trade-offs are depicted in *Chart 7*. This provides an illustration of the potential impact on prices and abatement of linking the EU ETS to a federal US cap-and-trade system.

Chart 7 Illustrative impact of linking on price and abatement



* This is an illustrative example of price impact only. Obviously, if starting prices were reversed (EU ETS prices lower than US) then the price impacts of linking would be similarly reversed.

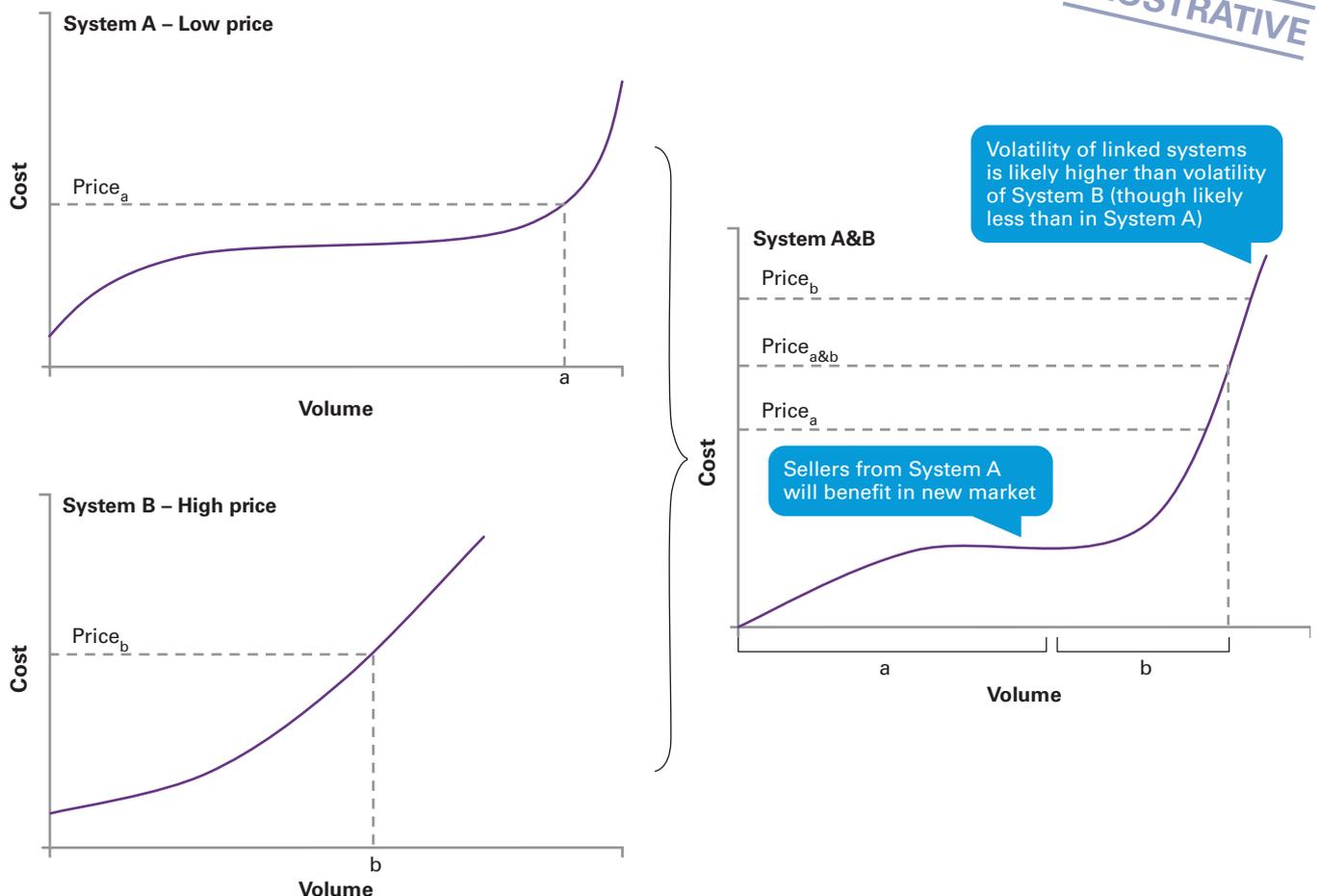
Source: Climate Strategies.

For illustrative purposes, we have assumed that in an unlinked world, EU ETS prices are twice those in a US system. In this case, if the systems were linked, the EU ETS would need to accept lower carbon prices and hence lower levels of domestic reductions than it might otherwise seek. In addition, there would be a net flow of allowances from the US to the EU, financed by EU industry.

The net result would be that the EU would face a lower price and undertake less domestic abatement than without linking, and would transfer money and abatement to the US. Even if the cost of abatement to EU businesses decreases, the EU would lose co-benefits associated with domestic abatement, such as reduced imports of fossil fuels and incentives for low carbon industrial innovation. The US, in turn, would gain finance but face higher domestic carbon prices than before linking. The decision to link will depend on the extent that these trade-offs are acceptable for each region.

Price convergence from linking two emission trading systems has distributional impacts as shown in *Chart 8*: buyers in the high price system and sellers in the low price system benefit from the link, but sellers in the high price system and buyers in the low price system suffer. Thus, even though linked trading systems should yield a net economic benefit, some participants may be worse off as, depending on relative market size, the link will create winners and losers. In systems where all sectors are under the cap, small price increases may be politically sensitive, even if linking leads to net overall economic benefits.

Chart 8 Price convergences from linking two systems



4. Barriers to linking systems

Along with economic impacts and trade-offs related to linking, there are a range of differences between systems. Some do not pose serious obstacles to linking, but others, such as the stringency of caps, enforcement provisions, the eligibility of offset credits and cost containment measures, can make linking quite difficult.

System differences unlikely to create barriers

In these cases, although there are differences between systems, harmonisation is not needed and/or it is politically relatively easy to reach agreement in spite of the differences. Differences in this category (as summarised in *Chart 9*) include differences in monitoring, reporting and verification (MRV) rules, banking provisions, registry systems, rules governing new entrants and closures, compliance periods, and allocation methods.

Some differences – notably around allocation – mean that linking may not achieve expected outcomes.

The implication of different allocation approaches may be particularly complex to understand. Different approaches may raise concerns about comparability; for example, if one region gives free allocations, this may represent an implicit subsidy. That does not mean however that in itself this poses an obstacle to linking: the inequality exists irrespective of whether the systems are linked, though linkage may affect the value of the inequality.

Chart 9 System differences unlikely to create barriers

Feature	Description	Why not a barrier	Examples
MRV Standards	Different methods and procedures for monitoring, reporting and verifying emissions	Different MRV systems would not present a barrier to linking as long as systems are robust and ensure integrity	EU and US systems can have different MRV processes, provided both are sufficiently robust
Registry systems	Alternative registries across countries	Technical issue which can be resolved	The EU ETS is linked to the Kyoto Protocol registry
Allocation rules	Companies that buy allowances at auction will be more affected by price changes than companies that get free allocations	Economic impact of different allocation approaches exists irrespective of linking	Different systems have different allocation rules
Banking provisions	Different banking provisions may pose a problem as linking effectively extends the most generous banking rules to all other systems	All of the emerging systems allow banking	
New entrants and closure provisions	Different measures can affect the overall cap and equity within linked systems	Technical issue which can be resolved	EU ETS member states use different approaches now without affecting overall system operation
Compliance periods	Compliance periods could be different between systems	Not a barrier as could be beneficial through improved market liquidity	EU ETS has different compliance periods to the proposed federal US (Waxman-Markey) system

System differences likely to pose barriers to linking

There are a set of differences in cap-and-trade system design which present more fundamental difficulties to successful linking. These are set out more fully in *Chart 10* and include:

Stringency of caps: Systems with different levels of ambition for emissions reduction will most likely have different levels of local carbon price, in the absence of linking. Typically, those with lower levels of ambition would have lower carbon prices. As discussed in Section 3, to link systems of different ambition would therefore cause a lowering of price in the more ambitious system and raising of price in the less ambitious system, with a consequent flow of finance to the less ambitious region. If the result of differing stringency of cap is a significant change in price and high levels of finance flows, this is likely to prove politically unacceptable both to the region experiencing the higher cap and to the region which experiences financial outflows.

Stringency of cap enforcement: A failure to enforce systems with due rigour will undermine confidence in the system. The linking of systems would cause each system to share the lowest common denominator of enforcement. This is likely to lead to a minimum threshold of stringency of enforcement, below which no robust system will be willing to link. Therefore, any significant difference in stringency of enforcement is likely to make linking impossible until rectified.

Eligibility of offset credits: If emissions systems link, then effectively they will share the same pool of offset credits. If one system permits a certain type of offset, yet another does not, this may prove a significant barrier to linking. Harmonising offset credit eligibility criteria would reduce this barrier, and if the supply of eligible offsets is sufficient, would reduce any price impacts.

Absolute vs. intensity targets: Japan, for example, has been relying on intensity-based voluntary targets for more than a decade, so shifting to mandatory absolute targets could be a long-term process. The US system is also proposing intensity (output-based) compensation, though within an overall absolute cap. Although it is possible to link trading systems with absolute targets to ones with intensity targets, the technical complexities may be considerable, and other factors may make such links politically very difficult. Concerns include competitiveness, cap integrity and liquidity shocks. Under intensity-based systems companies do not have the same incentive to factor carbon costs in decisions on output and prices, because the output-based allocation (or compensation) negates the carbon cost of production decisions. Compared to a system that imposes absolute targets this could be viewed as a subsidy and raises competitiveness concerns. Production increases in the region with an intensity target also inflate the combined cap. Because output-based allocations are adjusted according to prior emissions, this could lead to liquidity shocks for the linked systems at the moment of adjustment. The proposed US system might avoid this since it focuses upon output-based compensation rather than actual allocations.

Cost containment measures: Some systems may introduce measures to contain price – for example, either a floor price or a ceiling on the cost of carbon in the system. Any such measure in one system will then prevail in another system, with the highest floor price or lowest ceiling prevailing and the entity guaranteeing such price becoming responsible for the enlarged linked system. Any such measures may be politically unacceptable in one region and form an insurmountable barrier to linking.

Coverage and scope: Economic and natural resource circumstances, and consequent emissions structure, are also determinants of the system design. In New Zealand forestry and agriculture emissions dominate and so have a correspondingly large mitigation potential; and US proposals almost all include a sizeable contribution from land-use activities. The EU ETS currently rejects the integration of forestry into emissions trading due to concerns over monitoring and other issues.

Chart 10 System differences likely to pose barriers to linking

Feature	Description	Why a barrier	Examples
Stringency of caps	Intensity of caps/emission reduction targets are politically critical issues. It may be a precondition for linking that systems have comparable caps or at least accept the trajectory of the resulting system	Capital will flow to a lower priced system, which could be an incentive to have a lower target. A Kyoto-type agreement may reduce this barrier, otherwise, countries must agree on comparably stringent caps	EU: -21 % from 2005 Waxman-Markey: -17% from 2005
Stringency of cap enforcement	Enforcement of targets is critical to ensure market performance and confidence	Significant differences in the reliability and transparency of enforcement could prevent linking. Also, if paying a penalty fee for non-compliance removes the obligation to meet emissions targets, this acts as a price cap	Until a minimum standard is agreed between systems this could prove a barrier
Eligibility of offset credits	Situation where some types of offset credits are considered as eligible in one ETS but not in the ETS of a potential linkage partner	Units that are eligible in one system will affect the overall supply of units (and therefore price) in the combined system. May be less important when backed by Kyoto units	The EU does not accept forestry or REDD* credits (until 2020), but US proposals include both
Absolute vs. intensity targets	Intensity-based systems rely on calculation and adjustment of emissions after the trading period	In intensity-based approaches allocations are adjusted ex-post, this could lead to liquidity shocks for the linked system	Canada, US and Japan propose incorporating intensity-based targets or adjustments in their systems
Cost containment measures	Cost-containment measures including offset provisions, borrowing provisions, or price caps. If these provisions are present in one of the linked systems, they will propagate to the linked system regardless of whether the other system has the same provisions	Unlimited import of credits from other sectors and regions could reduce the CO ₂ price and environmental effectiveness. Borrowing can lead to delays in implementation, potentially increasing future abatement costs. If a system without a price cap is linked to a system with a price cap, the price cap will set the cost limit for the combined system	US: different approaches proposed; Waxman-Markey advocates strategic reserve auctions EU ETS: 50% of reduction effort in scenario of 30% reduction by 2020 can be met by international credits Australia: price cap
Coverage and scope	Different systems include different sectoral coverage – for example power vs. industry vs. land-use sectors	Some systems judge the credits of certain sectors as not robust due to additionality of abatement or monitoring concerns	Proposed New Zealand and US systems include land use emissions but the EU ETS does not

*Reduced Emission from Deforestation and Forest Degradation

Fundamental barriers to linking reflect sovereignty concerns

Linking may also reduce the control that a country has over its system. When one system is linked with another, it will be influenced by decisions of the government overseeing the second system. If the second system decides to link with third system, allows domestic offsets, or expands the scope of allowed international offsets, for example, all these will feed through to the first system, and may influence its price and hence distributional impacts. A decision to link thus has profound strategic consequences for governance. Countries would probably reserve the right to 'break a link', but this could be very difficult to implement in practice, in part given the extent to which allowances might already have been exchanged.

As noted, a deep set of barriers to linking emerge from the fundamental nature of sovereignty considerations and related concerns that can create a large wedge between national perspectives and global objectives. Linking may be optimal from a global perspective, but it requires one country to set rules by which it (or its industry) either pays another country money in return for doing less ambitious abatement, or *vice versa*. Evidence from the Kyoto process shows that countries, including their electorates, do not accept paying money abroad for abatement as an acceptable substitute for doing it at home. Nor may they consider it acceptable for domestic prices to be driven up due to linking with a more ambitious region, and in effect to have domestic carbon and energy prices so strongly influenced by decisions outside their jurisdiction.

What this really reveals is that a focus on 'linking' is premature if the underlying systems, including the preferences they express, are too divergent. From this perspective, a more appropriate term might be the challenge of 'docking' systems together, with its implicit recognition that two systems cannot 'dock' unless they have been developed to make this possible. This has important policy implications as indicated in the final section of this report².

Finally, the debate on linking will now be set against the backdrop of the credit crunch and subsequent recession. The origins of the crisis in the inadequacy of financial regulatory structures in some of the most advanced economies must inevitably feed public and political doubts about the wisdom of interlinking cap-and-trade systems that are designed first and foremost to cut domestic emissions. An interlinked international carbon market cannot easily entertain doubts about other jurisdictions, given the potential for faults in one system to propagate into others. Reluctance to engage with the international financial transfers inherent in linking may be further exacerbated by such doubts.

² Note that the term 'docking' has also been used for closely-related but distinct approach. The Environmental Defence Fund suggests a 'docking station' as a mechanism that would enable a nation to participate in the global carbon market if that nation adopts 'comparable' commitments, such as a national cap-and-trade system, even if the nation has not yet ratified the new treaty. A 'docking station' provision would allow any Party to the new agreement to trade in the carbon market with a non-Party if the non-Party enacts comparable national emission caps. See Environmental Defence Fund, 'Spurring Swift Action to Curb Emissions: How Docking Stations Can Help', 20 August 2008; <http://www.edf.org>.

5. Strategic approaches to linking

Top-down and bottom-up approaches to developing emission trading systems links are both on the international agenda. A key issue is whether they can reinforce each other.

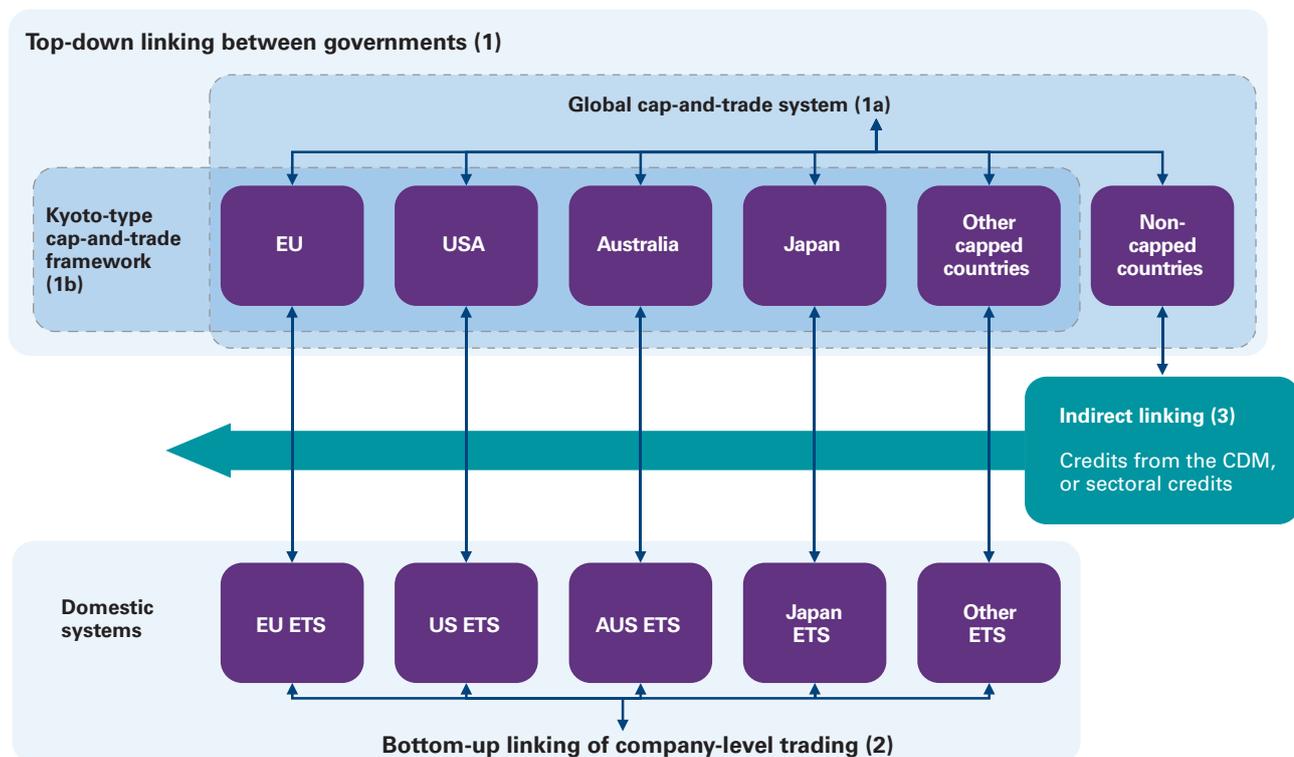
The prospects for linking arrangements will depend upon wider international policy developments. For both the broader policy framework and the technical design of trading systems, the international regime succeeding the Kyoto Protocol’s first period will be of crucial importance. This is because there are broadly two strategic approaches to linking.

The ‘bottom-up’ approach, in its extreme form, may dispense entirely with globally negotiated architecture and even national caps. It focuses first and foremost upon the domestic development of company-level cap-and-trade systems, and then considers whether and how such systems in different jurisdictions may be linked as considered in this report. In this approach, linking is an entirely ‘bottom-up’ process (box 2 in *Chart 11*,

in isolation) driven by a set of bilateral negotiations between different jurisdictions. This may – or may not – evolve slowly towards a goal of multiple interlinkages that could culminate with a global carbon market for those emissions covered by domestic systems. In theory, this could dispense with multilateral negotiations entirely, or offer a fallback in case such negotiations fail to deliver any significant post-2012 deal.

In contrast, a ‘top-down’ view places the emphasis upon internationally-negotiated structures of national emission caps, and agreed rules around international offsets. This is represented by box 1a in *Chart 11*. Governments can then devolve caps and trading to the level of companies to create direct incentives that enhance carbon market efficiency, and link these systems; international trades

Chart 11 Strategic approaches to linking cap-and-trade systems



between private entities in different systems are then accompanied by a corresponding transfer of the governmental cap. This broadly corresponds to the approach taken in the Kyoto Protocol, and its implementation in the EU through the EU ETS, where EU ETS allowances traded across national country borders correspond to transfers of Kyoto Units (AAUs³). In principle, governments can also trade directly to increase flexibility and efficiency of delivery in relation to sectors not covered by domestic ETS. As described in our previous report⁴ direct intergovernmental trading has tended to emerge only very slowly and cautiously, and not at all in the form of an intergovernmental trading market.

There are, of course, strengths and weaknesses in the different approaches. Global negotiations have many advantages in principle: they help to focus on the global objective; they provide a framework for negotiating 'comparable efforts' in defining national commitments; they facilitate the development of common rules and standards rather than a plethora of unrelated national systems; and integrated coverage of world regions and economic sectors maximises the gains from trading, as emissions are reduced in places where this can be achieved at the lowest possible cost.

Thus a *Kyoto-type inter-governmental cap-and-trade approach* (box 1b in *Chart 11*) facilitates negotiations of regional levels of ambitions in terms of emission caps for Annex I countries, and enables flexibility and some commonality of systems in meeting these. Moreover, if other major emitters adopt caps or at least clear incentives for reducing emissions from their baseline, this can reduce concerns over carbon leakage, enabling a higher level of ambition of the aggregate reduction effort. However, if the trading is directly controlled by governments, large countries might have undue influence. Moreover, global negotiations are extremely difficult and they require countries to compromise between purely domestic considerations and the needs of global accommodation.

Not surprisingly, the larger and more powerful countries express more interest in 'bottom-up' approaches: they have greater capacity to develop their own analysis and systems, more complex internal political processes to manage, and larger domestic trading markets which reduce the gains from international cooperation. The US in particular advocates an essentially 'bottom-up' approach, whilst seeking some 'comparability of effort', particularly from China.

The EU has also begun expressing more interest in 'bottom-up' approaches, partly to accommodate the US position and also to promote its view of the EU ETS as the nucleus of globally-linked industry trading systems, with minimum multilateral interference. There is some irony in this, since the EU ETS could not realistically have been created without the Kyoto Protocol, key rules (including offset provisions) draw directly on Kyoto mechanisms, and the adequacy of its Phase II allocations hinged directly upon the EU's Kyoto Protocol targets⁵.

However, having established this basic infrastructure and declared a unilateral 21% target post 2012, the EU ETS could continue without a new global treaty. Yet, such 'bottom-up' processes on their own would not enable negotiation of a global cap-sharing regime and may result in very restricted coverage. It does not seem plausible that a significant number of major emitters like the US, EU, China, Russia and others would agree to form a joint carbon market outside the UNFCCC arena.

Finally, *indirect links* (illustrated by box 3 in *Chart 11*) among systems are likely to play a prominent role under either multilateral or bilateral approaches. Indeed, these could emerge as the *de facto* architecture of linkage after 2012, at least for an intermediate period, until bilateral links between trading systems are implemented. Indirect linking could occur through a continuation of the CDM or through a successor mechanism. Indirect linking can lead to complete or incomplete carbon price convergence depending on the supply and cost curves of offset credits, cap levels and limits on the import of credits. For substantial indirect linking to occur, however, a large-scale international offset mechanism would be required, without much restriction on the use of such credits.

³ AAU: Assigned Amount Unit.

⁴ See Carbon Trust (2009), *Global Carbon Mechanisms: Emerging Lessons and Implications*.

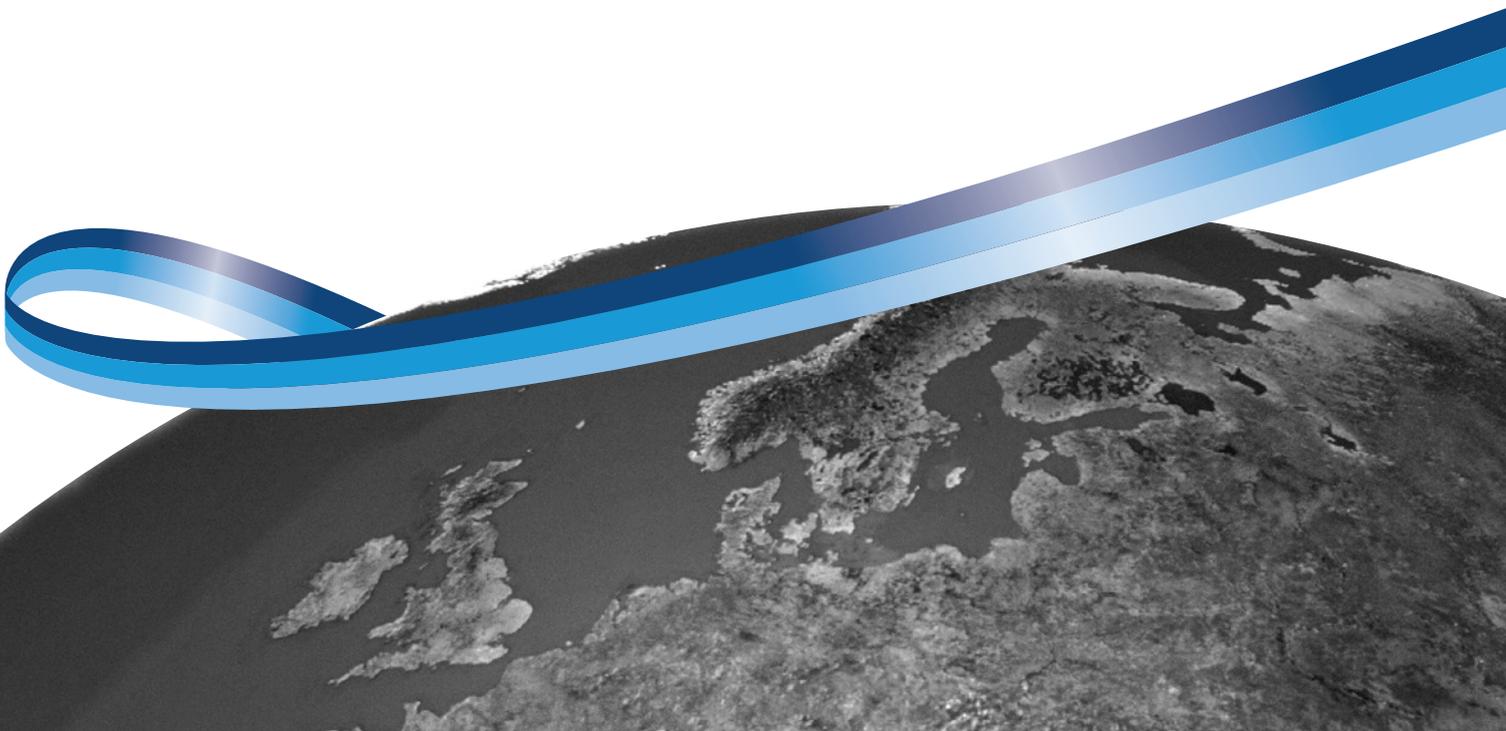
⁵ See Carbon Trust (2007), *EU ETS Phase II: Implications and Lessons*.

⁶ See Carbon Trust (2009), *Global Carbon Mechanisms: Emerging Lessons and Implications*.

Sectoral mechanisms may offer a new form of indirect linkages. These can represent a mid-way between 'top-down' and 'bottom-up' approaches, if countries agree sector caps and these are either formulated as allowances that can be sold directly, or devolved as cap-and-trade allowances to emitting companies within these sectors. Sectoral crediting and trading may become explicit structural elements of future international carbon markets on the way to a more encompassing international carbon market, and currently several proposals to expand the scope of action via sectoral mechanisms are being discussed under the UNFCCC:

- *International sectoral trading systems for intrinsically international sectors outside the scope of national caps*, such as aviation and maritime emissions. If, as expected, international aviation and shipping are net buyers of allowances, unilateral links with other systems may be sufficient, as this would moderate the price of the international aviation and maritime allowances. These sectors could then create a significant demand for allowances or credits.
- *For advanced developing countries*, several proposals for sectoral cap-and-trade systems have been made which could be linked to other systems in the same way as to national cap-and-trade systems.
- *No-lose sector targets*, which would enable allowances to be sold into an international market, but with no obligation to buy if emissions exceeded the agreed sector target. Governmental or company-level trading systems in developed countries could implement a unilateral link to credits from sectoral no-lose targets in the same way as currently under the CDM. Furthermore, countries could implement sectoral trading systems to reach their no-lose targets (as planned by Mexico).

Thus several options for new crediting mechanisms are being discussed under the UN process, and if these are to help drive a more integrated global carbon market via indirect links, such crediting mechanisms in developing countries would have to be accepted by all developed countries. As noted in our Global Carbon Mechanisms publication⁶, one crucial question is whether industrialised country targets, or caps on their industry systems and potentially more global sectoral caps, will generate sufficient demand to establish some balance with the large volumes of potential supply.



6. Prospects for linking

While countries that already have close economic and political relations are promising candidates for linking, most pairings or other groupings of countries do not offer the prospect of linking for many years.

Despite many attractive features, which suggest that linking could and should be pursued, the analysis of barriers in the previous sections reveals the difficulties. Particularly in the aftermath of the credit crunch, countries may take an even slower and more cautious approach before adjusting their domestic aspirations and opening up their systems to the compromises, perceived

risks, reduced control and diminished sovereignty implied by linking. Against this background, for many policymakers and business leaders two key questions about linking are which systems are likely (or unlikely) to be linked, and when? *Chart 12* summarises tentative answers to these questions.

Chart 12 Likelihood of linking for various combinations of systems

	US federal: Waxman-Markey	US regional: WCI	Canada
Key challenges to linking	<ul style="list-style-type: none"> • Cost containment provisions • Domestic LULUCF credits and international forest carbon credits, discounting of offset credits • Reserve auctions increasing the cap and other interventions 	<ul style="list-style-type: none"> • LULUCF credits • Cap significantly weaker than the EU cap 	<ul style="list-style-type: none"> • Intensity targets
EU ETS	<p>Probable</p> <p>Rationale/impact:</p> <ul style="list-style-type: none"> • Reduced competitiveness distortions • Funds flow to US system • EU CO₂ price and abatement level decreases 	<p>Probable</p> <p>Rationale/impact:</p> <ul style="list-style-type: none"> • Same as for US federal system 	<p>Probable</p> <p>Rationale/impact:</p> <ul style="list-style-type: none"> • Would likely be an indirect link (through WCI or US Federal)
US federal: Waxman-Markey		Likely	Probable
US regional: WCI			Likely
Canada			
Japan			
Australia			
New Zealand			
Switzerland			

Several examples illustrate the variety of conditions that affect the prospects for linking. Some countries, such as Australia, may discourage unilateral links to their systems in order to prevent price increases. The price caps planned in Australia may also deter other countries seeking to link in the short term. The uncertain prospects for a Japanese system and its heritage of intensity-based voluntary targets make it hard to envisage a link with an EU ETS-type system. Furthermore, Japan (like Australia) has substantial concerns about the potential negative competitiveness effects on its industry caused by an overly high carbon price, given its high trade intensity with its Asian neighbours.

The economic size of a country, and hence the size of its emission trading system, can be important. When establishing a bilateral link, small countries are more affected by price volatility and price-relevant decisions within large systems. In relatively small systems – even where there is a general interest in establishing linkages to increase liquidity – there is caution and even wariness about establishing bilateral links, and there is also an interest in cost containment. Also, sectoral coverage may have a higher priority than bilateral links. In New Zealand, for example, the emissions from the forestry and agriculture sectors account for up to 70 per cent of the country's emissions.

Japan	Australia	New Zealand	Switzerland
<ul style="list-style-type: none"> In the short term, possibly intensity targets, cost containment 	<ul style="list-style-type: none"> Cap possibly significantly weaker than the EU cap Price cap, no export of Kyoto units possible 	<ul style="list-style-type: none"> Dominance of agriculture and forestry AAUs in the NZ system would impede a link 	<ul style="list-style-type: none"> Low penalty
Unlikely Rationale/impact: <ul style="list-style-type: none"> Unclear funds flow Unclear price impact 	Unlikely Rationale/impact: <ul style="list-style-type: none"> Funds flow to the Australian system EU CO₂ price decreases 	Unlikely Rationale/impact: <ul style="list-style-type: none"> Unclear funds flow Unclear EU price impact, likely to be marginal 	Likely
Unlikely	Unlikely	Unlikely	Unlikely
Unlikely	Unlikely	Unlikely	Unlikely
Unlikely	Unlikely	Unlikely	Unlikely
	Likely	Probable	Unlikely
		Likely	Unlikely
			Unlikely

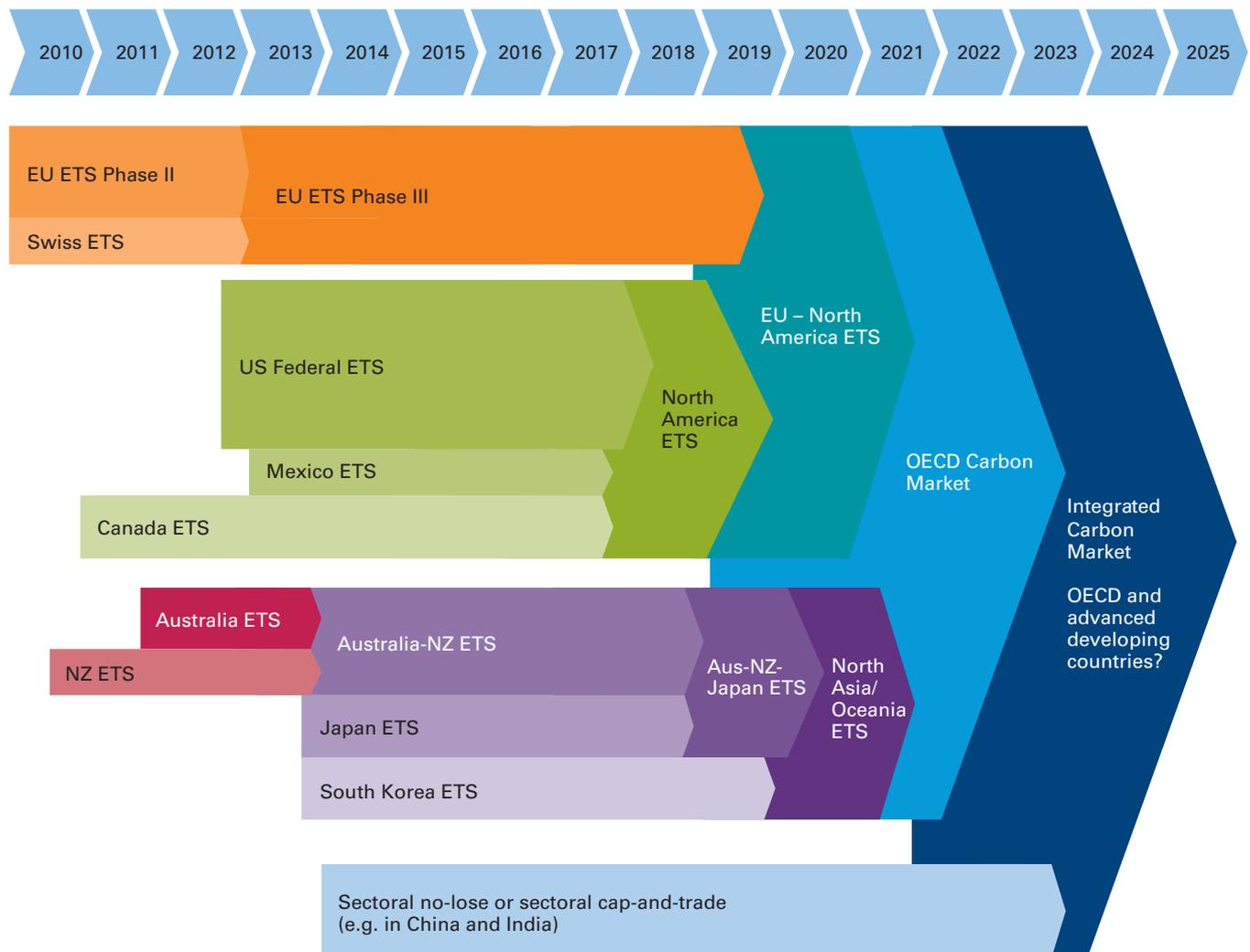
As noted, the acceptability of linking will be strongly influenced by the extent of existing similarities in circumstances and in the design of emergent systems. Moreover, political culture and diplomatic and trade relationships will be an important factor. This implies that emission trading systems in countries that are already close trading partners and have undergone some degree of legal and political integration are likely to see earlier bilateral links. Australia and New Zealand – despite complications – are candidates for relatively early linkage. Their common dependence with Japan and Korea on Asian trade means that a set of Asia-Pacific interlinkages could emerge more easily than these systems linking with the EU ETS.

As for a transatlantic EU-US linkage, difficulties of prediction are obvious whilst the US still has a patchwork of regional proposals in the midst of developing a federal cap-and-trade system that has yet to face the test of Senate approval. However, certain key features, including probably a lower level of ambition than the EU, the use of land-use based domestic and international credits, output-based compensation and cost containment measures in some form, all seem likely to complicate the development of a direct link with the EU ETS.

Against this backdrop *Chart 13* presents some inherently speculative suggestions about the prospects for linking arrangements to 2025.

ILLUSTRATIVE

Chart 13 Timeline for potential system linkages



Source: Climate Strategies

7. Implications for business

Business has significant stakes in the prospects for linking generally and in the particular features of systems that could facilitate (or impede) it.

Pro-active involvement now could help shape a better future

Understanding the implications of linking issues for business requires analysis at many levels – global, regional, national and sub-national, as well as industry, firm and facility.

In the abstract, from a global perspective and in terms of economic theory, linking emission trading systems offers possibilities for increasing their collective efficiency. This potential has led to much interest in specific possibilities for linking particular systems as well as interest in the more general issues posed by linking. Thus, linking is now on the public policy agenda in many countries, and business leaders need to be conversant with the issues and related facts and concepts. There is much at stake for business in the resolution of the issues – in both the short term and the long term.

For the next few years, businesses need to prepare for a scenario of multiple trading systems of increasing regulatory complexity and uncertainty, without much linking. Firms will thus face different carbon prices across countries, particularly between those that have cap-and-trade systems or other significant carbon-constraining measures in place, and those that do not. Firms will therefore have to operate in a highly fragmented and largely uncoordinated international system.

Furthermore, there will not only be increasing numbers of (unlinked) emission trading systems, there will be increasing diversity among the systems. Governments are likely to continue to develop their systems in response to a multitude of internal economic and political circumstances, with less regard for the implications of their system design choices for linking opportunities. The diversity of design features of separate emission trading systems will lead to higher compliance costs for business, as compared to a fully linked world or even a situation of extensive linking among major systems. The reality for the next several years is likely to include price differences between systems and a range of price containment measures, as well as differences in the strictness of emissions caps of systems.

In the longer term, even if a new international climate change agreement is reached, this would not necessarily lead to a global carbon market or even significant bilateral linkages between countries or regions, for the establishment of linkages will likely take many years.

In any case, the linkage aspects of the international regulatory environment of business will be dynamic and complex. It will *not* be a stable regulatory environment that is easily classified dichotomously as either ‘linked’ or ‘unlinked’. Rather, it will be an evolutionary world in which various systems linkages are under consideration or development or implementation in some countries, while other countries remain committed to being unlinked.

Businesses will assess how their own industries, firms and facilities are affected by the linkage issues in their regulatory environment. The direct implications of linkage – or its absence – is the greatest for industries and firms that are both energy intensive and trade intensive. For they are the ones that are the most sensitive to the international competitiveness implications of linkage arrangements.

The implications of linking issues extend as well across managerial processes within firms – including financial management as well as marketing. Finance and capital budgeting processes for international plant location decisions will need to take into account the impact on future carbon prices of the presence or absence of linking arrangements for specific countries where the establishment or acquisition of new production facilities is being considered. As for marketing, cross-national differences in product prices in different national markets may be greater or smaller depending on whether or not there is linking between the countries. In sum, the implications for business extend across many levels and organisational contexts – from decision-making about particular projects to strategic decisions about internationalised production processes and marketing strategies of product lines.

8. Implications for policy makers

Linking of trading systems has significant potential benefits, but systems also need to be appropriate to national economic and political circumstances. Striking the right balance as systems evolve and overlap will be a continuing challenge.

As outlined in this report, linking trading systems is ultimately a challenge of matching the top-down vision of globally interlinked carbon markets with the bottom-up realities required for systems to fit domestic circumstances: to 'dock' domestic systems together into an internationally linked system.

The most generic, immediate implication is that governments need to at least consider the implications of domestic design choices for linking prospects. Only they can decide if the benefits of designing to link internationally outweigh domestic needs. A valid case can be made for a period of 'regulatory competition' between different approaches, but the risk is that incompatibilities will be locked in. Thus government and business decisions taken in the short-term will have long-term implications. Policymakers must decide to what extent their trading systems should be designed for linking, and whether to accept the trade-offs of making that choice. Also, policymakers should be aware of the business implications of their decisions. Especially in case of linking to a larger market the implications on their own system can be significant.

Role of a 'global deal' and international offsets

Whilst agendas for policymakers vary by region, more effort should be devoted to reaching a common view on the long-term vision for a global carbon market. Ideally, this could be an important role for the global UNFCCC negotiations on a post-2012 international climate regime that are due to culminate at Copenhagen. In practice, the issues of linking domestic systems are far from central in current talks.

Even without that, the future of linking and a global carbon market could be strongly influenced by the outcome of current negotiations. Bottom-up linking of company-level trading systems could be within the framework of government-level emission trading, as with the Kyoto targets in the EU. Some of the

potential barriers to linking cap-and-trade systems, such as significantly divergent MRV provisions, will be easier to overcome in the event of a post-2012 international agreement. More importantly, the comparability of targets will have been addressed through an international consensus-based agreement establishing an acceptable comparability of effort, the absence of which could otherwise undermine the strength of domestic programmes.

In addition, in a post-2012 agreement, most emission trading systems will have unilateral links to international offset mechanisms, such as the CDM or potential new trading mechanisms for non-OECD countries. Therefore, OECD country emission trading systems will be indirectly linked, to degrees determined by their openness to offset credits, and hence may be in competition with each other for CDM credits. Depending on the extent of the price differential, import restrictions (which are common to both EU ETS and US systems) and CDM supply, this competition may lead toward a greater convergence of prices. CDM credits will exert downward pressure on prices in any system where allowance prices are higher than those for CDM credits, until either price levels are equalised, import limits reached, or the CDM supply is exhausted. Systems where allowance prices are lower than the price for CDM will not be affected, since neither buyers in these systems, nor sellers in the CDM would have an incentive to trade.

Bottom-up linking

Even without a global deal to underpin it, linking is entirely possible. In this circumstance, the most important links to foster may be a EU-US transatlantic market, and a more consistent approach to indirect links. Rapid progress in US legislation combined with flexibility on the part of the EU to amend its system and accept the trade-offs, might enable a powerful core of EU-US linked systems to be established relatively quickly as discussed in Section 6. This would certainly be at a scale to form a focal point for international carbon markets. But full international linkage – let alone harmonisation of system coverage and design – is likely to take much, much longer, and both governments and businesses need to be prepared for this reality.

While the European Commission envisions an OECD-wide carbon market by 2015, only a few candidates will be ready for full direct bilateral linking on such a timescale – or even within the next decade. An OECD-wide company-level carbon market by 2015, therefore, seems to be a very ambitious goal. Within the context of that vision, establishing a transatlantic link between the EU and US is a priority for the Commission. If the EU and US do find common ground on key design elements, this would exert significant influence on the other OECD countries to align their system designs accordingly.

Furthermore, given the desirability of regulatory certainty for business investment decisions, key design elements of trading systems should not be changed precipitously; rather, businesses should be given as much lead time as possible. The implications of linking (economic, political, regulatory and legal) should be discussed with businesses early before linking actually takes place.

While a full set of bilateral links is unlikely to be feasible in the next decade, neighbouring systems might synchronise their operation rapidly (e.g. US-CAN-MEX, AUS-NZ, EU-CH). It is important for the development of an international carbon market to explore and establish the institutional framework required to eventually harmonise the design elements that are critical to bilateral linking and to guarantee a stable market. This development is likely to occur through an evolutionary process of progressive market integration. While no single trajectory can be currently identified, a case can be made for successive stages of institutional development, starting with informal cooperation and information exchange as already exists under the International Carbon Action Partnership, to more formal arrangements specifying uniform standards and best practices on the technical implementation of trading systems.

Such integration might eventually culminate in the creation of a separate international or supranational institutional entity, endowed with powers to oversee and regulate the integrated carbon market. It is important that policymakers explore what regulatory preconditions and institutional structures, new or existing, a linked market would need in order to guarantee stability.



About Climate Strategies

Climate Strategies is an international network of leading academic specialists on economic and policy issues concerning climate change. It provides a bridge between research and international policy challenges. Its aim is to help government decision makers manage the complexities both of assessing the options, and of securing stakeholder and public consensus around them. It convenes international teams of leading researchers focused on specific projects. Its reports and publications have a record of impact in the public and private sectors.

In addition to the support of the Carbon Trust, Climate Strategies receives support from a wide range of governments, foundations and business sponsors.

Climate Strategies' research programmes for 2007 and 2008 spanned a range of topics on the future design of economic instruments in industrialised countries and strengthened

engagement with developing countries – topics that included Energy and Climate Options for the G8 and Carbon Prices in Phase III of EU ETS. Other studies completed in 2008 included: The Role of Auctions for Emissions Trading, country case studies concerning International Support for Domestic Climate Policies, and Agriculture and Forestry in Annex I Countries. For 2009 the principal projects on the former include: Kyoto track negotiations; price floors, caps, and exchange-rate mechanisms in emission trading schemes; distribution and comparability of effort; and lessons from effort-sharing in the EU 2020 package. Further research on extending and reforming the CDM, and international support for domestic policy and implementation, is under way; and we have studies on sector-specific approaches, including international marine and steel sector studies, in progress. Additional projects are focused upon international competitiveness issues.

Collaborating research institutions 2007-2008

- Australian National University, Australia*
- Cambridge Center for Energy Studies, UK
- Cambridge IP, University of Cambridge, UK
- Center for Climate Change and Sustainable Energy Policy at Central European University, Hungary
- Centre for Energy, Environment and Engineering Zambia (EECG), Botswana
- Centre for Environmental Policy, Imperial College UK
- Centre for European Economic Research, Mannheim, Germany
- Centre International de Recherche sur l'Environnement et le Développement, France
- Climate Advisers, USA
- Corvinus University, Hungary
- Ecologic Institute, Washington DC*
- Electricity Policy Research Group, Cambridge University UK
- FICCI Federation of Indian Chambers of Commerce and Industry, India
- Finnish Institute of International Affairs, Helsinki
- Fraunhofer Institute for Systems and Innovation Research, Germany
- Fridtjof Nansens Institute, Norway
- German Marshall Fund of the United States
- IDDRI Institut du Développement Durable et des Relations Internationales, France
- IEEE Institute for Energy and Environmental Economics, Tsinghua University, China
- IGES The Institute for Global Environmental Strategies, Japan*
- IISD International Institute for Sustainable Development, Canada
- Indian Institute of Technology Kanpur, India
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- Öko-Institut, Germany
- Office of the Parliamentary Commissioner for Future Generations, Hungary
- Oxford Climate Policy, UK
- Oxford Institute for Energy Studies, UK
- Point Carbon, Norway and Japan
- Potsdam Institute of Climate Impact Research, Germany*
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- SWP German Institute for International and Security Affairs, Berlin
- The Carbon Trust, UK
- University of New South Wales, Australia*
- University of Zürich, Switzerland
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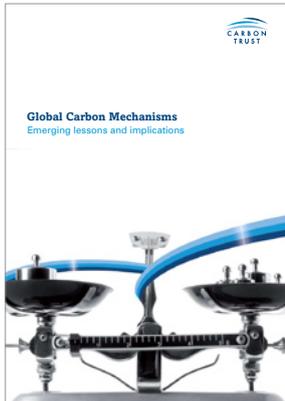
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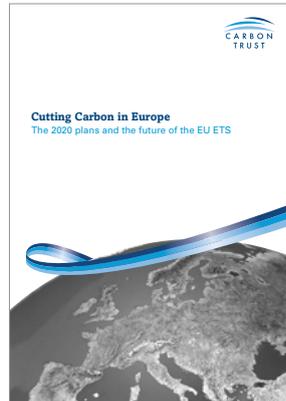
* Institutions directly contributing to Climate Strategies' research on linking emission trading systems

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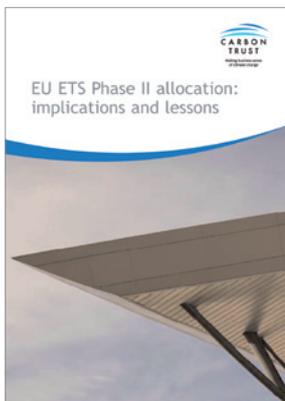
Global Carbon Mechanisms:
Emerging lessons and implications
2009



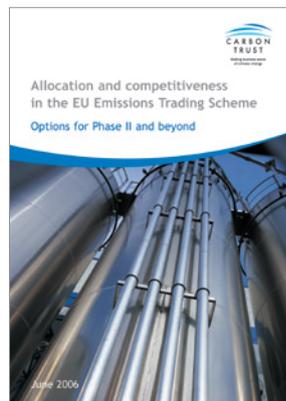
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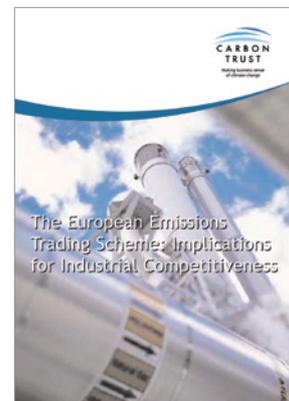
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Sources

This Carbon Trust report draws upon findings of Climate Strategies research on linking emission trading systems. A series of working papers are available from www.climatestrategies.org. Charts may be reproduced from this report on the condition that they are cited either with the full reference accompanying the chart, or in the abbreviated form as 'Source: Carbon Trust and Climate Strategies'. All other content is strictly subject to the copyright provisions on the back cover.

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The Carbon Trust's mission is to accelerate the move to a low carbon economy, by working with organisations to reduce carbon emissions now and develop commercial low carbon technologies for the future.

We cut carbon emissions now

- By providing business and the public sector with expert advice, finance and accreditation.
- By stimulating demand for low carbon products and services.

We cut future carbon emissions

- By developing new low carbon technologies through project funding and management, investment and collaboration.
- By identifying market barriers and practical ways to overcome them.

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ACT ON CO₂ is the Government's initiative to help individuals understand and reduce their carbon footprint. Visit <http://actonco2.direct.gov.uk> for more information.

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