CARBON PRICING SCENARIOS

JULY 2013

PROMETHIUM CARBON

LIST OF ACRONYMS AND ABBREVIATIONS

(ARB) California Air Resources Board
(BCA) Border Carbon Adjustment
(BOCM) Bilateral Offset Credit Mechanism
(CBEEX) Beijing Environment Exchange
(CCEMA) Climate Change and Emissions Management Act
(CCERS) China Certified Emissions Reductions
(CCS) Carbon Capture and Storage
(CDM) Clean Development Mechanism
(CERS) Certified Emission Reduction Scheme
(CRC) Carbon Reduction Commitment
(ETS) Emissions Trading
(EU ETS) European Union Emissions Trading Scheme
(FVA) Framework for Various Approaches
(GHG) Greenhouse Gas
(GGAS) Greenhouse Gas Reduction Scheme
(IMO) International Maritime Organisation
(JCM) Joint Credit Mechanism
(KP) Kyoto Protocol
(MRP) Market Readiness Proposals
(NAMA) Nationally Appropriate Mitigation Actions
(NDRC) National Development and Reform Commission
(NMM) New Market Mechanism
(PMR) Partnership for Market Readiness
(RGGI) Regional Greenhouse Gas Initiative
(SCE) Standard Coal Equivalent
(SEEE) Shanghai Environment and Energy Exchange
(SISA) System of Incentives for Environmental Services
(TCX) Tianjin Climate Exchange
(TGO) Thailand Greenhouse Gas Management Organisation
(WCI) Western Climate Initiative
(WEF) World Economic Forum

DISCLAIMER

CONTENTS

01 INTRODUCTION

Limiting the increase of global average temperature to 2°C represents one of the greatest challenges that face humanity. Global greenhouse gas emissions continue to accelerate, while market and political turbulence appears to effectively render the 2°C goal unrealistic and unachievable. Carbon chaos on the political and market front not only constitutes a challenge in terms of achieving our climate change objectives, it also offers the opportunity for new initiatives to control emissions in a cost-effective way.

This briefing paper presents Promethium Carbon's observations on the status and development of global carbon pricing, both in terms of market and non-market measures. The analysis takes into account global carbon pricing developments and the new departures of some powerful carbon players concerned at the lack of progress and urgency at UNFCCC level. Our analysis, therefore, focuses on a relatively recent phenomenon, whereby development and cooperation amongst localised carbon initiatives overtakes the UNFCCC as the primary driver in the race to curb emissions. Promethium believes that a 'process of reversal' is emerging as a common attribute amongst some of the world's most significant carbon players. In this process, old assumptions become quickly outdated, as climate leadership emerges from unlikely corners.

The paper commences with an overview of prospects and implications of developments at UNFCCC level giving context to the suite of options that could support future demand for emission reductions. In a second step, we describe how the emerging pathways of localised carbon pricing (trading and taxation) may lead towards market-linked emission reduction demand in the future. Throughout the paper we include information slides highlighting our assertion that despite unfavourable market conditions, there continues to be a high level of activity surrounding carbon pricing in all corners of the world.

02 BACKGROUND

"Nothing is going to be agreed internationally until enough is legislated for domestically. We're not doing it from an altruistic point of view, to save the planet. We will save the planet also, but climate legislation at the domestic level must be absolutely grounded in national reality, and it must be for the purpose of national benefit."

- Christina Figueres, January 2013

The risk that climate change poses to the world economy is increasingly being recognised by global leaders. The World Economic Forum (WEF) Global Risks 2013 report identified climate change as one of the top 5 risks that the world faces in 2013. With UNFCCC progress effectively stalled, the drive towards global carbon pricing rests increasingly within the realm of localised initiatives, be they market-based (ETS, offsets, NMMs) or non-market in nature, such as a carbon tax. Numerous carbon pricing initiatives are at various stages of implementation across the globe and many have the potential to inter-link and generate additional benefits.

The increasing role of "bottom-up" carbon pricing is a highly visible development on the global economic horison. Aside from the world's largest emissions trading scheme, the EU ETS, national or sub-national schemes are already in operation in Australia, Japan, New Zealand, the USA, Switzerland and Canada, and are planned in China, South Korea and Brazil. Further initiatives such as efficiency certificate trading, fossil fuel subsidy removal and renewable energy support structures are similarly multiplying from the ground level upwards.

Beyond a reversal of the top-down UNFCCC led approach to climate change, we are also witnessing a policy reversal among key players in the carbon space on a macro level. More and more, former climate sceptics across the spectrum of nations, corporations and institutions are reinventing themselves as like-minded contributors to the carbon pricing infrastructure of the future.

By the first quarter of 2013, only 30% of global emissions came from jurisdictions that in one form or another, have failed to take steps towards carbon pricing. As such, although the international carbon market remains in a weak state of repair, the lion's share of global GDP will, by 2015, be generated within an economic framework that places a price on carbon. Distortion of international trade is resulting from the increasing weight of carbon as a recognised global liability. Developments in carbon pricing therefore implies a complex mixture of risks and opportunities that forms the basis of new climate leadership and cooperation amongst unexpected allies.

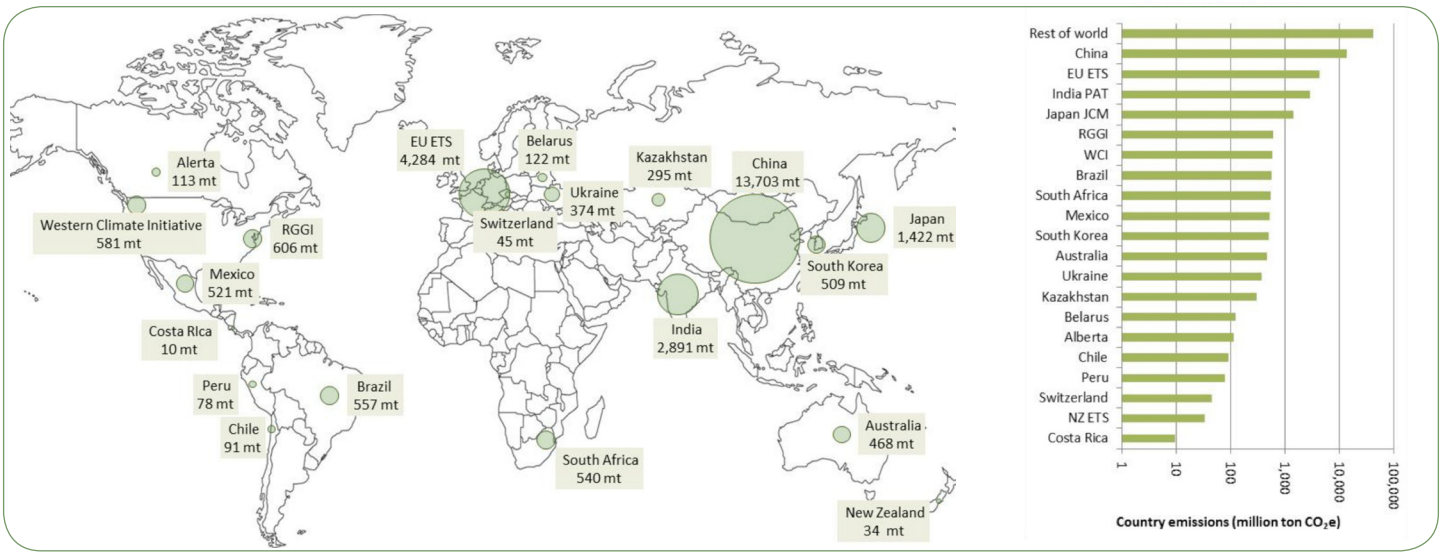

Figure 1:
Emissions emanating from jurisdictions with carbon pricing schemes by 2015

03
UNFCCC DEVELOPMENTS

The second commitment period of the Kyoto Protocol was formalised during COP18 in Doha. This commitment period will run from 1 January 2013 to 31 December 2020 and is implemented as an amendment to the existing Protocol. Collectively Kyoto Protocol participants will reduce their emissions by 18% below their respective 1990 levels for the period 2013-2020 - targets that may be strengthened by 2014. One significant outcome of COP18 was that CERs will not be accessible to countries that are not parties to the second commitment period of the Protocol.

The Clean Development Mechanism faces challenges in light of the price collapse in the world's largest emissions trading scheme, the EU ETS. Whereas in February 2012 there were 256 projects seeking validation, this number fell to 18 projects in February 2013. The variance may be attributed to the rush to register projects in advance of the 2012 EU ETS deadline that further restricts eligible CERs. Nonetheless, considering the reduced demand for credits, project developers may have little incentive to participate in the CDM, absent policy developments that render the mechanism more attractive.

On the other hand, the expansion of domestic and regional carbon pricing initiatives provides CDM opportunities. These include the potential for countries to allow international credits for use as offsets in domestic carbon pricing schemes and to meet prospective national mitigation targets. CDM experience will also assist in the development of standards and procedures in emerging carbon policies and ETSs around the world, particularly as regards the standardisation and design features of offsets. Also, the CDM can be used to create an 'indirect link' between ETSs, where policy-makers wish to maintain the regulatory independence that can otherwise act as an obstacle to ETS linking.

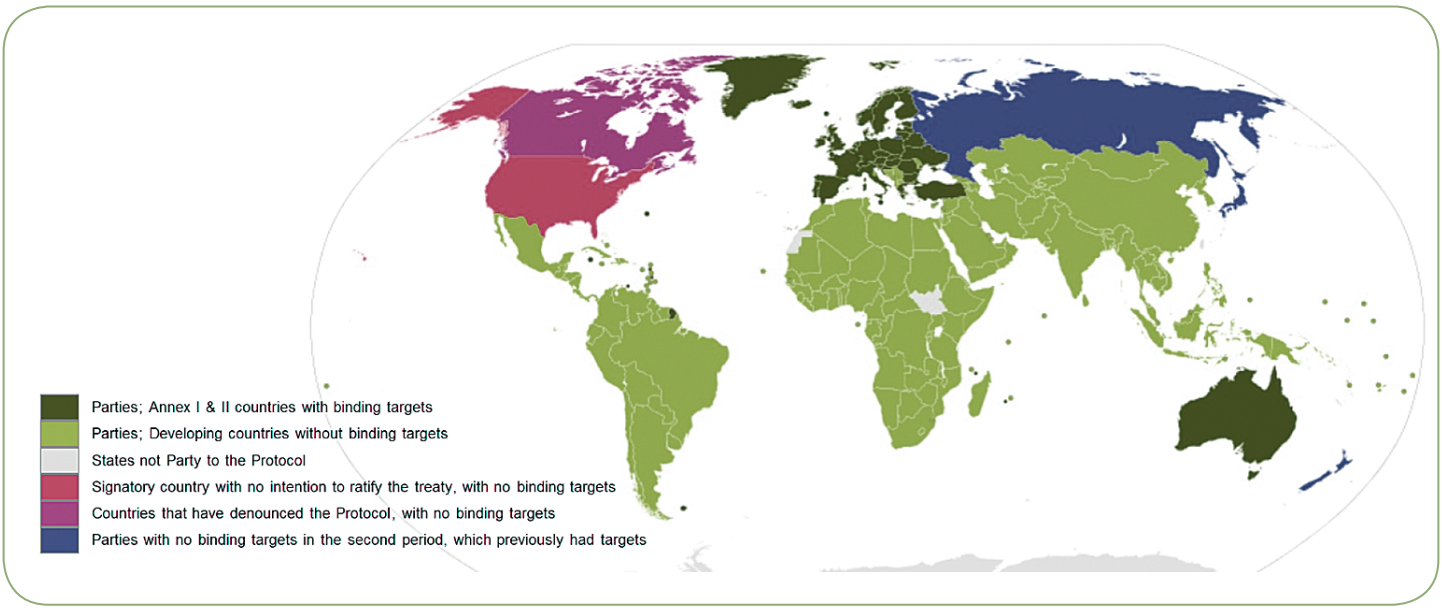

Figure 2:
Kyoto Protocol Parties and non-Parties

UNFCCC DEVELOPMENTS

New market mechanisms (NMMs) continued to gain momentum at the Durban climate conference in December 2011. While precise NMM attributes remain opaque, it is clear that private sector participation will be crucial to the success of the initiative. Also, it is intended that NMMs will go beyond CDM by ensuring a net decrease or avoidance of emissions, as distinct from purely offsetting.

Despite the presently inchoate nature of NMM, the UNFCCC intent is to incentivise project-based mitigation actions on a scale that exceeds extant market based mechanisms under the Kyoto Protocol. NMMs could create the next generation of tradable carbon instruments and ensure a net decrease or avoidance of emissions. But NMM proposals have been on the table for quite some time. Additionally, NMM design features, its relationship to emerging carbon pricing scenarios in developing countries, and the implications for the future of CDM are all crucial questions that remain unanswered. As such, NMMs could also be said to potentially present little more than a niche opportunity for specialised offset requirements.

The Framework for Various Approaches (FVA) is a new development that seeks to integrate national, regional and multilateral schemes into a UNFCCC framework. This would enable individual countries to progress initiatives tailored to domestic realities, provided that they *"meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid double counting of effort, and achieve a net decrease and/or avoidance of greenhouse gas emissions".*

The FVA shares many characteristics in common with the NMM, but what the eventual substance of the framework will resemble remains elusive. One interesting aspect of FVA development concerns the extent of UNFCCC oversight. Should domestic units be recognised internationally conditional upon UNFCCC approval, or should the UNFCCC limit itself to acting as a platform for the sharing of information and best practice?

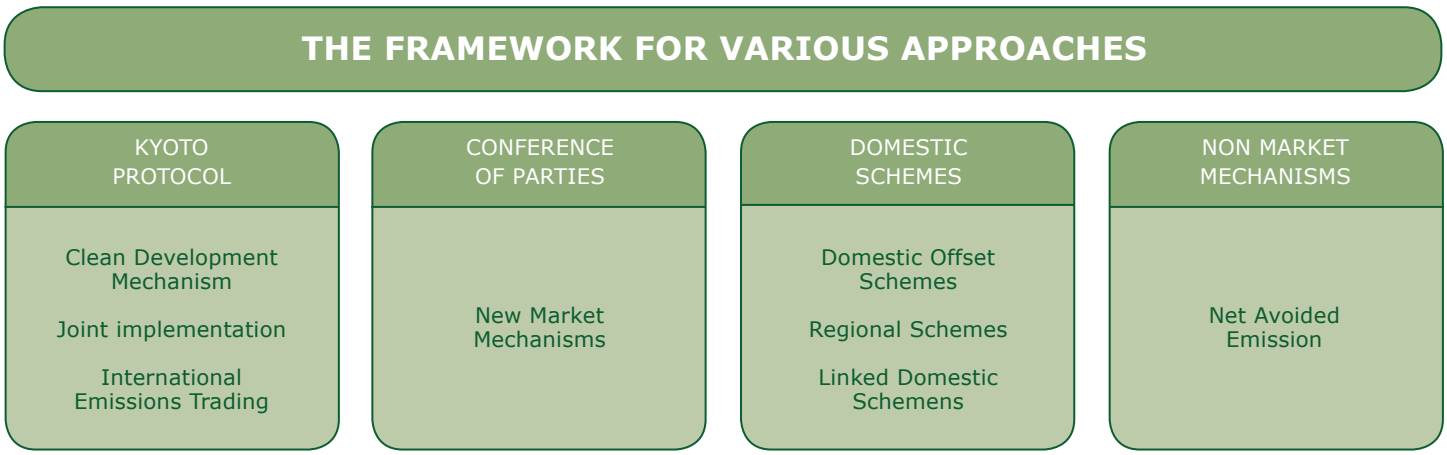

Figure 3:
Framework for Various Approaches[1]

1 Institute for Global Environmental Strategies, *New Market Mechanisms in Charts* (January 2013)

UNFCCC DEVELOPMENTS

Mechanism	Description	Proposed by
Project based	Similar to CDM & JI	China. Japan
	Initially non-tradable credits will be issued on a project basis where the baseline and additionally is determined in a simplified way taking local reality into account.	Japan
Market based NAMA	A credit mechanism where credits are issued ex-post. As opposed to other mechanisms that will allocate credits on an ex-ante basis.	Papua New Guinea
Sectoral Crediting	There are 2 proposed structures: • Credit mechanisms where emissions in sectors of the economy are measured against ex-ante, no-lose targets. • Trading mechanisms with an ex-ante defined absolute targets in economic sectors with emissions allowances issued and verified against the agreed baseline.	EU, AOSIS, Norway, Switzerland
Sectoral Trading	Decoupled from specific activities or policies, allowances are issued ex-ante based on a sectoral target, with penalty for missing target.	EU, AOSIS, Norway, Papua New Guinea
NAMA Crediting	Crediting of specific NAMA's or based on sectoral thresholds.	South Korea, Switzerland
Net avoided emissions mechanism	Compensation for not exploiting known fossil fuel reserves.	Ecuador
Mechanism for Carbon Efficient Economies	A proposed mechanism for developing economies.	Colombia

Table 1:
Proposed New Market Mechanisms[2]

2 Institute for Global Environmental Strategies, *New Market Mechanisms in Charts* (January 2013)

04

REGIONAL, NATIONAL & SUB-NATIONAL CARBON PRICING

Considering the lack of progress on securing an ambitious international agreement on climate change, it is unsurprising that the momentum for carbon pricing has shifted from a top-down UNFCCC approach, to a bottom-up approach focused on the efforts of regional, national and sub-national actors. As figure 4 demonstrates, there is a growing trend of major GHG emitters taking steps towards carbon pricing despite contrasts in their respective levels of GDP.

The World Bank Partnership for Market Readiness (PMR) puts the spotlight on institutional support for countries seeking to advance post-2012 mitigation efforts through bottom-up carbon pricing developments. As demonstrated in Appendix One, a critical number of nations have moved towards carbon pricing. Multilateral institutions are supporting this trend through, amongst others, the establishment of the World Bank PMR. The PMR is a grant based and technical platform that assists developing countries to launch carbon pricing schemes in the drive towards a global carbon scheme.

As of 2013, the PMR has assisted 16 of the world's leading developing economies in the process of introducing carbon pricing structures. With the bottom-up approach to carbon pricing gaining ever greater momentum, the share of world GDP channelled through economies that have not made moves towards carbon pricing could be as low as 25% by 2015.

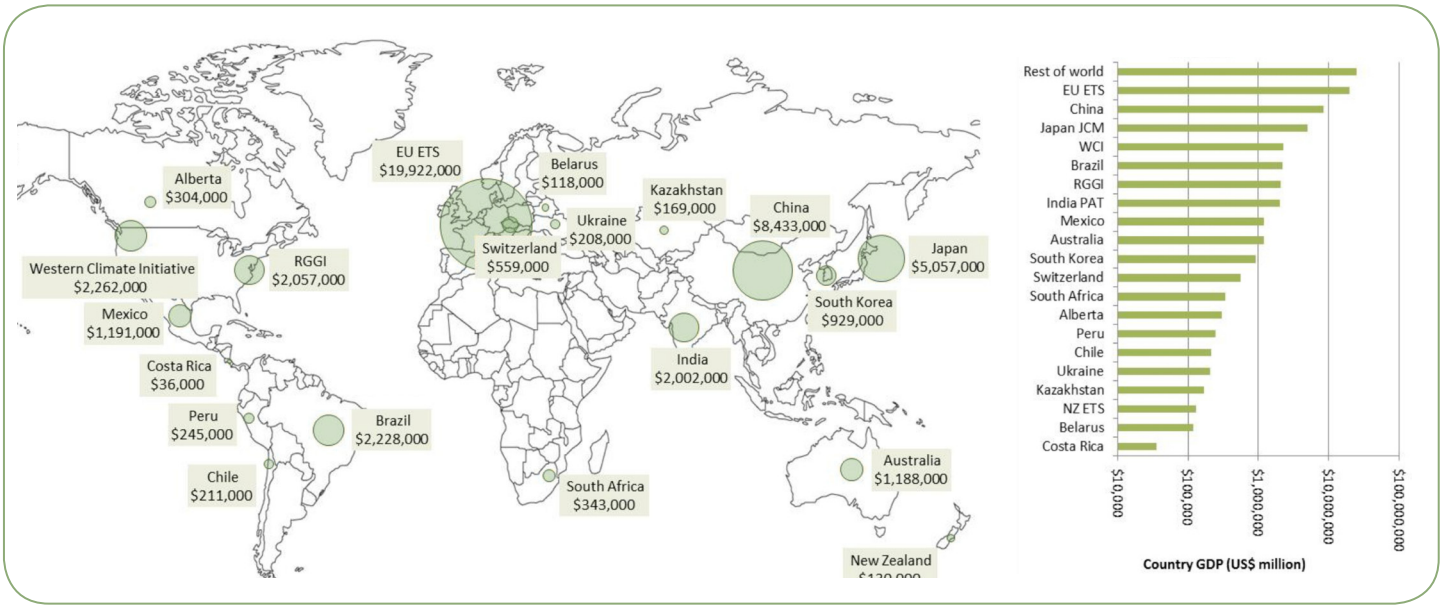

Figure 4:
GDP of jurisdictions with carbon pricing schemes by 2015

REGIONAL, NATIONAL & SUB-NATIONAL CARBON PRICING

Non-state actors increasingly treat carbon as a liability requiring immediate action. The International Energy Agency, for instance, has progressively adopted the view that energy companies can no longer treat carbon as an inconsequential externality but must instead take immediate action to cooperate on limiting global temperature rise. Similarly, a global mobilisation of shareholders of carbon intensive companies have demanded that companies detail their climate change related risks through initiatives such as the Carbon Disclosure Project. Recently, the Asset Owners Disclosure Project has emerged to encourage the world's largest asset owners to voluntarily disclose their actions to address climate change risk, and climate risk increasingly features in the environmental and financial assessment of projects. As such, the momentum for ambitious climate demands no longer rests solely with public interest organisations.

Private-sector action will play a significant role in the future of carbon pricing. By 2011, almost half of the 100 largest economies in the world are companies operating in the private sector, as measured by country GDP and company turnover. The carbon footprints of many of these companies dwarf that of numerous countries. Evidence suggests that more and more forward-thinking corporations view internalising the price of carbon as making business sense. As of 2013, Microsoft has introduced a 'carbon fee feedback' system that will make individual Microsoft divisions worldwide responsible for the cost of offsetting their carbon emissions. It may be inferred that other corporate entities could follow suit, with a trend of generating revenue from corporate emissions at corporate level, and channelling these funds towards projects that can achieve net carbon neutrality.

05
LINKING EMISSIONS TRADING SCHEMES

The gradual emergence of global carbon pricing has commenced with the development of regional, national and sub-national carbon pricing initiatives. Successful evolution of global carbon pricing involves creating links between schemes that will facilitate greater mitigation ambition and a reduction of prices. However, fundamental differences in standards and methodologies, as well as national concerns as to sharing regulatory independence, means that the linking of carbon schemes will be a gradual process, requiring time, commitment and patience.

Figure 5:
Linking carbon markets

The EU and Australia have agreed upon full harmonisation of emissions trading by 2018. Also of significance is the forthcoming carbon pricing link in California and Quebec by 2014. Whereas Korea does not currently have plans to link its scheme in the immediate term, key design features of its ETS are drawn up in line with European standards to enable future linking. Figure 6 outlines the expected process of linkage of schemes worldwide.

Linking existing schemes may provide benefits including increased economic efficiency through a lower abatement cost, and lower allowance price volatility. Market participants may also benefit from a larger market. However, the situation becomes less clear when one speaks of linking new schemes. In the latter case, it is necessary for the proponents of linking to negotiate equity factors in advance to avoid price volatility and market confidence issues.

LINKING EMISSIONS TRADING SCHEMES

A reformed CDM may play a role both within domestic carbon schemes and as a mechanism for indirect linking of transnational schemes, despite expected significant decrease in CDM registrations in the coming years. As the issues of additionality, bureaucracy and transaction costs are resolved, CDM experience can provide a basis against which to measure and verify emissions reductions and can inform the key design features of offsets. Of course, CDM will also meet competition as alternative offset standards are developed by various jurisdictions.

Alternative international and domestic offsets could advance the linking of carbon schemes by defining common rules for participants while leaving regulatory independence intact. Japan has developed a Joint Credit Mechanism (JCM) with a number of countries, while California and Quebec have developed offset protocols within the WCI framework. Reconciling the governance diversity of such varied offset schemes will be a challenge.

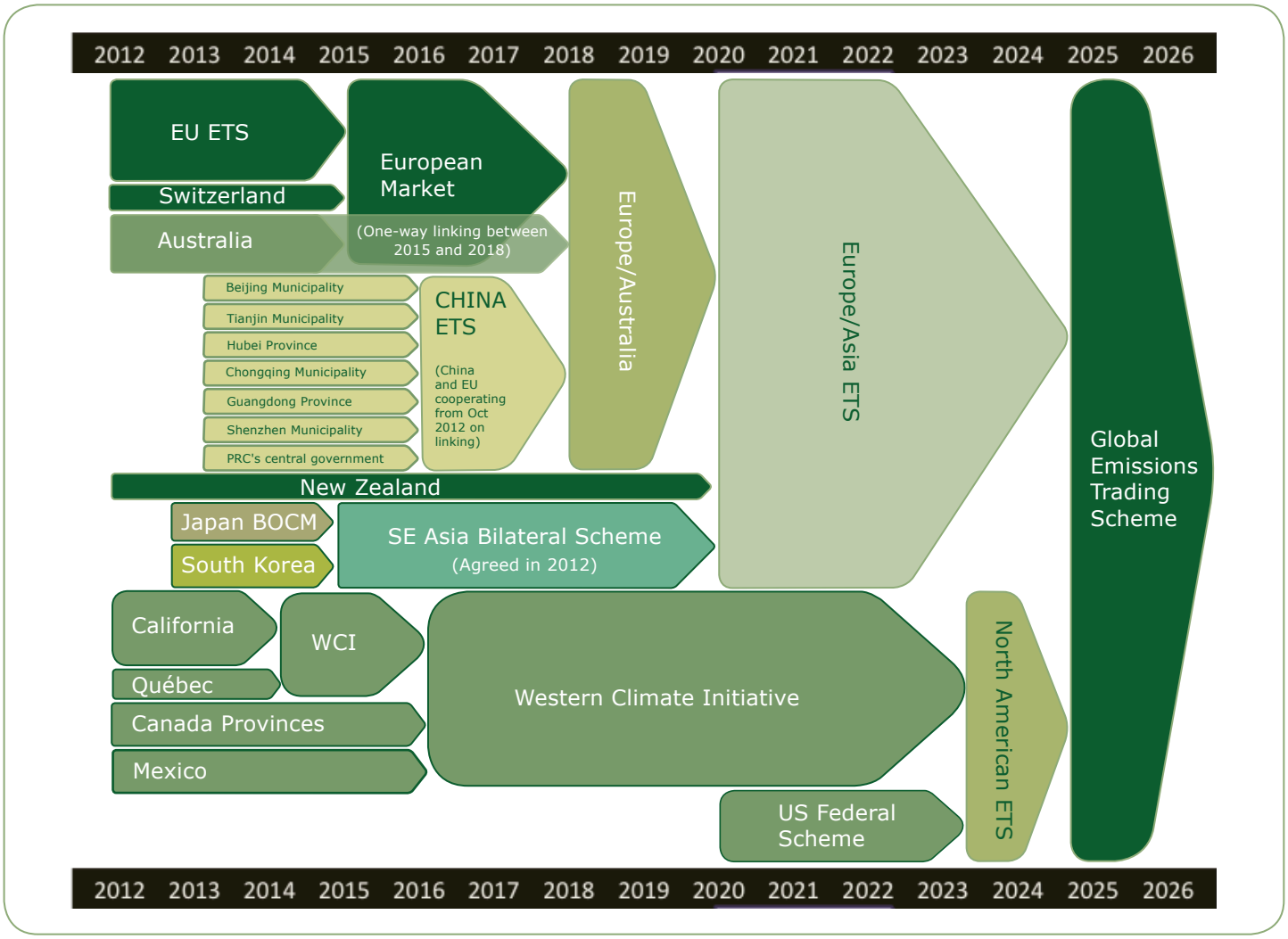

Figure 6:
A Potential Process of Carbon Scheme Linkage

06
COMPETITIVE DISTORTION AND GLOBAL CARBON PRICING

Carbon leakage (when emissions from a jurisdiction that has put a price on carbon are displaced to another jurisdiction without an effective carbon price) requires effective preventative measures to protect from the adverse economic effects of carbon related trade distortion. These measures will take centre stage as the roll-out of carbon pricing schemes continues.

Economic Growth will always remain top priority for policy makers in times of economic turmoil. Such considerations feed into design features and coordination initiatives of emerging carbon pricing schemes. While the EU ETS sought to shield industry prone to carbon leakage by allocating additional free allowances, elsewhere attention has shifted to other options. Sectoral specific exclusions and border carbon adjustment have been recent focal points of discussion as regards competitive concerns.

Sectoral specific exclusions in the design features of carbon schemes (such as in the case of the RGGI) can address concerns of industry within the scope of regulation. Conversely, certain sectoral specific inclusion in carbon pricing, such as international aviation in the EU ETS, can produce consequences that go beyond carbon pricing and create an unintended domino effect. National actors have been seen to rely on tax exemption as a means to protect trade exposed sectors, particularly in the case of Norway and South Africa. However, such initiatives are often criticised to the extent that they reduce the utility of pricing carbon in the first place.

A border carbon adjustment (BCA) can be imposed by a country to adjust the price of products to an extent proportionate to the GHGs contained in the product. In the context of climate change, a BCA generally refers to the imposition of an import duty on carbon intensive products coming from a jurisdiction without an effective carbon pricing strategy. However, BCAs are politically sensitive and may provoke retaliatory measures. Additionally, uncertainty remains as to whether certain BCAs would be compatible with the rules of the World Trade Organisation. It should be recalled that BCAs need not necessarily come in the form of a levy imposed, but could allow the use of international offsets.

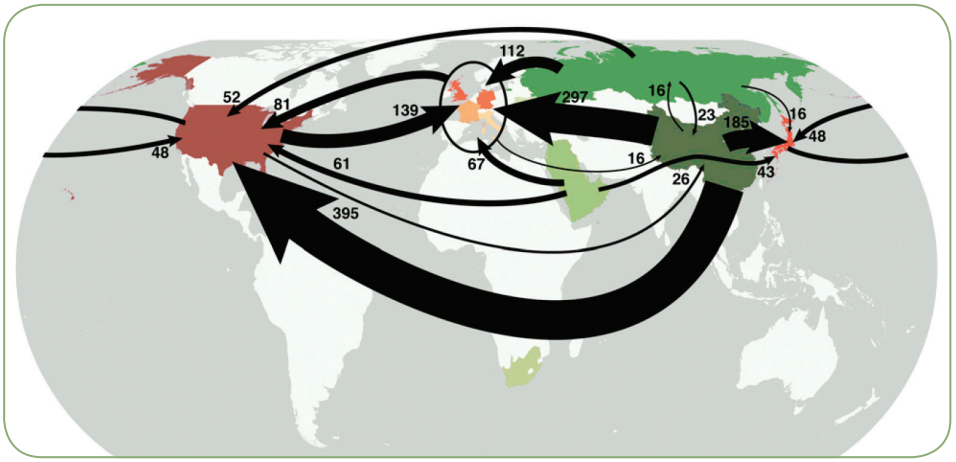

Figure 7:
Carbon emissions embodied in International Trade[3]

3 Davis SJ, Caldeira K, Consumption-based accounting of CO2 emissions, (2009)

07
AVIATION AND SHIPPING

Emissions from international aviation and shipping constitute a growing and considerable portion of global emissions. A carbon price regulation scheme for these sectors provides an option for unilateral or bilateral link. While a bilateral link could be a complex, requiring an in-depth compatibility process, a unilateral link could be more straightforward process. More complex and unpredictable still are unilateral measures to capture international aviation and shipping emissions within a localised scheme without broad international agreement.

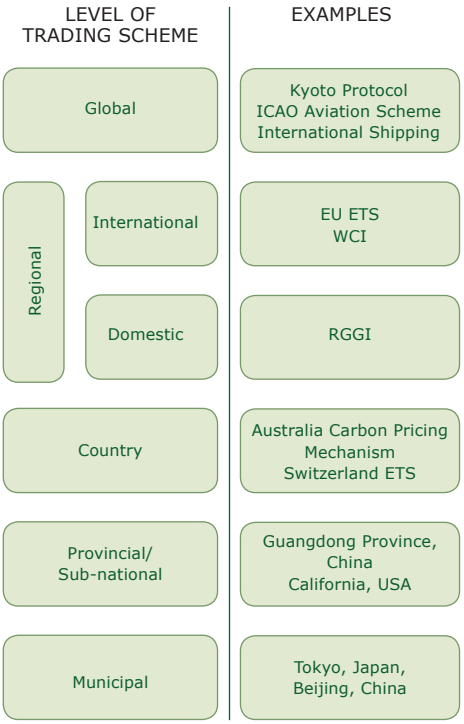

Figure 8:
Classification of carbon trading schemes

Inclusion of international aviation in the EU ETS has generated international opposition and the postponement of legislative enforcement has resulted in uncertainty. Following International Civil Aviation Organisation (ICAO) failure to address carbon pricing in aviation, the European Commission sought to prevent carbon leakage by bringing international aviation within the EU ETS. As such, unless the country of origin of an incoming flight is taking measures to limit the emissions of departing flights, the airline will be obliged to surrender tradable allowances. The scheme resembles a BCA because non-EU airlines are subject to the same carbon pricing measure as their EU counterparts.

The EU ETS covers certain EU emissions but not the emissions generated from the production of products in other jurisdictions that are later imported into and consumed in the EU. Including international aviation emissions in EU ETS thus raises the question as to whether EU targeted emissions should be those measured on the basis of production or consumption. The unilateral EU action has provoked reaction from trading partners, including unsuccessful legal challenge, US blocking legislation, Chinese recalcitrance on contracts for EU produced aircraft and potential EU financial penalties for airlines that fail to comply with reporting obligations. The long-term repercussions for international trade deriving from the dispute remain to be seen.

Ultimately, the ICAO process may decide on whether to adopt a single global market mechanism to be applied uniformly to all countries, or a framework uniting a patchwork of different national programs. A most likely initiative would be the creation of a simple carbon offsetting scheme. Whether a trade dispute or diplomatic solution proves to emerge from the international aviation emissions discourse, it is clear that the details of carbon pricing have become both an issue of cooperation and a bone of contention amongst nations, and that we are seeing the emergence of a new classification of carbon trading schemes.

The International Maritime Organisation (IMO) has similarly come under pressure to address emissions from shipping and has taken steps towards the development of a market-based emissions reduction scheme for shipping, with the objective to introduce the scheme by 2015. As such, it could be that we will see an internationally integrated scheme to address carbon emissions, agreed not within the UNFCCC context, but potentially within the fora of international aviation and shipping. As such, the well-established principle of sovereign control over territorial emissions may be seen to fall away.

08

EU CONSUMPTION BASED EMISSIONS AND INTERNATIONAL TRADE

The accounting framework under the Kyoto Protocol is defined on the basis of production-based emissions for industrial GHGs. Nonetheless, there is ever greater recognition of the inadequacy of measuring the emissions of a defined territory on the basis of production-based emissions alone. As the trend of shifting industrialisation and manufacturing from the developed to the developing world continues, it follows that related developed country emissions fall, while developing country emissions rise. The implications of international trade, however, dictate that very often emissions are incorporated into products that are ultimately consumed far from the territory of production.

If emissions are measured on a production basis alone, emissions could be merely displaced from one territory to another. Developing an effective global price for carbon must accommodate the incongruence between production and consumption based emissions. Figure 9 demonstrates the level of consumption based emissions relative to production-based emissions, and highlights the need for the EU to take responsibility for the consumption of goods within its territory that contain emissions generated in other jurisdictions.

As demonstrated above, the emissions associated with the production of goods outside of the EU, stands in relative proportion to the emissions generated via consumption of goods across the EU. When one considers the difference as a percentage in terms of responsibility for emissions using consumption of CO2 as a means to attribute responsibility, one gets a very different picture that demonstrates the displacement effect of measuring emissions solely on the basis of production.

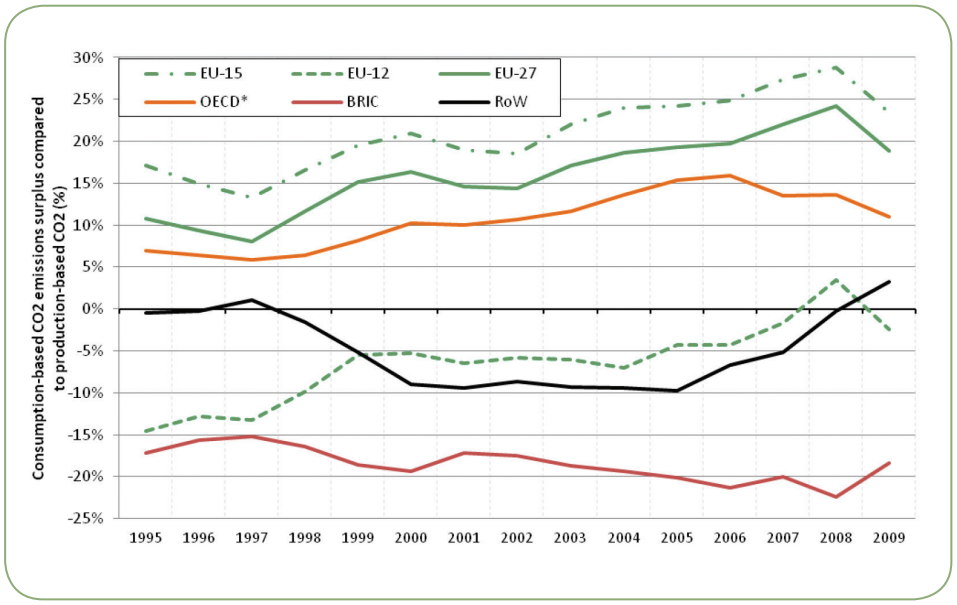

Figure 9:
Consumption-based CO2 emissions surplus[4]

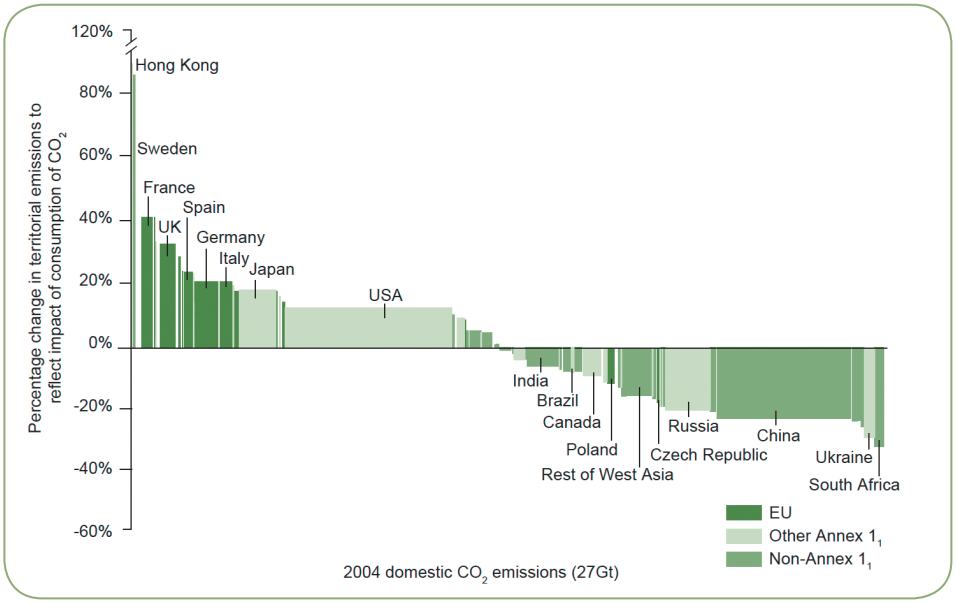

Figure 10:
The Impact of Consumption of CO2 on Territorial Emissions[5]

4 Boitier B, CO2 emissions production-based accounting vs consumption: Insights from the WIOD databases (April 2012)

5 House of Commons, Energy and Climate Change Committee, Consumption-Based Emissions Reporting, (Twelfth Report of Session 2010–12, Vol. I)

09
THE NEW LEADERS

As dissatisfaction with the level of ambition and achievement of international climate negotiations continues, new leaders are emerging from amongst previously unlikely candidates. This dimension reflects a process of reversal evident throughout the spectrum of carbon pricing development.

The USA and China are increasingly seen as playing a leading role in addressing climate change despite US failure to ratify the Kyoto Protocol, and the rapid development of coal-fired power plants in China. Cumulatively, the two countries contribute approximately 37% of total global emissions, yet both nations are not only on track to meet their climate commitments, but have also entered a bilateral agreement to cooperate on tackling climate change, and intend to strengthen emission reductions targets.

The focus of Chinese and US climate ambition rests largely with emissions trading and renewable energy investment. In 2011, the two countries were joint world leaders in renewable energy investment. In 2012, China only narrowly overtook the US as the world's largest contributor to investment in renewables with a 22% rise in commitment equating to a $67 billion investment.

The Major Economies Forum on Energy and Climate was launched in 2009 with the intent to advance climate and energy dialogue among 17 major Annex I & II countries. During COP18 it was reported that the US may seek to move elements of UNFCCC negotiations to the MEF as an alternative forum. To date, a number of MEF meetings have recognised the growing acceptance and applicability of a bottom up approach to carbon pricing, the ambitious nature of a top-down approach and the need to develop a hybrid of the two. The forum acts as a platform enabling experience sharing and design feature alignment of carbon pricing mechanisms.

NORTH AMERICA

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL/ SUB-NATIONAL
Carbon trading at federal level is not expected before 2020. In March 2012, the Environmental Protection Agency (EPA) proposed the GHG New Source Performance Standards for Electric Generating Units (EGU). The rule would require new fossil fuel-fired EGUs greater than 25 MWh to meet an output-based standard of 1,000 pounds of CO2/MWh (0.453 t/MWh).		**FEDERAL USA**
In 2006, Boulder introduced a tax on electricity usage of $0.0049 per kWh for residential use, $0.0009 for commercial use, and $0.0003 per kWh for industrial use. The tax is due to expire in 2013.		Boulder, Colorado
As of October 2012, Australia has entered negotiations with California to link carbon markets, and in April 2013 the California Air Resources Board voted to link its carbon market to that of Quebec by January 2014.	The Global Warming Solutions Act provides for the Californian carbon market, scheduled to commence trading by January 2013. Covered emitters receive a 90% free allowance. November 2012 saw the first auction with 23.1 million permits sold at $10.09 each.	California
	The Florida House Bill 7135 of 2008 authorises the creation of a cap-and-trade program for electric utility GHGs.	Florida
	The Midwest GHG Accord aims to establish a cap-and-trade program between several States. With little action for some time, further developments are not foreseen in the near future.	Midwest
As of May 2010, a carbon tax applies of $5 per ton for annual emissions above 1 million ton CO2.		Montgomery Co. Maryland
Cap-and-trade legislation approved in 2010 was repealed in March, 2012.		New Mexico
In February 2013, RGGI proposed raising the cost of compliance to reflect lower recessionary emissions. The 2009-11 period saw RGGI issue only 4% of allowances for free.	RGGI regulates power plant emissions in10 States through 2018, aiming to reduce emissions by 10% below 2009 levels.	Regional GHG Initiative
	A tax of $0.042 per tonne, CO2 in the Bay Area Air Quality Management District has been in effect since 2008.	San Francisco Bay Area
The launch of the WCI is expected in 2013, covering California and Quebec. The target is to cut emissions 15% below 2005 levels by 2020. Emitters such as power plants must buy offsets to cover their emissions. Transport will be included in 2015.		Western Climate Initiative

CANADA

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL/ SUB-NATIONAL
	There is no federal emissions trading scheme in Canada. Having withdrawn from the Kyoto Protocol in 2011, Canada repealed its flagship climate legislation in June 2012.	**CANADA**
In September 2012, it was announced that Shell is constructing a Carbon Capture and Storage (CCS) project. Receiving 2 credits/ton CO2 buried, the value of carbon in the project comes to CN$ 30/ton CO2 with the actual cost of CN$ 72/ton CO2 largely subsidised by government.	In 2007, Alberta introduced a carbon tax. The Albertan trading system provides for emissions performance credits, climate fund contributions at CN$ 15/ton CO2, or the purchase of Albertan-based offset credits.	Alberta
	As of 2008, a revenue-neutral tax on fossil fuels of CA$30 per tonne of CO2 emissions has been implemented. BC remains a member of the WCI but has yet to implement a trading system.	British Colombia
In January 2012, Manitoba introduced a CN$ 10/ton CO2 emission tax on coal, committing to favour renewable energy in revenue recycling measures.		Manitoba
Ontario's Climate Change Action Plan calls for GHG reductions of 6% from 1990 levels by 2014, and 15% by 2020. In April 2011, the Ontario Environmental Ministry committed to participate in cap-and-trade.		Ontario
Québec introduced a carbon tax in 2007, and in 2012 increased its 2020 emissions reduction commitment. Plans for a Quebec-California link are at an advanced stage.		Québec

ASIA

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL
In October 2012, Japan raised its carbon tax over three phases, with the first increase adding between 12% and 31% on existing levies. The Bilateral Offset Credit Mechanism was renamed in late 2012 as the Joint Credit Mechanism (JCM). In December 2012, Japan announced that it will launch a pilot scheme for its JCM mechanism with Vietnam and Mongolia in 2013. By end 2012, Japan had model JCM projects in numerous developing countries.	Japan currently has a voluntary trading scheme in the form of J-VETS. The country is developing its Bilateral Offset Credit Mechanism with project feasibility studies in a number of developing countries, including South Africa. In addition, Tokyo has a cap and trade scheme in place that aims to reduce GHGs by 25% from 2000 levels by 2020. It caps energy-related carbon dioxide emissions from some 1,330 offices and factories and allows for trading of emissions credits.	Japan
Thailand has announced a voluntary emissions market to commence trading in October 2014. Sectors have yet to be specified.	The Thailand Greenhouse Gas Management Organisation is drafting legislation for implementation by October 2013. The trading scheme will be voluntary through 2020. Thailand received a $350 million grant from the World Bank PMR scheme to fund the development of its carbon trading scheme. A crediting mechanism and/or ETS is planned for the industrial sector.	Thailand
In November 2012, The World Bank approved credit of US$ 70 million for the second Vietnam Climate Change Development Policy Operation. In the same month, Vietnam approved its carbon trading plans. The scheme will be modelled on the EU ETS and will commence trading in 2020.	With a target to reduce CO2 emissions per unit of GDP by 20% below 2005 levels by 2020, Vietnam will participate in the pilot JCM project with Japan from 2013.	Vietnam
	Taiwan's GHG Reduction Act was passed in February 2008. The act has 5 pillars, one of which is a cap-and-trade scheme covering around 270 companies (about 174 million tons CO2, or 50% of the country's emissions). The target is to reduce CO2 to 2005 levels by 2020.	Taiwan
Expectations that South Korea may link to the EU ETS by 2018 may be invalidated by a decision in July 2012 not to allow offsets into the Korean ETS until 2020. Nonetheless, political commentary suggests that South Korea desires an emissions trading link with the EU and Australia.	The Act on the Allocation and Trade of Greenhouse Gas Emissions Rights was passed with a vote of 151 against 3 in April 2012. The scheme will cover 500 companies emitting more than 125,000 tons of CO2 per year, around 60% of the country's emissions. It will start on 1 January 2015. The target is a 30% reduction below business as usual levels by 2020. By June 2014 the National Allocation Plan is expected to be finalised. The scheme will cover the 6 Kyoto Protocol GHGs for direct and indirect emissions from individual facilities emitting over 25,000 ton C02e/y and companies with multiple installations emitting more than 125,000 ton C02e/y. Any firm can voluntarily join the scheme.	Republic of Korea
Indonesia is a recent recipient of a $350 million grant from the World Bank PMR scheme to fund the development of its carbon trading scheme.		Indonesia
In December 2012, the Environment Ministers of Japan and Mongolia signed an agreement during the UN climate change summit in Doha to establish a Joint Crediting Mechanism. A separate document that formalises a "*Low Carbon Development Partnership*" between the two countries and sets out preliminary rules for the joint carbon offset market, was signed by the Japanese and Mongolian governments in January 2013.		Mongolia
In October 2012, Kazakhstan announced that it would link its ETS to the EU ETS. In January 2013, Kazakhstan commence trading on its domestic ETS.	Kazakhstan designed an ETS with implementation of a pilot stage in 2013-2015. The Kazakhstan ETS will cover 178 companies, with a total cap set at 146 million tonnes of carbon dioxide equivalent (Mt CO2e). The legislation foresees that the scheme will start with a one-year trial period in January, followed by a seven-year trading period from 2014 till 2020. The Kazakhstan ETS does not allow for the use of offsets from CDM and JI projects. Offsets from projects in the country are permitted.	Kazakhstan

LATIN AMERICA

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORKS	NATIONAL/ SUB-NATIONAL
In 2012, Brazil introduced forest code amendments to its 2009 National Policy on Climate Change.	Brazilian climate legislation is based on the National Fund on Climate Change, the Inter-ministerial Committee on Climate Change and the National Plan on Climate Change. Emissions are to be reduced by 36% to 39% below business as usual by 2020. Brazilian law has enabled creation of several sub-national schemes.	**BRAZIL**
In October 2010, Acre state government created the State System of Incentives for Environmental Services, enabling State participation in international carbon markets. It was indicated that the State may have the first issuance of REDD+ credits in 2013.		Acre
The 'Bolsa Verde (BVRio)', or 'Green Exchange' trading scheme was due to commence with the first phase running from 2013-2015.		Rio de Janeiro
In June 2012, Sao Paolo announced plans to launch an emissions trading scheme to assist meeting its 20% below 2005 levels by 2020. The scheme could be linked with Rio's planned carbon market.		Sao Paolo
Chile has submitted draft Market Readiness Proposals as a grantee of the World Bank PMR. The proposal of September 2012, involves designing a pilot ETS for the energy sector that includes (i) an MRV system; (ii) a registry system for a voluntary pilot ETS; building of (iii) technical and institutional capacities; and (iv) the design of complementary instruments.	In 2012, Chile amended the National Climate Change Action Plan, to improve access to the grid for renewable energy	Chile
Colombia is developing its carbon trading scheme with a $350 million grant from the World Bank PMR scheme .	The National Development Plan (2010-14) has a focus on low carbon strategy.	Colombia
Assisted by a $350 million grant from the PMR, Costa Rica has submitted an MRP including a domestic carbon market proposal.	As of 1997, Costa Rica has a 3.5% fossil fuel tax and plans to be carbon neutral by 2021.	Costa Rica
Mexico passed its General Law on Climate Change in April 2012. This law authorises the government to create a voluntary carbon trading scheme and link it to international schemes. The target is to reduce emissions by 30% below business as usual levels by 2020. The legislation establishes an ETS and creates a national registry of annual GHG emissions. It also includes provisions concerning inspection, surveillance and security measures and sanctions associated with emissions mitigation.		Mexico

AUSTRALIA, NEW ZEALAND

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL/ SUB-NATIONAL
In October 2012, it was announced that Australia has commenced discussions with California to link trading schemes. Also, in March 2013, Australian Minister for Climate Change stated that Australia and China would work towards the creation of an Asia-Pacific carbon market including major emerging economies like China and South Korea. In 2012, secondary legislation was introduced to underpin the Clean Energy Act and draft legislation to fully link with EU ETS by 2018.	Australia, with an emission reduction target of 25% from 2000 levels by 2020, passed the Clean Energy Future Package legislation during 2011, according to which a carbon price of $23/tonne CO2-equivalent was introduced on 1 July 2012. The carbon tax will transform into a trading scheme by 2015. The Australian scheme will be linked to the EU ETS from 2015. Initially Australian emitters can buy European credits. From July 2018, European emitters may also buy Australian credits. A maximum of 12.5% of liabilities may be offset with CERs.	Australia
In January 2003, the NSW Greenhouse Gas Reduction Scheme (GGAS) was introduced.	In July 2012 the GGAS was decommissioned with the introduction of the Australian Federal carbon pricing mechanism.	New South Wales
In September 2012, a bill was passed that postponed plans to phase-out free hand-outs of permits and include agriculture in the scheme. In December 2012, NZ announced that it would ban units from HFC-23 and N20 destruction projects and large-scale hydroelectricity projects from June 2013. It was further announced that the government was exploring regional linkages amongst carbon markets for beyond 2015.	New Zealand introduced a carbon tax in 2005. Cap and trade legislation was passed in September 2008 and amended in November 2009. The scheme is based on scaling up to 100% compliance by 2015. It allows for the use of CERs to be used for all required offsets. The annual offset obligation is around 16 million tons.	New Zealand

EUROPE

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	REGIONAL/ NATIONAL
It is expected that the EU ETS will link with the Australian scheme from 2015. In July 2013, the European Parliament approved 'backloading' in an effort to revive the low carbon price of the mandatory trading system. Inclusion of international aviation has been deferred through Autumn 2013	The EU ETS is Europe's flagship climate change instrument, seeking to achieve a 21% emissions reduction below 2005 levels by 2020.	EU Emissions Trading
Croatia has commenced trading on the EU ETS in advance of its July 2013 accession to the EU.		Croatia
	Denmark introduced a carbon tax in 1991. Since 2005, the tax has been 90 DK ($14.72) per ton of CO2 emissions on the purchase of fossil fuels.	Denmark
In November 2012, Finland announced it would reduce its emissions by 80% by 2050.	Having introduced the world's first carbon tax in 1990, the current carbon fuel tax is €18.05 per ton of CO2 for traffic fuels and €9 per ton for heating fuels.	Finland
	Germany introduced a broad ecological tax on energy in 1999, which includes greenhouse gases and environmental externalities. The tax rate was last modified in 2003. Tax on petroleum of €0.65 per litre; tax on electricity of €0.0205 per kWh.	Germany
In 2010, Ireland introduced a carbon tax on fuels at €15/tCO2e. The rate increased to €20/t on 1 January 2012 and is expected to rise to €30/t by 2014.		Ireland
	Introduced a carbon tax in 1990	Netherlands
	Slovenia has a carbon tax of 13 EUR/t CO2	Slovenia
	Sweden enacted a carbon tax in 1991. The tax is currently on 930 Swedish Kronor (SEK) per ton of CO2. Industry pays a reduced rate of about 200 SEK per ton. A separate energy tax is levied at €0.372 per liter of liquid fuels, €0.244 per cubic meter of natural gas, and €0.287 per kilogram of coal.	Sweden
The Carbon Reduction Commitment (CRC) Energy Scheme is an energy efficiency scheme for non-intensive industries that fall outside the EU ETS. Launched in April 2010, the CRC applies to organizations that have metered electricity consumption greater than 6,000 MWh per year. From 2012, participants purchase allowances from the government each year to cover their emissions from the previous year. The price of allowances was set at £12 per ton CO2. The UK announced in December 2012 that it will simplify the CRC from 1 January 2013 and may scrap it after 2016. In March 2013, it was confirmed that a carbon price floor will be introduced in the UK from 1 April 2013, at a rate of £16 per ton CO2. The price floor will increase to £30 per ton by 2020.	The UK introduced a carbon tax in 2001. The Climate Change Levy is a tax on energy use was enacted in 2001: electricity tax is £0.00509 per kWh, natural gas is £0.00177 per kWh, petroleum and diesel is £0.0137 per kilogram.	United Kingdom

CHINA

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL/ SUB-NATIONAL
	In 2011, seven Chinese provinces and cities were nominated for ETS pilot schemes by the National Development and Reform Commission. All schemes are mandatory with absolute caps but a varied sectoral cover.	China
In 2012, Beijing adopted an ETS implementation plan. The mandatory ETS adopts trading on the Beijing Environment Exchange and covers up to 600 companies. Allocation will be by free allocation through 2015, with small reserve auctioning and Chinese certified emissions reductions (CCERs) allowed as offsets.		Beijing Municipality
In January 2012, the Asian Development Bank provided a $750,000 grant for cap-and-trade based ETS development in Tianjin. The ETS was launched in February 2013 with trading via the Tianjin Climate Exchange. The scheme will cover 120 companies with a threshold of above 20,000 tonnes CO2 per year. CCERs will be allowed as offsets and free allowances distributed along benchmarks and historical data.		Tianjin Municipality
Shanghai launched its scheme on 2 August 2012, with trading through the Shanghao Environment and Energy Exchange. In November 2012, the ADB approved an amount of $500,000 to assess the impacts of ETS on the Shanghai economy and key sectors, and to recommend sector-specific benchmarking methods and other system design elements of the ETS. In June 2013, the scheme will start trading, covering 197 companies above the threshold of 20,000t CO2/year for industry and 10,000t CO2/year for non-industry will participate. CCERs and land credits are allowed as offsets. Once-off free allocation will be made for 2013-2015 based on 2009-2011 emissions taking growth into consideration. Benchmarking will be used for sectors when data allows and auctioning will be considered. A potential price stability safety valve involving buy-back quotas is considered		Shanghai Municipality
Hubei Province trading scheme is under review with the National Development and Reform Commission and introduction of the scheme is likely to be delayed by at least one year. The scheme will cover six high-energy consumption industries, including electrolytic aluminium, ferroalloy, calcium carbide, caustic soda, cement and steel. Forest carbon sink trading will also be incorporated.	The threshold for participation on the scheme is 120,000t CO2/year or 60,000t of standard coal equivalent. Offsets allowed are CCERs and CERs from Hubei province. For the first three years all companies will be allocated enough permits to allow them to increase production annually. After the first three years the government will auction 10% of the permits, rising to 30% in 2018 and 100% in 2030. The penalty for non-compliance is three times the carbon price. There is possible linking with Guangdong in 2014.	Hubei Province
Chongqing launched the carbon emission trading pilot project in April 2012, with the objective of conducting the first deal by the end of the year. Trading is expected to start in late 2013. The threshold for participation is 20,000t CO2/year or 10,000t SCE for industry and 10,000t CO2/year for non-industry. CCERs and forestry credits are allowed as offsets.		Chongqing Municipality
Guangdong launched its pilot scheme on 20 September 2012 with the release of framework regulations and the launch of an emissions trading platform. The scheme covers 827 entities, accounting for approximately 42% of the power consumption of the province. Cross-provincial trading is planned for 2015 with the Guangzhou Exchange Services Group identified to host trading under the GD ETS. In November 2012, the first credits traded when 1.3 million credits traded at 60 Yuan ($9.55) per ton. It is expected that 1 billion tons a year will trade by 2015. The threshold for participation in the scheme is 10,000tonnes CO2 per annum. CCERs and forestry offsets will be allowed within the scheme and permit quotas will be issued for 2013-15. Potential linking to the Hubei scheme is envisaged in 2014.		Guangdong Province
In July 2013, Shenzhen Emission Exchange commenced trading with initial prices in the order of 28 to 30 Yuan (US$5) per ton of CO2e in eight deals covering 21,000 tonnes.		Shenzhen Municipality

EUROPEAN ECONOMIC AREA

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL
The EU ETS is mandatory for Iceland, Liechtenstein and Norway, in addition to all EU Member States.		
In October 2012, Norway announced that double their domestic carbon tax from 210 Norwegian Krone to 410 Krone (or €28 to more than €55) per ton of CO2.	Norway first introduced a carbon tax in 1991. The country has a tax on offshore petroleum sector increasing to 410 Krone per ton of CO2 emissions in 2013, and an average tax of 130 Krone per ton of CO2 for other fuels.	Norway
Combines emissions trading, carbon taxation, and domestic offsetting. Emissions tax of CHF36 per ton of CO2 emissions (up to CHF60 if predefined national targets are not met). Free allocation based on benchmarking and historical production. Companies can be exempted if they participate in Switzerland's emissions trading scheme. Although Switzerland is in a position to link its ETS to the EU ETS, it was announced in October 2012 that a link will be delayed by one more year.	The Swiss CO2 Act, 2000 (revised, January 2013)	Switzerland

AFRICA

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL
In May 2013, South Africa announced a carbon tax with potential offset trading. Although crucial details are yet to emerge, the system is planned for implementation from January 2015.		South Africa
In November 2012, Namibia announced a carbon tax on vehicles and tyres. Vehicles with higher CO2 emissions are charged between 0.6% and 4.1% of the total price. In April 2013, Namibia announced a tax on electricity. The tax is designed to "avoid temporary price shocks as well as to help catapult the renewable energy sector".		Namibia
Morocco has been awarded US$ 350,000 preparation funding under the first phase of a programme to establish a framework for monitoring, reporting and verification, as well as a pilot carbon market instrument for crediting Nationally Appropriate Mitigation Actions in relevant sectors. NAMA's covering electricity, cement production, phosphate extraction and processing are being considered.		Morocco

OTHER

RECENT DEVELOPMENTS	TARGETS AND LEGISLATIVE FRAMEWORK	NATIONAL
In December 2012, Belarus announced that it will have a national carbon trading scheme in place by 2014.	Belarus has a reductions target of 5-10% below 1990 levels by 2020, conditional on access to carbon markets, technology and capacity assistance, as well as clarity on accounting rules for forestry and land-use.	Belarus
A crediting mechanism covering the energy and waste management sectors is planned. Jordan is expected to receive a disbursement from the World Bank PMR scheme.	In 2008, Jordan introduced a carbon tax.	Jordan
In January 2013, Russia announced it is considering a domestic carbon trading system. The Ministry of Economic Development proposed to produce an 'early-stage' list of suggestions by March 2013. According to the Climate Doctrine plan of action, the Ministry is tasked with developing "economic instruments" by 2020 to ensure an eventual transition to low-carbon development.		Russia
Turkey received a $350 million grant from the World Bank PMR scheme to fund the development of its carbon trading scheme. As part of its climate related initiatives, Turkey is developing an emission offset infrastructure.		Turkey

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