

2014 REPORT
MARKETS MATTER



IETA
CLIMATE CHALLENGES,
MARKET SOLUTIONS



**GREENHOUSE
GAS MARKET 2014**



GREENHOUSE GAS MARKET 2014

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DIRK FORRISTER
President and CEO, IETA

MARKETS MATTER: PARIS ON THE HORIZON

As the Paris climate summit approaches, business is beginning to see the contours of a new international agreement.

The headline items appeared in a document that average people would think is hopelessly obscure: a 22-page UN “non-paper” entitled “Parties views and proposals on the elements for a draft negotiating text”. It is organised under broad topics like mitigation, adaptation, means of implementation, finance, etc.

FOR THOSE INTERESTED IN CARBON PRICING SOLUTIONS, THERE’S NOT MUCH TO CHEW ON

For those interested in carbon pricing solutions, there’s not much to chew on. Buried within the “Mitigation” section, there is a general notion of cooperation between groups of nations – and some simple accounting language.

Beyond this, there are a few simple words on market matters – but not much of a sense that markets matter.

The text indicates that parties can make “joint contributions” and make “joint fulfilment of commitments”. Next, it suggests a simple concept of good accounting to avoid double counting and ensure environmental integrity – and address banking and borrowing. All of this is a good, but humble, start. While little else is said, the summary offers a hook for more substance as the talks advance.

The 2015 deal is the main event for Paris – but it is not the only negotiating session that matters. Policies about markets appear in several other important negotiating streams:

- Reform of the Clean Development Mechanism;
- Joint Implementation improvements;
- Operational decisions on REDD+; and,

- Establishment of a New Market Mechanism and a Framework for Various Approaches.

But, for too long, all of these negotiations have been stuck in the mud. They are in desperate need of new energy, ideas and direction. We’re hoping this report will provide the substance to fill some of the gaps.

RAISING THE PROFILE: MARKETS MATTER

For many in business, carbon market design is a topic deserving headline attention in the UN talks. Thanks to the signatures of over 1000 CEOs and 74 national governments on the World Bank’s Joint Statement on Carbon Pricing, negotiators got a strong signal to beef up work on this critical topic. IETA’s GHG Market Report 2014 brings a number of new ideas forward, with practical suggestions for how to advance them.

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- Active in carbon markets since 2005, EEX has long-standing experience in the market
- EEX shares its experience through contributing to the development of carbon markets – in Europe and internationally
- Through its wide range of markets and products, EEX offers its trading participants significant synergies

THE REPORT FOCUSES ON A SIMPLE THEME: MARKETS MATTER.

- They matter for channelling investment for the future.
- They matter for assuring economic vitality.
- They matter for achieving climate action at scale – without wasting money.
- They matter for encouraging cooperation between countries with different emissions reduction opportunities.
- Finally, markets matter for rewarding technology innovation.

This edition focuses intently on what the Paris agreement needs to contain. It offers perspectives on this discussion by surveying how markets are delivering now – and how they can deliver more in the future. It examines how climate financing strategies can inject capital into market-based programmes – and, on the flip side, how market-based programmes can provide leverage for public finance.

Several articles explore innovative ideas for future market evolution – including markets for REDD+ and adaptation. We hope the authors stimulate your own thinking about future market-based approaches.

GETTING IT RIGHT: THE BASIC MARKET ELEMENTS FOR PARIS

The centrepiece of this report is a summary of new research from a team led by Robert Stavins of the Harvard Project on Climate Agreements with colleagues Seth Hoedl at Harvard, Daniel Bodansky at Arizona State University Law School and Gilbert Metcalf at Tufts University.

These experts investigate how an international agreement should support national and subnational carbon pricing systems, which could come in many flavours.

The researchers suggest that the fundamental text in the Paris agreement can be fairly short and straightforward. They urge that a hybrid system be considered, which can provide some basic clarity on emissions monitoring, reporting and verification (MRV) rules at international level – but that governments should be given ample flexibility to adopt systems to meet their national circumstances. They recommend that the operational detail about market tools should be reflected in “decisions” by the Conference of the Parties (COP), which are easier to update over time as learning occurs.

The team’s research influenced the design of an IETA ‘straw proposal’ on a market provision for the Paris agreement, which David Hone describes in this report. As Chairman of IETA’s International Working Group, he draws on a number of perspectives from member

companies and peer reviewers from around the world.

Hone describes our version of that simple text. IETA’s Straw Proposal goes on to describe the full package of ideas needed in COP decisions. We envision that a basic authority could ensure fair accounting and offer parties flexibility to choose which carbon units to accept for compliance in their domestic system.

We also urge a consolidation of UN-level offset programmes into a “unified project crediting mechanism”, and we propose that an unbundled set of market tools should be available at international level – things like standardised emissions benchmarks, a registry and MRV protocols for sectors, among others.

GROUND-TRUTHING THE IDEAS, AND MAKING THE LINKS

Our straw proposal reflects a multi-year process of assessing how markets are evolving – particularly through the World Bank’s Partnership for Market Readiness (PMR), described in this report by Maja Murisic. With 19 different carbon pricing programmes in development, including in China and Brazil, it is clear that most of the big emitting emerging economies recognise that economic instruments offer many advantages to their own contributions for the Paris agreement.

One thing is clear: while many of these systems have common hallmarks, they are also carefully crafted to local circumstances. They offer a reasonable starting point for each jurisdiction. But it is not year clear if or how some of these systems might join together in the future – if they wanted to improve efficiencies. Still, the topic of readiness for future linkage is a design criteria for several important jurisdictions: China, Korea, Kazakhstan and Mexico, to name a few.



THIS EDITION FOCUSES INTENTLY ON WHAT THE PARIS AGREEMENT NEEDS TO CONTAIN

Thanks to IETA's "B-PMR" initiative, our members have had opportunity to "ground truth" some of the concepts in the IETA Straw Proposal through dialogues with local companies covered by many of the PMR markets. Our views gained a richer perspective from these conversations – and it has led us to a few conclusions that will guide our advocacy.

First, for market solutions to thrive in the future, they need to earn broad public acceptance. The recent examples – from California and Québec to the China pilots

– are deeply rooted in solid local policies, where compliance occurs.

Second, systems in developing countries can benefit from support structures offered internationally. Right now, those benefits come in the form of technical assistance from the World Bank's PMR team. But as the policies gain more strength over time, they could benefit from market tools available at the UN. This could bolster the credibility and durability of new market structures – and it could promote harmonisation of the various systems.

Third, national and subnational systems gain extra benefits when linked to another similar system. By broadening the geographic reach of mitigation opportunities for participants in the linked systems, the linkage can improve the economic performance of the two systems. If a broad network of linked markets

could form in the future, it could help address concerns about competitiveness. In the near term, these linkages may form in modest ways – but when they do, they offer a vote of legitimacy.

THE 2015 OPPORTUNITY

At the close of September's Climate Summit, IETA convened a joint workshop with our friends at the International Carbon Action Partnership. With the help of several ministers, we explored the steady progress of carbon markets around the world this year. The event closed with a call to arms from UN climate chief Christiana Figueres: with the new momentum from the summit, she urged business leaders to seize the opportunity – emphasising "there's no time for sleep in 2015!"

We hope that this edition of the IETA GHG Market Report stimulates your thinking – and inspires you into action in 2015.

SETTING THE STAGE FOR PARIS

Momentum is building for a deal in Paris next year which includes markets – but there is more work to be done, writes Christiana Figueres



It is an honour to be invited to write the opening article for the IETA GHG Market 2014 report as governments prepare for the next round of United Nations climate negotiations in Lima, Peru, en route to a new universal agreement in Paris in late 2015.

Over the past few months the momentum towards climate action has been steadily building – and not just among governments. Bold announcements and transformative initiatives have been emerging from local authorities and regions, as well as businesses, investors, foundations and institutions like faith groups and universities.

This bodes well for the delivery of a draft agreement in Peru this December and a new agreement 12 months later – one that outlines policies and pathways towards peaking emissions within the next decade and puts the world on a track to deep decarbonisation and ultimately a climate neutral world in the second half of the century.

Clearly markets and market mechanisms will play an important role in

achieving these vital steps towards ensuring that a global temperature rise is kept under 2°C.

In terms of political engagement, a key point came in September at the Secretary-General's Climate Summit. The Summit not only emphasised the catalytic role of business, finance and non-state actors, but also triggered a rich array of bold new initiatives.

Indeed, the event may well go down as a moment in time when the world got off the fence and into a new and dynamic phase of climate action – business, finance and governments in partnership – emboldened by the strong show of public support at the People's Climate Marches in New York and across the globe.

Significantly, the Summit put business and political leaders together on the same issue: the importance of carbon pricing.

The world needs to capitalise on that added momentum in every forum, whether at the political, business or community level – particularly on the message of carbon pricing.

The global business community, whether in developed or developing countries, is increasingly aware of the impact of climate change on economic activities and increasingly motivated to create sustainable futures for their businesses and avoid damage resulting from climate change. Reports like that of the Global Commission on the Economy and Climate¹ highlight that economic growth and climate change mitigation

THE AGREEMENT THAT THE WORLD IS HOPING FOR CANNOT BE A SHORT-TERM, FIVE-YEAR PLAN

can go hand in hand if policy-makers make that a conscious choice – and that goes for developing countries as well as developed countries. Increasingly, climate risk is being built into everyday decision-making across many countries in the world, through shadow carbon prices, climate risk assessment and developing resilience.

Carbon pricing policies are essential – fundamental – to delivering price signals that redirect private sector capital from high-carbon to resilient low-carbon investment. The multinational business sector also understands the need for all the leading economies of the world to take action to avoid distorting global patterns of production and industry, avoid carbon leakage, and level the playing field for the cost of doing business across the world.

And carbon pricing is happening. Across many diverse countries, the use of emissions trading and carbon taxes is growing. We have seen emissions trading systems and carbon taxes emerging in countries that are not obliged under international rules to reduce greenhouse gas emissions. These policy-makers see the economic sense of starting to transition towards a low-carbon model and the need to set business on that path now rather than later.

The proliferation of such domestic programmes brings many opportunities for cost-effective mitigation around the world. It also brings challenges. We need to find an optimal relationship between the recent emerging domestic focus on carbon pricing in countries at all stages of development and the Convention and Kyoto Protocol carbon pricing mechanisms.

There will be many countries that will want to develop their own infrastructure for emissions trading and carbon pricing, but some countries do not have the means to create entire domestic programmes. These countries will continue to rely on international approaches to pricing carbon domestically and on internationally supported tools to achieve mitigation and sustainable development.

The Clean Development Mechanism (CDM) has proved that international approaches to pricing carbon can be transformative and powerful instruments that make real changes to the emissions pathway for host countries.

Over its years, it has achieved 1.5 billion tonnes of emissions reductions from a business-as-usual baseline. It has incentivised private sector action and investment, spurred technology transfer, and generated funds for adaptation. It has established standards used globally for measuring and verifying emission reductions and has helped improve the lives of millions of people.

It has also evolved from a project approach into a mechanism with scalable rules focused on standardised baselines and programmes of activities. Actors as diverse as multinational investment banks and single heads of families in rural Africa have engaged in this unique tool for climate finance, all for reasons that make good, economic and sustainable sense.

And yet there seems to be a risk that we are now in danger of losing this value and this effort as the international carbon price languishes.

We should not be naïve about the effort that the world has put into the CDM. The international community has spent 15 years designing, developing, financing, using and refining this instrument. This globally invested value and effort cannot easily be replaced. No new system or infrastructure would be perfect, or free from criticism. No new system would likely be quicker to design and operationalise. No new system would please everyone all of the time. And we simply do not have time to start again from scratch.

We must harness the value of the existing CDM infrastructure. We should draw every lesson and apply everything we have learned and prepare it for a post-2020 future. We should keep the principles and rules of the CDM in some simplified and streamlined form – taking it beyond its role in the Kyoto Protocol and making it available long into the future for those that wish to use it.

We must also collectively examine other ways of using the CDM and its certified emission reductions (CERs) for other roles in climate finance and sustainable development. The CDM can be integrated into domestic emissions trading systems and CERs applied as a means of payment for carbon taxes. The CDM monitoring, reporting and verification (MRV) rulebook works for results-based financing. CERs can be cancelled for social responsibility reasons, using real and already achieved emissions reductions to offset emitting activities. This multiple-use future is where the CDM Executive Board wants to take the mechanism. I support them in that goal.

Building on what we already have means that at the business level we should also look for synergy between new finance

structures with existing infrastructure. The Pilot Auction Facility for Methane and Climate Mitigation by the World Bank² is such an example. Designed to deal with short term climate pollutants, it provides put options to methane abatement projects – incentivising continued mitigation of existing activities by ensuring a minimum price for that effort.

Still other means of creating synergy must be found. As we support Parties to create a tool box for climate finance for the 2015 agreement, we need to design multi-purpose levers that can serve many different functions. We also need to come to a common understanding of how diverse instruments for carbon pricing at all levels of regulation can fit together and how diverse international and national programmes and measures can inter-relate.

ECONOMIC GROWTH AND CLIMATE CHANGE MITIGATION CAN GO HAND IN HAND IF POLICY-MAKERS MAKE THAT A CONSCIOUS CHOICE

That is because environmental effectiveness requires maximising cooperation so that Parties can find the lowest cost mitigation. For one thing, it means maximising fungibility of outcomes of those programmes while avoiding a race to the bottom in environmental terms. We must ensure that we achieve compatibility of domestic markets at the global level.

I am committed to assisting the UNFCCC to provide the conditions for global markets to operate and grow. This means supporting Parties development of common rules and standards in the context

of the framework for various approaches and articulating how different domestic instruments can be recognised within the future regime.

So, what should business be doing right now? Now is the time to be specific in engagement and yet engage at many levels. At the international level, between now and Paris, business should be talking to governments about what markets and private investment can bring to the shared goal of limiting global temperature change to under 2°C.

This means engaging on the way in which an international agreement needs to be structured to enable that private sector participation. At the domestic level, it is time to engage with governments for effective policy-making, encouraging governments to elaborate policies that incentivise private sector mitigation action and transition to a low-carbon and resilient economy.

That is not just about creating and incentivising markets – it is about supporting development of regulation on carbon pricing in the supply chain. It is also about climate risk reporting, disclosure and support for renewable technology deployment.

At the same time, the multinational private sector sees beyond national regulation, and can understand the effect of combinations of policies in different jurisdictions – including issues like carbon leakage. And this needs to be communicated back into each country so that the impact of measures from other countries can be understood. This will take us closer to the carbon-priced and level playing field that business needs to operate effectively.

Spreading the message of the need for coherence at the international level to support effectiveness at the domestic level can be a key contribution of the

private sector in this critical time before Paris.

The agreement that the world is hoping for cannot be a short-term, five-year plan. It needs to be robust and visionary enough to last decades and contain the seeds needed to unleash creativity in terms of policy, technology, finance and healthy, game-changing markets.

Christiana Figueres is the Executive Secretary of the United Nations Framework Convention on Climate Change, a post she has held since 2010. She has been active in the UN climate negotiations since 1995, as a delegate for Costa Rica, and has also served on the CDM Executive Board. In 1995 she founded the Centre for Sustainable Development of the Americas (CSDA), a non-profit think tank for climate change policy and capacity-building, which she directed until 2003. Figueres has also worked as an adviser in the private sector.

(1) Better Growth, Better Climate: The New Climate Economy Report <http://newclimateeconomy.net/content/global-commission> (2) www.worldbank.org/en/news/press-release/2014/09/15/world-bank-group-launches-design-pilot-auction-facility-methane-climate-mitigation

FACILITATING LINKAGE OF VARYING CLIMATE POLICIES THROUGH A FUTURE INTERNATIONAL AGREEMENT¹

With efforts underway to tie together various climate change efforts and make them count in a future climate regime, Daniel Bodansky, Seth Hoedl, Gilbert Metcalf and Robert Stavins look at how policy-makers could make the links

In the Durban Platform for Enhanced Action, adopted by the Seventeenth Conference of the Parties (COP17) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2011, governments agreed to “develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties,”² for adoption at COP21 in December 2015, in Paris. The new agreement would become effective from 2020.

Although the negotiations are still at a relatively early stage, it appears likely that the 2015 agreement will reflect a hybrid climate-policy architecture — one that combines top-down elements, such as for measurement (or monitoring), reporting and verification (MRV), with bottom-up elements consisting primarily of “nationally determined contributions” (NDCs). In their NDCs, countries would specify their own targets, actions, policies — or some combination of these — to reduce greenhouse gas emissions. The character and ambition of NDCs will be based upon domestic political feasi-

bility and other factors, and will be subject to some system of international peer review.

Linkages across regional, national and subnational jurisdictions can make lower-cost mitigation opportunities available to a larger set of emitters and thus make systems more cost effective in aggregate. In the case of the Paris agreement, the prospect of reduced aggregate cost could yield somewhat more ambitious NDCs and, during implementation of the agreement, facilitate compliance, political support and overall environmental effectiveness.

Importantly, with appropriate provisions for linkage, the agreement reached under the Durban Platform can also be consistent with the Convention’s principle of “common but differentiated responsibilities and respective capabilities” (CBDRRC). The hybrid architecture under consideration provides for self-differentiation, since each country’s NDC is — almost by definition — consistent with each country’s own view of its fair share. Linkage and the associat-

ed cost-effectiveness of the system facilitates more ambitious contributions from developed countries, realising CBDRRC even further, in practice.

Linkage can be very straightforward, as with the bilateral recognition of allowances under two cap-and-trade regimes. Linkage can also take place among a heterogeneous set of policy instruments, such as between and among systems of performance standards, carbon taxes and cap-and-trade systems. As NDCs submitted by various UNFCCC parties may contain any combination of market and non-market policy instruments, it would be wise to fashion the 2015 Paris agreement such that it would best advance heterogeneous linkage.

A review of the general economic and political advantages of — and challenges to — linkage suggests that a number of regions, nations and subnational jurisdictions have demonstrated their revealed preference for linkage, and that well-designed linkage of carbon markets has proven to both advance environmental objectives and reduce costs.

With specific regard to design elements to facilitate linkage that merit serious consideration for inclusion in — or exclusion from — the Paris agreement: First, there are a number of design elements the 2015 agreement should avoid, because they would inhibit linkage. These include “supplementarity

THE MOST VALUABLE OUTCOME OF THE PARIS AGREEMENT REGARDING LINKAGE MAY SIMPLY BE INCLUDING AN EXPLICIT STATEMENT THAT PARTIES MAY TRANSFER PORTIONS OF THEIR CAPS TO OTHERS

requirements” that require parties to accomplish all (or a large, specified share) of their NDCs within their national borders. Such a provision would drive up costs and reduce the political viability of the Paris agreement.

Other elements to avoid include: competing and conflicting objectives and rules between the UNFCCC and national or regional trading systems; elements that would complicate recognition of national or regional carbon mitigation systems as valid for purposes of meeting international commitments under the Paris agreement; and including too many objectives that linkage might be required to achieve (for example, adding “sustainable development” as a condition for international recognition of linkages).

What should the 2015 agreement include to facilitate linkage, either directly or by establishing a process for subsequent international negotiations? Potential rules vary along three important dimensions: mandatory versus optional, uniform versus harmonised, and legally-binding under international law (hard rules) versus not-legally-binding (soft rules). Several lessons for international climate negotiators can be drawn from a review of a number of existing international instruments, both hard and soft, that regulate international trade and finance, including the GATT, the Basel Capital Accords and the OECD Model Tax Treaty.

First, effective linkage requires common definitions of key terms, in particular the units that are used for compliance purposes. This will be particularly important for heterogeneous links, and it is an area where a model rule could be particularly helpful. (See below for more on model rules.)

Second, registries and tracking are necessary with linked systems, whether

the links are among a homogeneous or heterogeneous set of policies. Indeed, a key role for the top-down part of a hybrid architecture that allows for international linkage of national policy instruments will be the tracking, reporting, and recording of allowance-unit transactions. Internationally-recognised compliance units would make the functioning of an international transaction log more straightforward and reduce the administrative burden of reconciling international registries with national registries. Market oversight and monitoring may increase confidence in the system, although in some cases, national and international institutions may already exist or need only relatively minor additional capacity.

Third, many elements of linkage can be addressed through default or model rules, from which nations are free to deviate at their discretion. Rules that may benefit from this approach are typically concerned with the details of linking two or more regulatory systems. For example, when linking cap-and-trade systems, the nations involved must consider rules regarding market coverage, cost containment, banking and borrowing, compliance periods, allocation methods, and treatment of new emitters and emitter closures. Additional rules may be needed for linking of heterogeneous systems. Developing uniform rules for all of these issues is unrealistic. Instead, a degree of harmonisation could be achieved through default rules that facilitate linkage by providing a common framework for nations to use when developing their own linkage agreements.

Fourth, inclusion of detailed linkage rules in the core agreement is not desirable; an agreement with more flexibility would allow rules to evolve on the basis of experience. Minimum standards to ensure environmental integrity should be elaborated in subsequent COP decisions — for example, establishing

THE PROSPECT OF REDUCED AGGREGATE COST COULD YIELD MORE AMBITIOUS EMISSIONS TARGETS

the minimum requirements for national MRV, registries and crediting mechanisms. The function of the core agreement might be confined to articulating general principles regarding linkage, relating to environmental integrity, as well as authorising the COP to develop more detailed rules. Whatever minimum standards are adopted, international oversight of compliance would be important, to ensure the integrity both of the 2015 agreement and of the linked national systems.

The most valuable outcome of the Paris agreement regarding linkage may simply be including an explicit statement that parties may transfer portions of their NDCs to other parties, and that these transferred units may be used by the transferees to fulfil their own NDCs. From a legal perspective, such a statement would be helpful in providing certainty both to governments and private-market participants that linkage is feasible within the UNFCCC framework, and it is likely a necessary condition for widespread linkage to occur. Such a minimalist approach would allow diverse forms of linkage to arise among what will inevitably be heterogeneous NDCs, thereby advancing both cost-effectiveness and environmental integrity.

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CHANGING THE TERMS OF ENERGY TRADE AND INVESTMENT: COMPONENTS OF A 2015 CLIMATE AGREEMENT

David Hone sets out what the 2015 global climate agreement needs to include if it is to drive change across the global energy sector

As we move quickly towards COP21 in Paris, from which a global agreement on climate change is expected to emerge, there is much talk about renewable energy, energy efficiency, national contributions, clean energy and other low-carbon development alternatives. However, we face the challenge of the world's legacy fossil fuel-based system which provides energy for almost everything we do, use, make or buy and which, if extracted and exploited, has sufficient proven reserves to emit well beyond an accumulated trillion tonnes of carbon into the atmosphere (over 580 billion tonnes in up to 2014) or, in simpler language, well above the concentration of GHG emissions that will cause a global temperature increase of 2°C above pre-industrial levels.

The impact of carbon dioxide on the climate (ΔT) is linked directly to the cumulative extraction over time of the fossil resources we have available. The efficiency of energy extraction, when it is used and the energy mix with low-carbon technology may impact the speed at which ΔT occurs and the unpredictability of the climate's response, it is the cumulative extraction that is the overall most important variable. If we apply the following equation, (where k is the climate sensitivity, f denotes some function and the fossil resource is expressed in gigatonnes of carbon, GtC);

$\Delta T = k f$ {Fossil resource size (GtC), (Energy price-Extraction cost)}

This means that the prevailing energy price would need to fall below the resource extraction cost to stop the release of carbon and limit warming. Of course, that is where renewable energy can play an important role. Nevertheless, once extraction is underway and all the equipment is in place, the energy price has to fall below the marginal operating cost to stop the activity – however, this can be very low for some operations.

Looking at this on a macro scale, where thousands of facilities are already in existence all over the world and are designed to last long enough to extract the resource they are sitting on, the task of limiting global emissions becomes a very difficult one.

THE NEED FOR A CARBON PRICE

The above doesn't have to be the end of the story. Returning to the equation, the introduction of a price on the resultant carbon dioxide emissions (a "carbon price") would tilt the balance:

$\Delta T = k f$ {Fossil resource (GtC), (Energy price-Carbon Price- Extraction cost)}

When the carbon price is high enough to offset the profit from the resource extraction, then the process will stop, but, it is argued, not before. With a carbon price operating in the energy system, the alternative pathway forward for the resource holder or emitter would be to

invest in carbon capture and storage (CCS) to negate the carbon costs and continue extraction rather than ceasing operations. This one technology then becomes critical to the supply-demand-emissions equation, thereby minimising the impact of carbon dioxide mitigation on economic growth and development.

THE INCLUSION OF A CARBON PRICE WITHIN THE ENERGY SYSTEM SHIFTS THE BALANCE OF THE EQUATION

But it is the inclusion of a carbon price within the energy system that shifts the balance of the equation. Not only is it critical at national level, but it must become progressively global owing to the nature of the problem and the vast scale of international energy trading. Limiting carbon emissions in just a handful of jurisdictions, even if it is through pricing, will be significantly less effective in achieving the broader 2°C goal. A broadly implemented carbon price would impact the terms of trade for fossil fuels, shifting investment patterns away from coal and towards lower carbon fuels such as natural gas and requiring the development and deployment of alter-

THE CDM HAS CLEARLY SHOWN THAT THE MARKET CAN REACT TO A PRICE SIGNAL AND MOVE QUICKLY IN ITS RESPONSE

native energy projects and CCS. Given the nearly \$2 trillion per annum that is expected in energy investment over the coming decade, this one instrument has enormous potential leverage.

A recent report released by the MIT Joint Program on the Science and Policy of Global Change argued that with cost as the primary motivation, a command and control policies and measures style agreement would not be the economically preferred societal approach to emissions control. MIT noted that although in some instances market failures can only be cured by regulatory measures, substantial literature documents the potential advantage of using a price instrument. In their own analysis where MIT assumed that if Australia, New Zealand, Canada, EU and Mexico formed a carbon trading group within a global agreement, substantial savings would be realised. This could also translate to greater ambition at the same cost.

THE ROLE OF AN INTERNATIONAL AGREEMENT ON CLIMATE CHANGE

In 1997, the Kyoto Protocol sent a powerful signal that carbon pricing would progressively permeate through the global economy. But as the implementation phase got underway, that signal became progressively weaker as some parties retreated from their initial enthusiasm and others failed to follow through with cogent carbon pricing based legislation. Initially the EU and New Zealand were the only Annex 1 countries (that is, countries with emission reduction tar-

gets) which embraced the concepts laid down, although some others have since followed, and the Clean Development Mechanism (CDM) has brought a form of carbon pricing to many developing countries. In recent years, these price signals have reduced to just a few euros and, although regions such as California are making progress, there is no real sign of a price signal above \$10-20 per tonne CO₂. This is insufficient to change the global emissions pathway.

The outcome in Paris is now widely expected to consist of an aggregation of national contributions, sitting within a validation and review framework of some description. Whereas global carbon trading played a fundamental role in the Kyoto Protocol, no similar role currently appears likely to be an outcome of Paris. National carbon trading systems may still exist, but these would simply be regarded as a means to achieve a given mitigation contribution; the synergy and cost reductions that international trading could catalyse are at risk of being lost, along with a pricing mechanism to drive CCS development and deployment, among other things.

This raises the question of how an international carbon pricing system might evolve in a contributions based architecture.

Some national governments may find it challenging to put forward meaningful contributions, given domestic growth aspirations, the fuel mix and energy infrastructure they have to hand and the immediate opportunities to reduce emissions. For such cases, the ability to trade Assigned Amount Units (AAU) was introduced into the Kyoto Protocol, giving rise to an international market price for carbon. A parallel approach could still be envisaged under the Paris agreement, whereby a provision is included to allow for the transfer of some portion of a contribution between parties.

For some parties this may be a relatively simple process, particularly if their contribution is underpinned by an emissions trading system (ETS). However, it would still require that their system was linked with another or that they at least recognised the allowances of another system as valid compliance units within their own. But this approach dictates the need for an emissions trading approach from the outset, which in many instances may not be the case. Rather, a given national government may define its mitigation contribution in terms of performance standards, renewable energy objectives or even changes in land use practices.

Irrespective of how a mitigation contribution is defined, some indication of future national emissions following the implementation of the contribution will also be required, simply because emissions management is the core objective of the UNFCCC process. With a national emissions objective in place behind a contribution, it then becomes possible to monitor the effectiveness of the effort being made and measure progress. An emissions objective also provides guidance on the necessary measures to take should the mitigation contribution not realise, or over realise, in terms of that objective.

Although the terms of the Paris agreement remain unclear at this point in time, arguably it should allow transfers between parties to “balance the books”, so to speak, to at least be able to demonstrate realisation of a given mitigation contribution and its impact on the national emissions inventory. With a view to encouraging the long-term development of transfers into a fully-fledged trading mechanism underpinned by carbon accounting and exchangeable units, a relatively modest hook is required in the agreement now. One example has been developed by the IETA International Working Group, a compact version of which is as follows:

Cooperation between Parties in realizing their Contributions

- Parties may voluntarily cooperate in achieving their mitigation contributions.
- A unified international transfer system is hereby established.
 - A Party, through public/and or private entities, may transfer portions of its nationally defined contribution to one or more other Parties through carbon units of its choice.
 - Transfers and receipts of units shall be recorded in equivalent carbon reduction terms.

This can then be built on through subsequent decisions by the COP. While it is not the preferred approach to establishing a global price on carbon, it does at least provide the foundation for one to develop.

There may well be other routes to such a transfer based approach within the Paris agreement, but it is the concept of having one that is important.

CREDITING MECHANISMS

A major feature of the Kyoto Protocol and a subject that has exercised the minds of negotiators since 1997 is the crediting mechanism. The Clean Development Mechanism (CDM) is the current best practice example of this in operation.

This single tool, with the EU and Japan as the major buyers of the resultant certified emission reductions (CERs), has directed well over \$315 billion in capital towards lower emitting activities in developing countries. The mechanism has also delivered benefits to communities and led to the creation of an entire sector of project developers actively using the market to promote novel clean en-

A BROADLY IMPLEMENTED CARBON PRICE WILL CHANGE THE TERMS OF TRADE FOR FOSSIL FUELS AND SHIFT INVESTMENT PATTERNS

ergy projects throughout the world. The CDM has clearly shown that the market can react to a price signal and can move quickly in its response.

But the CDM is not without its problems, with one glaring issue now confronting it: price. The market price for a CER is just a few cents (in late 2014), which essentially means new commercial CDM project activity is no longer viable. The supply/demand balance for CERs is the underlying issue, with too little demand, in part driven down by significant early oversupply which flooded the EU ETS and economic downturn leading to lower industrial production and which prompted regulators to shut the doors for further CERs.

Additional demand is clearly needed and this can come from new jurisdictions recognising CERs and then beginning to purchase them as part of their nationally defined contributions – i.e., so counting them as mitigation efforts towards developing country contributions instead of just offsetting developed country emissions. This could be in the context of cap-and-trade systems, but also as part of the transfer approach discussed above.

Further to this, the CDM itself must change; perhaps bifurcating into a system that supports clean energy access projects in the least developed economies and one that focuses on much larger scale systemic change in newly emerging economies that have yet to move towards their own cap-and-trade approach. The latter step would tend to

target power generation and therefore better align the abatement opportunities presented through the CDM with those being targeted in the cap-and-trade systems that are open to CER purchase. This also minimises potential arbitrage between systems and makes for a more acceptable carbon market.

IN SUMMARY

Whether it is through a structured transfer system under the Paris agreement or progressive bilateral and multi-lateral linkage of national ETs, cross border and ultimately global carbon market development must become a fixture of the international climate change agenda. This will undoubtedly include crediting mechanisms of some description, built on the experience of the CDM or, ideally, bringing structural change to the CDM itself and making its price relevant to least developed and newly emerging economies.

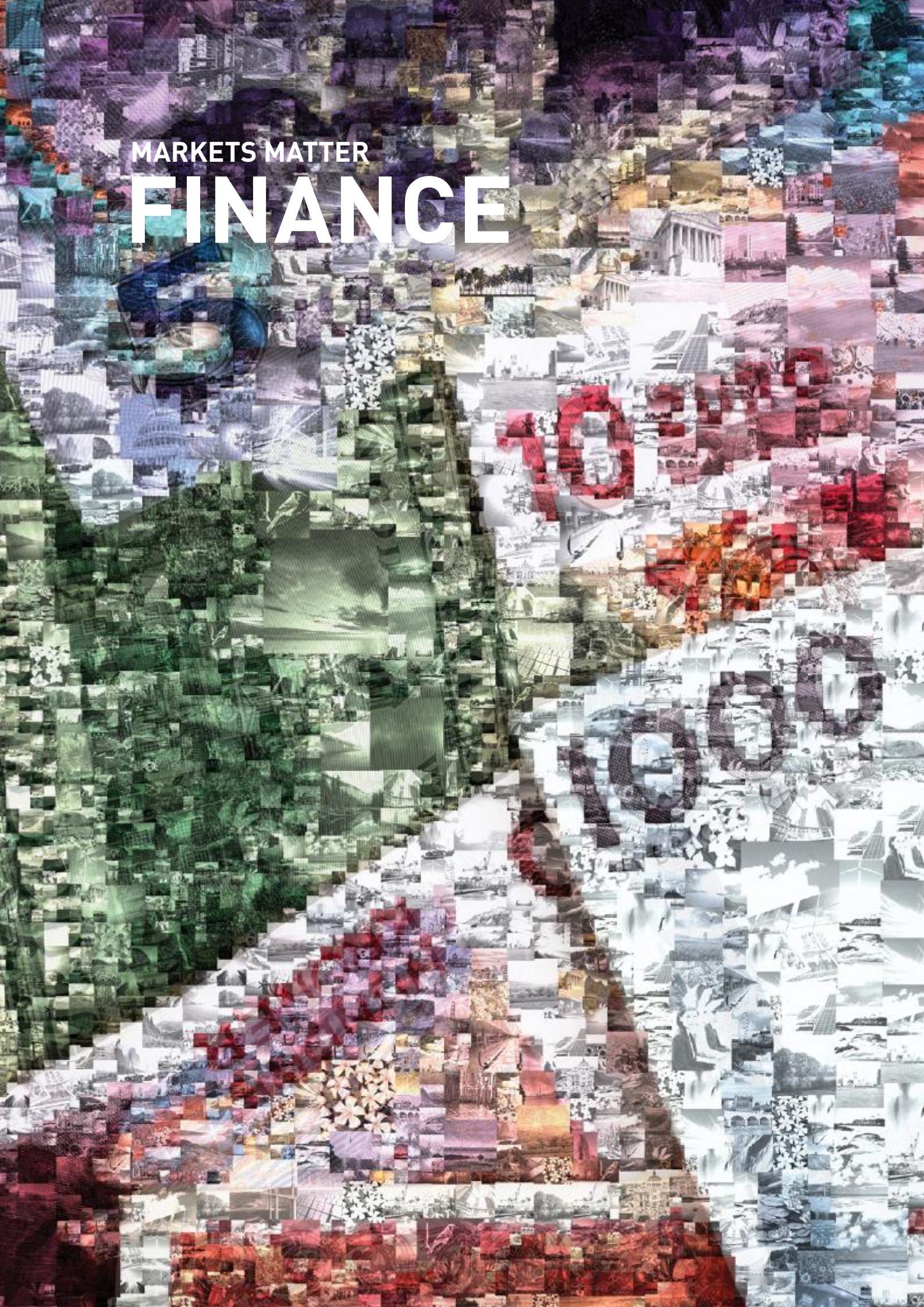
Without such provisions and changes, the world may find itself unable to implement a broad-based carbon price within the energy system, or even have an incentive or catalyst to trigger such a process. Unless it does, the goal of halting the accumulation of carbon dioxide in the atmosphere is probably lost, let alone at a level that equates to 2°C.

David Hone is chairman of IETA's International Working Group. He works for IETA member company Royal Dutch Shell plc where he is Chief Climate Change Adviser. This article is a personal reflection of the current discussions in IETA and its proposals for the Paris agreement.

(1) Conference of the Parties to the United Nations Framework Convention on Climate Change (2) See Table SPM.2, Summary for Policymakers, IPCC 5th Assessment Report, WGIII. (3) IEA World Energy Investment Outlook 2014 (4) Report 264, Expectations for a New Climate Agreement, by Jacoby, HD and Y-HH Chen (August), Joint Program Report Series, 24 p., 2014 (5) "Contributions" may include action on mitigation, but they are not limited to this. They could also include adaptation, finance, capacity building and technology transfer or support. (6) A carbon unit allocated by the UNFCCC to developed countries with Kyoto targets. In a given Kyoto period, those countries would be required to surrender one AAU for each tonne of CO₂e emitted. (7) CDM Executive Board Annual Report 2013. http://unfccc.int/resource/docs/publications/pub_cdm_eb_annualreport_2013.pdf

MARKETS MATTER

FINANCE



DEMYSTIFYING THE CLIMATE FINANCE-PRIVATE SECTOR NEXUS

Katie Sullivan sets out the climate finance challenge ahead for a 2°C world – and how the private sector is rising to the challenge

A hundred billion: that's the UN-prescribed magic number, the figure representing new and additional climate finance dollars, committed by developed country governments to mobilise and channel into mitigation and resilience measures across developing countries, each year by 2020.

It sounds like a big and straightforward round number. In reality, this target represents a fraction of what's truly required to finance the decarbonisation of developing (and emerging) economies while adapting to climate change. According to the IEA, the total estimated additional investment required to decarbonise the energy system by 2050 – to be consistent with the goal of stabilising the global average temperature increase to 2°C – is \$44 trillion.¹ Taking a step back from the UN world, the IEA estimates that additional clean energy sector investments, across both developed and developing countries, must reach over \$10 trillion between now and 2030. These are big, transformative, paradigm-shifting numbers.

Although different studies and methodologies might result in different figures related to future estimated climate and resilience financing requirements, the headline stories remain the same. First, all sectors (and pockets) must come to the table. Second, public resources alone cannot tackle the challenge (particularly in the developing world). Third, governments' ability to leverage, scale, "smartly blend" and track massive sums of private capital into mitigation and resilience will dictate whether we win, lose or – at least – decently adapt to climate change.

With clear, consistent signals and enabling frameworks, including carbon pricing and new demand sources for emission reduction credits, the power of markets can move mountains of capital to clean alternatives – just look at the \$315 billion the Clean Development Mechanism mobilised in 12 years. But private investors expect returns on climate investments, commensurate with perceived levels of risk. Harnessing the true power of global financial markets to support climate solutions therefore requires new instruments, new mechanisms, new products, and new regulatory landscapes to offer appropriate incentives, guarantees and risk-reward balances that appeal to the mainstream investment community.

CLIMATE FINANCE MOMENTUM BUILDS...

With IETA's help, climate finance and carbon pricing stole the show at the UN Climate Summit in September. The Summit's formal session on climate finance was structured around three core areas and deliverables: 1) green financial instruments; 2) green regulatory frameworks to enable climate finance to flow, be leveraged, and tracked; and 3) the Green Climate Fund. This was evidenced by the remarkable number of wide-ranging climate finance declarations, including:

- The launch of a new Portfolio Diversification Coalition by institutional investors, committed to decarbonising \$100 billion-worth of investments by 2015.
- Some of the world's largest pension funds committing to grow low-carbon investments to over \$30 billion by 2020.

- Large insurance associations, managing one-third of the world's investment capital, pledging a 10-fold increase in climate investments, to \$420 billion, by 2020.
- Global investors' coalition, representing \$24 trillion of assets under management, voicing support for carbon pricing and other low-carbon policy and financing enabling frameworks.
- A group of major commercial banks' collectively promising to issue green bonds – and other "green" finance instruments – worth \$30 billion before 2016.
- The launch of Bank of America's Catalytic Finance Initiative, aimed at stimulating at least \$10 billion of new, high-impact clean energy investment worldwide.

The subsequent chapters give readers one of the most comprehensive deep-dives to date on today's climate finance state of play and innovative mechanisms and instruments to meet climate finance targets. The insights and concepts shared in these chapters, authored by the world's leading policy, academic, and corporate climate finance experts, begin to shape a Climate Finance Skeleton Key to unlocking private capital.

Katie Sullivan is IETA's director of climate finance and North America. Based in Toronto, she coordinates IETA's Working Groups for California, Canada and international climate finance, and is a Private Sector Observer of the Green Climate Fund. Prior to joining IETA in 2010, she worked as a Senior Associate for ICF International. She holds a degree in Public Affairs and Policy Management and Masters in Environmental Policy from the University of Sussex.

(1) See Energy Technology Perspectives 2014, IEA.

THE GREEN CLIMATE FUND: A CATALYST FOR CHANGE

The Green Climate Fund has an opportunity to showcase how public-private partnerships can truly be transformative as it moves to catalyse unprecedented levels of climate finance. As the Fund starts to be seeded and prepares for its first investments, its secretariat outlines how its ambitions could be realised

The Green Climate Fund (GCF) is a new financial instrument to promote low-emission and climate-resilient development on the planet. Established at the 2010 UN climate change conference in Cancun, the GCF will provide financial incentives to developing countries to help limit or reduce their greenhouse gas emissions, and to adapt to unavoidable impacts of climate change. With an ambitious target, and a governing Board composed equally of developing and developed countries, the new fund has been built entirely from the ground up, putting in place the principles, policies, structures – and staff, at its Secretariat in Songdo, Republic of Korea – to get the fund started.

THE GCF WILL NOT SIMPLY BE A GRANT-MAKING BODY, BUT INSTEAD A CATALYST FOR CHANGE

This has admittedly been a lengthy process at times, with passionate consultations over direction and approach. Being a consensus-based organisation, the GCF Board members have worked together successfully to overcome problems and, after meeting the necessary conditions, the fund is now ready for

business. The initial capitalisation round will be completed by the end of 2014. So this is a good moment to review what the GCF will do, how it is different, and what needs to be put in place to allow this unique financial instrument to meet its ambitious objectives.

The challenge of climate financing is extraordinary. Global climate finance needs are estimated at about half a trillion US dollars – every year – and industrialised countries have committed to providing funds rising to \$100 billion per year by 2020, from a mixture of public and private sources. It is not intended that these funds should all flow through the GCF, but rather that the fund will act as a catalyst, unlocking private flows of capital. Thus, the GCF will not simply be a grant-making body, but instead a catalyst for change. The intention is to leverage the fund's assets to create the conditions for massive paradigm shifts. It is not only about managing projects: it is about creating the conditions for transformative and replicable change towards low-emission, climate-resilient economies.

One element that will determine whether the GCF can succeed will be the leveraging of private capital. In order to facilitate this, an integral part of the Fund is its Private Sector Facility (PSF). There is an enormous potential for private in-

vestment, but only a small proportion of private investment portfolios are currently in sustainable projects. The PSF is aimed at changing this, working with the investment community to overcome barriers to investment, to make private sector involvement more feasible by de-risking investment opportunities.

A consequence of GCF's catalytic role is that the Fund will have a different attitude towards risk compared to other international financing entities. The Fund needs to finance new and unconventional projects and programmes, as well as scaling-up conventional technologies which are new in certain geographies. These kinds of projects would not otherwise be financed on the market, because of perceived or real risks, or lack of economic and financial viability due to their cost or insufficient revenue. By their very nature, therefore, these activities and projects will at times assume a higher level of risk than conventional investments undertaken on the market.

To date, many of the largest climate projects in frontier and emerging economies have been focused upon mitigation. There is a need to scale-up these investments, for example by encouraging large-scale investments into renewable technologies, and by developing and implementing transformational projects that will significantly reduce emissions.

But the problems of climate change are already here today, particularly for small island developing states (SIDS) whose citizens need to adapt to those new climate risks. That is why the GCF is committed to achieving a 50/50 balance between adaptation and mitigation projects over time. At least 50% of the adaptation allocation will be allocated to particularly vulnerable countries including SIDS and African states.

Country ownership is one of the fundamental principles governing the GCF's operation. Following this principle means that the GCF will not impose strategies, but will help host countries to develop their own. Funding will be available under GCF's Readiness programme to assist with this process, and build capacity so that countries can be ready for investment. The need for single points of contact for countries was evident, and the National Designated Authorities nominated by recipient countries will play this key role. They will also be expected to submit funding proposals, and will have direct access through accredited implementing entities and intermediaries. Implementing entities will include national, regional, and international bodies, and will be accredited by GCF to ensure they meet the fund's fiduciary principles and standards, as well as its social and environmental safeguards.

WITH HIGH AMBITIONS TO REACH, STAKEHOLDERS NEED TO RAISE AS MUCH AS POSSIBLE, AS SOON AS POSSIBLE, AND WITH THE FEWEST POSSIBLE STRINGS

Concerning financial instruments, the GCF will provide financing in the form of grants and concessional loans in the first instance, with the possibility of developing further instruments at a later stage. Grants will initially be 'traditional', ie, without a repayment obligation, except where disbursements are due to corruption or fraudulent action. But special types of grants, such as performance grants or contingent grants, will be considered for a later phase. Loans will be provided with different forms of concessionality and maturities.

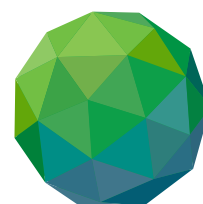
To make all of this happen, the GCF needs a rapid and significant capitalisation, and the Board has set the target of completing this by the end of the year. With high ambitions to reach, stakeholders need to raise as much as possible, as soon as possible, and with the fewest possible strings.

The initial resource mobilisation will take the form of grants from public and private sources, paid-in capital contri-

butions and concessional loans from public sources. The GCF has already received major commitments from Germany, France, Switzerland, Denmark, Norway, Luxembourg, Czech Republic and its host country, the Republic of Korea. A key moment for the GCF will be the first Pledging Conference, which will take place in November when further significant pledges are expected.

The capitalisation of the GCF by developed countries is likely to be a key element in the success of the UN Climate Summit in Lima (just two weeks after GCF's pledging conference) and in the steps towards a global climate agreement next year in Paris.

The time is right for governments to show their commitment to financing the GCF so it can play its role in catalysing the change that humanity so urgently needs – towards a low-carbon and climate resilient planet.



**GREEN
CLIMATE
FUND**

(1) See the next article for more on the GCF's Private Sector Facility

THE CRITICAL MILESTONE

Gwen Andrews outlines how the Green Climate Fund and its private sector facility are gearing up ahead of a future climate regime

There is one milestone on the road to Paris in 2015 that is particularly critical. Reaching it allows for an unrestricted view of the road ahead; falling short will likely stop progress towards a new international climate change agreement. That milestone is resourcing and operationalising the Green Climate Fund (GCF), which is the money element of the Paris climate agreement.

The last couple of years have been taken up with the effort to establish the Fund's structure and operating modalities which, like any new enterprise of scale, takes time. But its ambitions are large. Its Governing Instrument states that the GCF will contribute to limiting the average increase in global temperatures to 2°C. In the context of sustainable development, the Fund will "promote the paradigm shift towards low emission and climate-resilient development pathways" by supporting developing countries' efforts to reduce emissions and adapt to climate change.

The ambitions encompass innovation as well. There is a recognition that the work of international finance institutions to date, while laudable, is not sufficient to meet the 2°C goal. Things must be done differently to attract sufficient finance to the Fund so it can rise to the extensive challenge posed.

One key element of innovation is an attempt to mobilise private sector resources at scale. This is no small challenge in itself. The private sector is well aware of the opportunities presented by the needs and ambitions of developing countries, but a range of considerations often makes investment in these countries difficult. These include political and policy risk, lack of in-country capacity

and skills, environmental and social issues, and poor access to financing. Add to that the particular risks of climate investments, and the GCF has a significant task ahead to leverage private sector contributions. To meet these challenges, parties decided that the GCF would have a Private Sector Facility (PSF), which to many participants - especially donor countries - sets it apart.

So what will the PSF do, exactly, and how effective will it be? There are as yet no complete answers to these questions, but there have been some promising developments. At its fourth meeting in June 2013, the Board made a decision that guides the development of the PSF as an integral component of the Fund. It also said that the PSF's mandate would be to address barriers to private sector investment in mitigation and adaptation. It acknowledged the need to design modalities to mobilise funds at scale from institutional investors, and that

private sector willingness to invest would depend on host country readiness. It called on the PSF to promote the participation of private sector actors in developing countries, in particular small and medium-sized enterprises (SMEs) and local financial intermediaries.

The decision also established a Private Sector Advisory Group (PSAG), with a mandate to help develop the PSF modalities and to advise the Risk Management and Investment Committees of the Board. That group comprises four private sector participants from developing countries and four from developed countries, with expertise ranging from distributed solar power to large scale pension management. At its May 2014 meeting, the Board requested specific recommendations on three key issues: mobilising private sector funds at scale, financial instruments and engaging local private sector actors.

WHAT IS THE GCF?

The Green Climate Fund (GCF) aims to contribute significantly to the promised \$100 billion of climate finance per year by 2020, from public and private sources, to aid developing countries develop more sustainably and adapt to climate change.

The GCF has been established as an operating entity of the UN Framework Convention on Climate Change's financial mechanism. Arrangements have been concluded that allow the Conference of the Parties to issue guidance and receive reports from the Fund, but its operations are the purview of an independent Board comprised of 24 members: 12 from developing countries and 12 from developed countries. Each member represents a particular constituency and the constituency provides alternate members as well.

THE GCF HAS A SIGNIFICANT TASK AHEAD TO LEVERAGE PRIVATE SECTOR CONTRIBUTIONS

These issues were the subject of keen discussion at PSAG's second meeting in September 2014. The group noted that it is possible to mobilise significant amounts of private sector funds with strategies that are commercial in orientation and predictable in outcome, and that public finance should be used in a catalytic manner. Equity, credit, guarantee and insurance approaches can all be effective in crowding in private sector finance for mitigation and adaptation activities. To achieve optimal results, the PSF must be able to take a higher level of risk than existing funds, particularly by using concessional resources in a first loss position on projects and programmes, while ensuring an appropriate return across the portfolio.

PSAG also noted the importance of policy and regulatory certainty for private sector investment, and of early initiatives to demonstrate success in blending public and private funds. It pointed out that private investment could only be achieved through the use of asset-backed strategies, where investors can assess the value of and risk associated with underlying assets and predict returns. It therefore recommended the establishment of a mobilisation vehicle or vehicles to match investor interest with pipelines of projects. It also recommended issuing lines of credit to accredited private sector intermediaries, to allow them to proceed with structuring finance for existing pipelines of projects which were not yet bankable. Project pipelines should be in line with country strategies for mitigation and adaptation.

On instruments, PSAG recommended treating the GCF's financial intermediaries as implementation partners, allowing them to be accountable for the structuring of project financing and to deploy any

financial instrument which they have the capacity and expertise to deploy. This approach should be underpinned by a series of Board approved principles for financing, including additionality, ability to crowd in private investment, potential for commercial sustainability and minimising concessionality.

Given the importance of Board accreditation of intermediaries in the delivery process, PSAG recommended that the Board consider some additional guidance for selecting intermediaries. These should include timing for deployment of funds, ability to bring in co-financing, deployment of instruments at scale, and ability to pilot innovative instruments and share learnings. There should be an "accreditation lite" process for local and regional financial intermediaries that would not be operating largescale projects. And given the desire to accredit commercial financial intermediaries as well as multilateral and national/regional development banks, the accreditation panel should include commercial banking expertise.

In terms of engaging local private sector actors, PSAG considered that a direct approach via local intermediaries would provide much greater benefits than the existing approach of via international intermediaries. This would significantly reduce transaction costs, and has the potential to increase leveraging of finance and reduce risk of projects. The direct approach could involve a call for proposals from local private sector entities to present investment pipelines in line with countries' national plans and the GCF's strategic objectives. PSAG recommended that the most appropriate instruments for local SMEs are grants and concessional loans, but that the PSF should also consider the deploy-

ment of equity capital into SMEs that can augment country capacities - eg, engineering firms, efficiency companies and adaptation consultancies.

The next few months are crucial to establishing the Fund and the PSF on an effective basis. The Board meeting in Barbados in October considered the PSAG's recommendations. Donor nations have already met twice to thrash out policies on contributions (these policies were approved by the Board in October), and a pledging meeting is set for November. The decisions the Board made in October will likely condition the level of pledges the Fund receives in November, and therefore its likelihood of success.

EMISSIONS TRADING REVENUE AND GCF FINANCING CAN COMBINE TO HELP PROJECTS OVERCOME FINANCIAL HURDLES

The GCF is not a carbon trading vehicle; it is a financing vehicle. But if its PSF is given the right mandate and tools, and if intermediaries with good commercial expertise are accredited, it is likely that emissions trading revenue and GCF financing can combine to help many emissions reductions projects overcome financial hurdles. These are developments well worth watching.

Gwen Andrews is one of two Active Private Sector Observers advising the Green Climate Fund board. She previously worked for Alstom SA, a French multinational providing power and rail solutions worldwide. In the Australian government in the 1990s, she was General Manager Budget and later CEO of the Australian Greenhouse Office.

TRACKING CLIMATE FINANCE: BUILDING ON PAST EXPERIENCE TO MOBILISE MORE

Tracking climate finance is vital to ensure goals are met and to release further, much-needed investment. Three years into a climate finance mapping project, Martin Stadelmann, Barbara Buchner, Angela Falconer and Chiara Trabacchi outline lessons learned and best practice approaches to climate finance monitoring

The transition to low-carbon and climate-resilient economies will require substantial new investments in the next decades. The International Energy Agency estimates that around \$1.1 trillion of additional investments will be needed every year until 2050 for low-carbon energy systems alone.¹ In addition, governments, companies and households will have to provide funding for climate change adaptation, reducing deforestation and low-carbon agriculture. The Climate Policy Initiative (CPI) and others refer to these investments and government expenditures in pursuit of climate change mitigation and adaptation objectives as 'climate finance'.²

Policy-makers require estimates of current climate finance for many reasons: to understand the gap towards climate finance goals, to meet requirements for reporting of financial flows under the UN Framework Convention on Climate Change (UNFCCC) and to effectively manage public resources supporting policies and private investment.

To support policy-makers, CPI started mapping climate finance with the Landscape of Climate Finance in 2011.³ Since then, CPI has expanded the coverage of flows, refined its accounting methodology and looked in depth at specific countries, such as Indonesia (see

box). This paper presents what CPI has learned during more than three years of aggregating climate finance flows from different data sources, and interacting with experts at different levels of the life-cycle of climate finance flows.

HOW TO BEST TRACK CLIMATE FINANCE

Define 'climate finance'. Policy-makers, investors, financial intermediaries and analysts often have different understandings of the term 'climate finance', which leads to misunderstandings and confusion. Building a common understanding of key climate finance terminology would improve ongoing discussions on how best to track climate finance, clarify efforts to measure its effectiveness, and help identify where and how public sector interventions can be best delivered to maximise impacts, and incentivise private investments to scaling up climate finance flows.

Track both investments and public expenditures. Both private and public investments are at the core of low-carbon and climate-resilient development. Public expenditures fund the necessary framework to incentivise investments, build capacity and demonstrate pilot projects to support implementation, set up policies and monitor progress towards climate change goals. Private investments

represent the majority of climate finance flows, and are essential to scaling up resources to meet the needs of low-carbon, climate-resilient development.

Be comprehensive and transparent. To generate a transparent basis for informing specific political questions debated domestically and internationally, the scope of tracking and monitoring must be truly comprehensive. It must include private finance flows, domestic and 'South-South' flows, the instruments used, actual disbursement levels (as compared with commitment levels) and final uses. In addition, transparent methodologies for attributing ownership of finance flows need to be developed. This is particularly so for flows contributed by Development Finance Institutions (DFIs), and for private companies with public shareholders.

Avoid double counting. Organisations measure climate finance flows at different points, have different objectives, use different definitions and accounting practices and often measure the same flows. Therefore, aggregating data from various sources to global climate finance estimates poses challenges of double-counting. Such double counting would result in underestimating the efforts needed to achieve agreed policy targets.

To minimise the risk of double counting care should be taken to include only those elements of public support which constitute upfront investment costs (eg, grants and concessional loans), while not counting other support which reduces project costs (eg, guarantees, tax reduction) and increase revenues (eg, feed-in tariffs and carbon credit purchases).

Track finance at the project level. The best way to avoid double counting and to ensure comparability among flows is to track finance at the project level, where we have enough information on investors, geographies and type of intervention.

Bridge donors' and recipients' views. In the end, climate finance data is only useful if policy-makers believe in its quality and actually use it. Our tracking efforts show that donors and recipients have different views on what constitutes climate finance. This is due to different definitions and objectives, but also separate tracking systems. To bridge this gap, it is important to interact with all stakeholders to understand their views and to support the establishment of common tracking systems.

Mind the data gap. The CPI is tracking more than 10,000 climate finance interventions every year. This gives us a great level of accuracy in some parts of the climate finance world, eg, renewable energies or development assistance flows. However, we face substantial data gaps for other climate finance flows including finance for energy efficiency, low-carbon forestry and adaptation, where we can estimate public flows but have hardly any information on private investments. The lack of data in this area is due to the difficulty to delineate climate-specific flows and track decentralised investment decisions.

HOW TO MOBILISE CLIMATE FINANCE

Tracking climate finance can help policy-makers to better understand gaps in and opportunities for climate finance flows, down to a sectoral and country level. This information suggests a range of entry points for public actors to provide climate finance on their own and make investments financially attractive for the private sector. These entry points are to:

- Develop strong and clear domestic enabling environments: private actors prefer familiar policy environments where the perception of risk is lower.
- Address risks, which increase costs and lie at the heart of private investment decisions. Gaps in risk coverage exist in both developing and developed markets, particularly for policy risks (ie, retroactive changes to support systems for

climate-friendly technologies) and financing risks (including access to capital and investment exit/liquidity risks).

- Improve returns in order to close the viability gap of low-carbon and climate-resilient technologies.
- Close knowledge gaps, which impede our ability to track, evaluate and also invest in climate finance.

Both national policy-makers and international public finance, particularly DFIs, have an important role in such efforts to mobilise the climate finance necessary.

WAY FORWARD

While information on climate finance has significantly improved, existing efforts to track or measure available financial resources remain incomplete and inconsistent, which means resource and policy decisions are made on the basis

THE LANDSCAPE OF PUBLIC CLIMATE FINANCE IN INDONESIA

Aiming to show where finance comes from, how it flows to activities on the ground, which bottlenecks slow down its delivery and where opportunities for scale up exist, this study provides the most comprehensive overview of public climate finance in Indonesia to date.

At least 8,377 billion Indonesian Rupiah (\$951 million) of climate finance from public sources was disbursed in Indonesia in 2011, 66% of which came from the Indonesian government's budget, highlighting the importance of domestic resources. Encouragingly, the most emissions-intensive sectors received the highest share of climate finance: forestry (41%) and energy (19%). However, significant tracking difficulties - particularly for local government, private sector, state-owned enterprises and international development partners - inhibit our understanding of the complete picture of climate finance in Indonesia.

The study team found limited comparability between data on climate finance disbursements provided by international development partners and Indonesian public budget expenditure data.

of unreliable data and large information gaps. The application of different definitions associated with climate finance can yield vastly different calculations of climate finance flows and its use. An agreed-upon multilateral definition, or set of definitions, of 'climate finance' would encourage more consistent reporting and facilitate better analysis of the overarching landscape. It might also encourage dialogue between international and domestic organisations and initiatives actively tracking and monitoring uses of climate finance.

This might likewise inspire governments and institutions involved in the management and delivery of climate finance to report financial information consistently and comprehensively.

In this context, the UNFCCC's Standing Committee on Climate Finance has an excellent opportunity to advance a definition of 'climate finance' through the production of its biennial assessments and overviews. If it applied a definition

for climate finance incorporating lessons from the last years of climate finance tracking, the Standing Committee could take concrete steps to develop a methodological approach to capture all relevant flows, which could in turn become a new basis for monitoring, reporting and tracking climate finance flows.

By taking care to avoid limiting the assessment of different kinds of flows for political reasons, the Standing Committee could promote robust insights about where the world actually stands in relation to its adaptation and mitigation investment goals – supporting progress towards the 2015 climate negotiations in Paris, where solutions to effectively financing the transition to a low-carbon, climate-resilient future will be an essential ingredient to success.

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Angela Falconer works as an analyst at CPI Europe and is currently enrolled in Ca' Foscari University of Venice's PhD programme on the "Science and Management of Climate Change". Her research to date has focused on public climate finance and the design of funding instruments for reducing emissions from deforestation and land degradation (REDD).

Chiara Trabacchi is a senior analyst at CPI Europe and is also a PhD candidate on the Ca' Foscari University of Venice's Science and Management of Climate Change programme. Her research to date has focused on international climate finance, especially tracking and private sector engagement in adaptation and renewable energy projects and programs.



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CAPITALISING ON CARBON REVENUES

Samantha Sekar, Clayton Munnings and Dallas Burtraw look at the various ways regulators can use revenues from carbon pricing systems for further benefit to the environment and the public

Regulators of carbon pricing programmes increasingly choose to sell emitters rights to use the atmosphere. Previously, nearly all of the economic value associated with carbon allowances, or carbon asset value, would accrue to the regulated entities through free allocation. In many trading programmes, emitters now must purchase a significant portion of their emissions allowances, with the resulting revenue accruing to governments or their constituents. These differing strategies give rise to a fundamental question: who owns the atmosphere? As a greater proportion of payments for use of the atmosphere accrue to the government or its constituents, it's becoming clear that regulators increasingly view the public as the owners of the atmosphere.

NEARLY ALL REGIONS INVESTED CARBON REVENUES INTO LOW-CARBON RESEARCH AND DEVELOPMENT

One can think of payments for use of the atmosphere as a specific form of payment for environmental services (PES). Specifically, we view emitters as paying the public for rights to use the atmosphere and its associated environmental services. The payments commonly occur through an auction of carbon emis-

sions allowances in a trading programme or sometimes a tax. We choose to define PES to the public as uses of carbon revenue that benefit either the government or the government's constituents, which includes individuals and businesses, although we recognise that these groups may have different preferences for PES uses. Specifically, we have organised the uses of PES from carbon pricing into two categories:

1. A payment directly to the government that might be used to solve the government's fiscal problem or,
2. A payment of compensation to constituents who might be viewed as the owners of the atmosphere resource.

However, not all carbon revenues necessarily constitute a PES. For example, we do not count uses of revenues that reward carbon emissions as a PES, such as allocation of allowances based on a regulated entity's emissions rate.

A payment to a household or industry that is proportional to its emissions is not considered PES, but a payment to household or industry independent of emissions level is considered PES.¹

Table 1 displays the amount of carbon revenues collected across five regions as payment for use of the atmosphere in 2013. In table 1, the allowance price and total asset value associated with the EU are based on EU-wide data but, because of limited data availability from each individual EU nation, we assume that the quantity and use of PES (final two columns) by the EU as a whole is proportional to Germany's PES investment. Regulators in these five regions collected US\$7.6 billion through cap-and-trade auctions and carbon taxation, although not all was spent in that year.

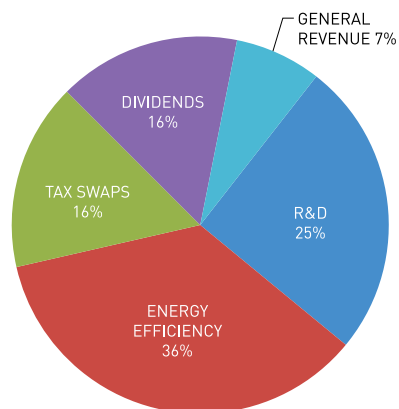
Figure 1 describes how a majority of the revenue was used. The five major PES expenditure categories include: climate dividends, which is a lump-sum return to taxpayers; tax swaps, that is an offset

TABLE 1.
Total carbon asset value and the portion viewed as PES in five carbon pricing programmes.

	Allowance Price (US\$)*	Total asset value (US\$ million)	PES as a percent of total asset value	PES revenues (US\$ million)
RRGI ²	2.92	477	94	448
California ³	12.93	2440	54	1325
British Columbia ⁴	28.02	1132	100	1132
European Union ⁵	5.78	12,057	39	4675
Alberta ⁶	14.01	Undefined**	Undefined	55

(*) All prices and monetary values are in US\$ 2013 (***) Alberta's total carbon asset value includes value generated from offsets and emissions performance credits, but the only documented value is that which is collected by the provincial government directed toward the climate change and emissions management corporation.

FIGURE 1.
Expenditure by PES category in 2013 from the five programmes (\$4.2 billion)*



*This figure only includes Germany's (not the EU's) PES expenditures, and 2013 RGGI revenue expenditure was assumed to be equivalent to 2012, because 2013 expenditures were not available at the time of writing, in August 2014

of existing taxes; investments in energy efficiency; investments in research and development (R&D); and contributions to general revenue, which refers to any PES that cannot be included in the first four categories. We discuss each of these strategies below.

ENERGY EFFICIENCY

In 2013, regulators used the largest amount of carbon revenue to invest in energy efficiency. For instance, Germany invested approximately US\$333 million of its EU Emissions Trading System revenue on improving energy efficiency in buildings. It also used part of its remaining auction funds to make other energy efficiency investments, both domestically and internationally.⁷

Energy efficiency investments also play a major role in the US Northeast's Regional Greenhouse Gas Initiative (RGGI) and Alberta. The majority of auction revenue spent by RGGI supported business and home energy audits, provided rebates for energy efficient appliances, and created grants for large projects to improve industrial energy efficiency.¹¹

RESEARCH AND DEVELOPMENT

Nearly all regions we consider invested carbon revenues into low-carbon R&D in 2013. RGGI regulators used about 10% of auction revenues to help finance solar, wind, geothermal, biomass and fuel cell projects.

Alberta's carbon pricing programme contains a unique mechanism that requires facilities that annually emit greater than 100,000 tonnes of CO₂e to reduce their carbon intensity by approximately 12%, compared with 2005 levels. As one alternative to achieving its facility-level reduction target, an emitter can pay a C\$15 fee into a technology fund for each tonne of CO₂e emitted above its target. Regulators used three-quarters of the total value invested by the technology fund in 2013 toward R&D efforts; specifically, to carbon capture, energy storage, solar and wind R&D projects.⁸

Regulators in Germany also directed carbon revenue toward R&D, investing US\$544 million in electric vehicle development and deployment in 2013.⁷ California's carbon auction revenue investment plan dedicates 70% of PES revenue for both energy efficiency and renewable energy, but there are limited details regarding how those funds will be used. For this report we have assumed that the funds, amounting to US\$740 million last year, were divided evenly between energy efficiency and R&D in 2013.

CLIMATE DIVIDENDS

Regulators dedicated nearly US\$660 million in carbon revenues to the public as a climate dividend in 2013. For example, California's cap-and-trade programme allocates free allowances to investor-owned utilities (IOUs), then compels IOUs to auction these allowances and finally requires IOUs to use the resulting revenues to benefit ratepayers, approximately US\$330 million of which is returned as a dividend on a twice-annual basis.^{3,9,10}

Meanwhile, the nine RGGI states returned nearly 10% of auction revenues, about US\$40 million, as relief from higher electricity prices, mostly in the form of a credit on a consumer's electricity bill. While some RGGI states targeted specific groups of ratepayers, such as low-income households or small businesses, other RGGI states returned carbon revenue to all electricity ratepayers. Overall, RGGI regulators used carbon revenues to lower more than 2 million recipients' utility bills by an average of US\$50 in 2012.¹¹

And last year, British Columbia's (BC) carbon tax also provided US\$286 million in dividends, including tax credits for low-income individuals and industry property owners.⁴

TAX SWAPS

BC primarily returned carbon revenues to the public through tax swaps. More than 50% of the province's carbon revenue contributed to cuts in personal income tax, corporate income tax and taxes on small businesses. These cuts amounted to US\$677 million in 2013.⁴ We count the reductions funded by carbon revenues to cut corporate income taxes as a payment for use of the atmosphere because the degree to which BC regulators lowered a corporation's corporate income tax did not depend on that corporation's emissions. This means that payments for use of the atmosphere need not always imply that regulators transfer carbon asset value from businesses to the public.

GENERAL REVENUE

Regulators used the smallest segment of carbon revenue for state and regional general expenditure. In this context, we define general expenditures as government programmes unrelated to carbon emissions. These expenditures ranged from administrative and technical costs associated with instituting the carbon markets, as is the case in RGGI and Alberta, to promoting fitness education

and providing incentives for film production in BC.^{4,8,11}

THE SHIFT AWAY FROM FREE ALLOCATION

Some may react to the trend of shifting away from free allocation and toward a payment for use of the atmosphere approach with alarm. Such reactions might be well justified; legitimate and important reasons do exist for free allocation. Freely allocating allowances to energy intensive and trade-exposed industries according to an output-based updating approach can help regulators minimise adverse impacts on competitiveness. Furthermore, political realities may largely preclude the sale of allowances. In China's carbon trading pilots, for example, regulators largely allocate allowances to utilities for free because electricity prices essentially do not change — likely preventing utilities from recouping any losses associated with carbon payments.

However, cap-and-trade regulators that adopt a payment for use of the atmosphere approach may reap numerous and substantial benefits. First, auctions can promote price discovery and market liquidity. Second, auctioning can guard against market manipulation. Third, auctions can help protect against wind-fall profits. Fourth, auctions can improve the perceived fairness of the overall programme by avoiding complicated and

potentially arbitrary allocation processes. The ability for regulators to collect carbon revenue, however, may ultimately represent the most important benefit of an auction.

Governments around the world increasingly view carbon regulations through the lens of public ownership of the atmosphere. Other states in the EU ETS, for example, intend to invest auction revenue in government and environment-related programmes. Specifically, France expects to spend the majority of auction revenue on improving the environmental sustainability of social housing projects.¹² The Czech Republic earmarked half of its auction revenue to finance industrial innovation, clean energy and international climate obligations.¹³

Recently established carbon markets like Québec's also plan to reduce the percent of freely allocated allowances each year between 2015 and 2020. South Korea, which will initiate its carbon trading system on January 1 2015, will auction a portion of its allowances in its second phase, from 2018.¹⁴ Currently, there is limited information regarding the intended use of revenues, for PES or otherwise, from emerging carbon markets, which provides an opportunity for stakeholders to identify and implement measures deemed effective based on experiences in existing carbon pricing programmes.

IT'S BECOMING CLEAR THAT REGULATORS INCREASINGLY VIEW THE PUBLIC AS THE OWNERS OF THE ATMOSPHERE

The trend toward PES represents a fundamental shift in climate policy. As outlined above, governments have diversified their carbon revenue investments among residential and commercial emissions reductions projects, climate-related R&D, climate dividends and tax swaps. Each of these investments are made possible by leveraging some form of a carbon pricing mechanism, generally an auction, and has the potential to provide long-term energy cost savings, drive technological innovation, and enhance businesses' and communities' economic and environmental sustainability.

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BUILDING A MARKET FOR ADAPTATION

Existing climate change markets focus on climate change mitigation – but could easily be retooled to finance adaptation efforts. Ken Newcombe explains how

Most observers wouldn't think twice about the idea of a market for adaptation credits. But the challenge is how could we possibly provide the same degree of quantification to adaptation outcomes as we do to emissions reductions in order to accommodate trade? After all, adaptation benefits are hugely diverse and amorphous from a market perspective. I think the answer is: don't take the quantification issue head on; use mitigation credits as a proxy.

A MORE POWERFUL MEANS OF GENERATING PRIVATE SECTOR INVESTMENT IN ADAPTATION IS THROUGH THE GREEN CLIMATE FUND

The most vulnerable populations under climate change are the rural poor of the developing countries. Shifting rainfall patterns and increasing severity of storms wreak havoc to food production that is firmly lodged in seasonally determined patterns of traditional practice, much of which is highly susceptible to climate variability. A case in point is the practice of heavy tilling, ridging and cleaning of fields of crop residues before planting for maize or groundnuts, and of removing trees from cropland, which was instilled in the colonial era in Southern and Eastern Africa. Intense rains

wash away unprotected topsoil, and soils lack the humus and organic carbon to retain water and nutrients in the growth zone in the event of lower and unevenly distributed rainfall through the growing season.

CAPTURING ADAPTATION

The Verified Carbon Standard's (VCS's) suite of Agriculture, Forestry and Other Land Use (AFOLU) methodologies enable carbon crediting for projects in sustainable landscape management that are rich in adaptation potential. Sustainable Agricultural Land Management (SALM) projects typically seek to increase soil cover with retained crop residues, protecting soil from heavy rains, and to increase the humus layer that retains moisture in the growth zone for longer periods.

SALM projects frequently include agroforestry, increasing nitrogen fixation and nutrient cycling from deeper soil layers to the crop growth zone. They seek to increase tree cover on cropland and the production landscape, and to reduce fires from burning residues and forest clearing through achieving higher and sustainable yields on the same land. All these practices lead to substantial and quantifiable increments in carbon pools across the landscape that can be monitored and verified under AFOLU methodologies.

It is also increasingly possible to confirm through objective independent professional review what the climate risks are across these landscapes, and to assess whether the project is addressing these

risks and increasing the resilience to climate variability as well as reducing climate risk to food security. Similar arguments can be built for avoided deforestation projects covering critical watersheds, for example.

What this means is that the carbon sequestered, or avoided carbon loss, in these projects can be used as proxies for adaptation credits and a value placed on the adaptation benefit through the willingness to pay for carbon sequestered. The Climate, Community and Biodiversity Association (CCBA) already has an independent third party adaptation benefits review process, just as it does for verifying the biodiversity and community development values of projects. This adaptation value assessment can be strengthened to increase its scientific credibility and rigor. And it is a fair and reasonable use of the independent monitoring and independent verification of VCS AFOLU projects to verify adaptation outcomes, if the issuance of carbon credits from such projects is a credible indicator that climate risk is reduced despite increased climate variability.

SELLING ADAPTATION

So how can adaptation products be packaged and delivered to the private sector? How do we make a market in adaptation? In the voluntary market, corporates buying carbon credits under corporate social responsibility or carbon neutral mandates nearly always buy mitigation credits under one or other carbon standard. They may be sensitive to adaptation but typically have no related product offering to support.

In 2012, the Santiago Climate Exchange (SCX) and CQuestCapital (CQC) decided to tackle the problem of how to capitalise land-use projects with high adaptation benefits that had difficulty raising funding and would not generate carbon credits for many years. Compliance buyers are not buying AFOLU credits, and the voluntary market rarely buys more than a year ahead at a time. Corporates issuing tenders for carbon credits expect delivery into registries typically within months of awarding the contract.

To address this constraint, and to wean climate sensitive corporates into an adaptation market without challenging their commitment to instant carbon gratification, SCX and CQC developed an Adaptation Credit Unit (ACU), comprised of a credible mitigation credit provided up front on contract award and a sequestration credit from an AFOLU project to be delivered in the future. The provisional credit designation would be offered by a registry that has listed the registered AFOLU project with CCBA or other third party adaptation attributes, as is possible under VCS. The contractual commitment from the seller would be to implement the project and to deliver in due course a matching number of AFOLU credits into the buyer's retirement account in the registry concerned.

The price paid for the ACU would cover the cost of the mitigation credit and help capitalise the AFOLU project with its rich, independently verified adaptation benefits. This ACU product works well while it is possible to buy certified emission reductions at \$0.50-1.00 apiece, which is the case for now, and a corporate can be persuaded to buy the ACU bundle for \$5-6 – the same price that

many pay for charismatic mitigation carbon from high social development impact projects, such as clean cookstove distribution.

The SCX-CQC team intends to develop and market this product in partnership with a project supported by the World Bank's BioCarbon Fund, developed by CQC with the Community Markets for Conservation and Brinkman Associates. That project, due to be validated and registered mid-2015, converts slash-and-burn farming to intensive no-till, residue retention and agroforestry farming with sustained higher yields in one location.

THE GREEN CLIMATE FUND AND ADAPTATION

A second, and more powerful, means of generating private sector investment in adaptation using the sequestration credits as a proxy is through the Green Climate Fund (GCF), which has a strong adaptation investment mandate.

In contributing to the design of the business model for the Private Sector Facility of the GCF, CQC proposed that the GCF's adaptation business unit should: pre-screen projects to determine their adaptation impacts; fund project design, preparation and validation; and then run a competitive process to determine the price of carbon at which the private sector would invest in project implementation.

For the GCF this is low risk, results-based financing of adaptation. For the private sector and NGO groups that would bid to invest in the projects, they have a guaranteed creditworthy carbon buyer. Bids could be structured with some ad-

A VALUE CAN BE PLACED ON THE ADAPTATION BENEFIT THROUGH THE WILLINGNESS TO PAY FOR CARBON SEQUESTERED

vanced payment component to ensure projects got started and credit generation began to meet operating costs to sustain implementation and achieve adaptation outcomes near term.

The process envisaged is not unlike that taken recently by USAID in Zambia, Malawi and other countries, to support large-scale programmes to reduce emissions from deforestation and degradation in designated landscapes where at least four or five consortia actively bid for USAID grant funds. This approach, however, has the added advantage of leveraging private venture and social impact capital with scarce public funds – which is the fastest way to meeting the promised \$100 billion a year in climate change mitigation and adaptation finance by 2020 – and could help establish a market for adaptation credits.

Ken Newcombe has over 30 years of experience in developing financially viable sustainable energy and forestry projects around the world for entities including Goldman Sachs, Climate Change Capital and the Carbon Finance Unit of the World Bank Group. At the World Bank, he started the first public-private partnership Carbon Fund, which went on to pioneer the global carbon market. He began his career in the energy sector as the first Head of Energy Planning in Papua New Guinea and as General Manager of its power utility.



REDD+ MARKET AND THE ROAD TO PARIS

While the Warsaw Framework for REDD+ was a positive step forward, more work needs to be done before private finance flows to protect forests ramp up, say Richard Saines and Marisa Martin

By all accounts, the reduction of deforestation and forest degradation along with the sustainable management of forests (REDD+) has been a bright light in international climate negotiations. Many press reports following the 2013 Conference of Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) heralded the achievement of the Warsaw Framework for REDD+ as one of the great successes of last year's COP. This could lead many to believe that the work on REDD+ design is largely complete – unfortunately, that is not the case.

A REDD+ MARKET IS THE BEST CHANCE OF ATTRACTING THE NECESSARY FINANCE

Tropical deforestation is responsible for approximately 10% of global greenhouse gas emissions and must be addressed if dangerous climate change is to be avoided. An annual investment of approximately \$40 billion is required to halve global deforestation by 2030. This will not come from public funds alone; private financing is essential to close the gap and scale up the response to deforestation. A REDD+ market, in concert with other private financing opportunities, is the best chance of attracting the necessary scale of financing.

Progress has been made since 2005, when the COP first considered REDD+, including setting forth monitoring, reporting, verification (MRV) and safe-

guards requirements. However, the future remains unclear. The next two COPs – in Lima, Peru in 2014 and Paris, France in 2015 – are critical. While public REDD+ financing remains essential, the COP should expressly adopt a clear market-based REDD+ system.

FURTHER CLARITY NEEDED

COP decisions related to REDD+ to date have focused on host country readiness and technical issues such as MRV (see timeline). The first explicit reference to REDD+ markets occurred in a decision at COP17 in Durban, which states that “appropriate market-based approaches could be developed by the [COP] to support the results-based actions by developing country Parties.” Most recently, the Warsaw 2013 COP decisions related to REDD+ focused on technical issues; no decisions were made on establishing or defining a REDD+ market-based mechanism.

Further COP decisions are needed to establish details of a REDD+ market mechanism, including the relationship between the mechanism and “contributions” expected from countries in a 2015 agreement, as well as the mechanics of crediting and issuance.

To avoid losing critical years between 2015 and 2020, which otherwise could serve as an early action/prompt-start period for REDD+, the Lima COP should approve a decision that formally establishes and provides details around a market-based REDD+ mechanism. The 2015 agreement could include provisions that incorporate by reference the Lima decision, as the Paris agreement is

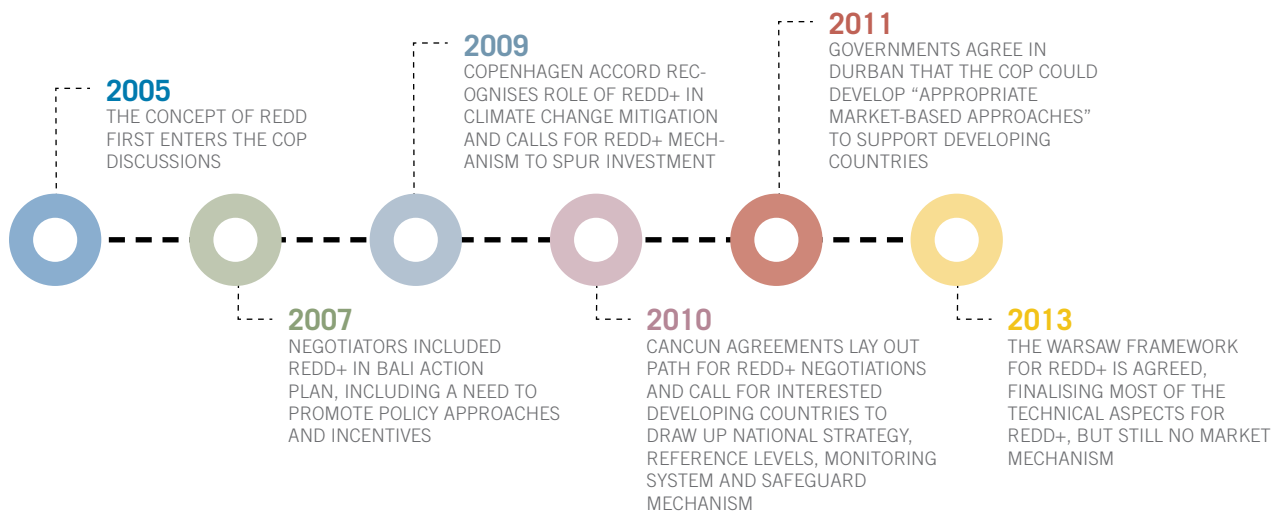
likely to be a higher level political agreement as opposed to a series of detailed COP decisions.

If the COP in Lima does not establish a market-based mechanism for a REDD+ system, it may be several more years before such a system is implemented. This is because the Paris COP will likely be completely focused on reaching consensus on an overarching agreement, leaving insufficient bandwidth to focus on the details of a REDD+ mechanism. This would further delay kick starting essential private sector capital being applied towards tropical forest conservation.

REDD+ PRIVATE FINANCE OPTIONS

The Paris agreement, if reached, is unlikely to emulate the Kyoto Protocol's top-down approach. Instead, it is expected to enshrine a bottom-up approach, whereby countries bring contributions to the table influenced by their national circumstances. To encourage more ambitious contributions from both developed and tropical forest countries alike while maintaining overall cost effectiveness to enable the system to survive politically, flexible options like a REDD+ market-based mechanism are essential.

How such a REDD+ system will operate in a new bottom-up paradigm remains to be determined, and there are a number of questions that need to be answered in the process of creating a REDD+ mechanism. For instance, what will be the UN's role; will it issue REDD+ credits, or merely provide consistent MRV



standards? Will bilateral REDD+ trading outside of the UN mechanism be allowed? If so, how will such credits will be accounted for and reported under the overarching agreement? Will the Green Climate Fund finance REDD+ projects?

From a market design perspective, the optimal outcome is a fungible instrument broadly traded across the largest number of market participants, which leads to greater market efficiencies, scale and price discovery. Having the UNFCCC establish a REDD+ crediting body to administer and issue REDD+ credits under a unified international trading system would be one way to achieve this. The challenge is that such an architecture is unlikely, considering the bottom-up nature of the current negotiations.

Absent such a system, relative fungibility could be achieved through common MRV standards and both an opt-in unified transfer mechanism as well as the ability for bilateral and multilateral alternative programmes to be recognised under such common MRV standards. It gets more challenging where a bilateral alternative approach uses different MRV standards and safeguards, as any instru-

ments created under such programmes would not be deemed fungible. Legitimate questions could be raised as to whether and how such credits should be accounted for as part of a country's "contribution".

Under any REDD+ system, the ability to invest in project-level REDD+ activities will be critical in mobilising private finance for REDD+. Jurisdictional REDD+ frameworks that involve national level accounting but recognise and credit privately-financed projects "nested" within that national programme should be a part of any REDD+ market-based mechanism created.

REDD+ markets need not stand alone but could be coupled with other private finance options. For instance, green bonds could be an important source of finance for REDD+, with proceeds from the bonds used to fund further investments toward reducing certain drivers of deforestation throughout the agricultural supply chain. Once a robust REDD+ credit market exists, additional bonds could be issued with yield based on the value of REDD+ credits. Of course, a strong and durable policy signal will be essential to support any such bond

financing approach to ensure sufficient demand for the REDD+ credits being generated.

Important work remains to be done to put in place the major elements necessary to scale and direct private sector finance towards REDD+. A COP-endorsed and supported REDD+ market mechanism has the potential to funnel much needed private finance. The sooner it happens, the sooner investors will take that leap of faith.

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(1) Forests in a Green Economy. A synthesis. 2011. United Nations Environment Programme. UNON Nairobi. (2) FCCC/CP/2011/9/Add.1.C, para 66. (3) FCCC/CP/2013/10/Add.1



BRIDGING THE REDD+ FINANCE GAP

With significant private investment in REDD+ still some years away, Ruben Lubowski, Alexander Golub, Rowan Parkhouse and Luca Taschini look at how the both the private and public sectors could use options to boost financing for these projects in the near term

Demand from the private sector for emission reduction credits to comply with carbon pollution limits will be key to addressing climate change and realising governments' emissions targets. However, robust private demand – and the corresponding investment – is unlikely to materialise before 2020, depending on the outcome at the climate talks in Paris next year and other climate policy developments at national, regional and international levels.

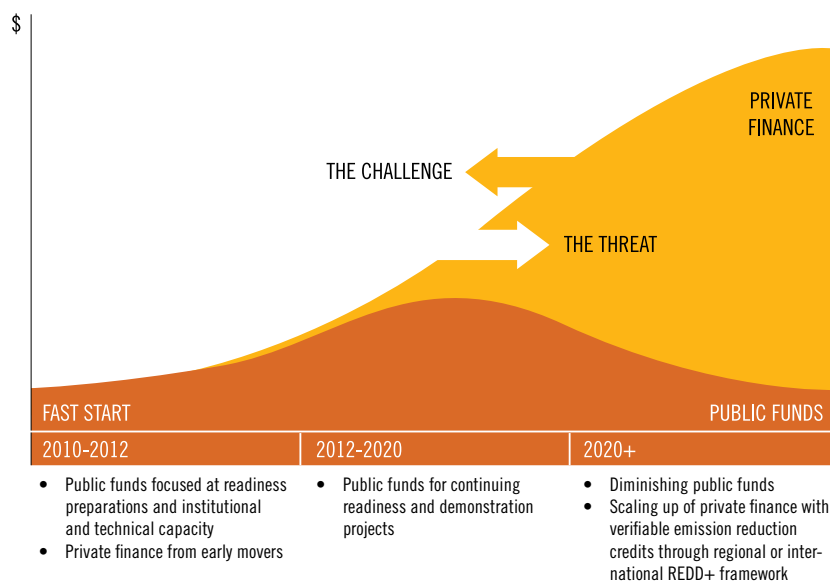
The world cannot afford to wait, literally and figuratively; we need to bridge this financing gap in order to prevent deforestation and achieve other cost-effective emission reductions in the interim, as well as help the market scale up quickly when compliance demand materialises. Using public and philanthropic funds to leverage private finance is one solution.

Reducing emissions from tropical deforestation and forest degradation (REDD+), which account for at least 10% of global emissions, presents an especially important, and time-limited, opportunity. Future carbon prices and potential emissions caps present a risk of greater costs for societies and businesses that do not act now to prepare.

Forest protection offers the opportunity to cost-effectively build a major carbon reserve in the years leading up to national and international climate policies, while also protecting biodiversity, regulating rainfall and providing other critical environmental and social benefits.

THE CURRENT SITUATION

The idea of carbon reductions as a new investable asset class reached a high point a few years ago. But following failures to reach a legally-binding inter-



Source: PwC, 2010

national agreement at Copenhagen and to implement a federal cap-and-trade system in the US, the prospects of imminent large-scale compliance demand faded. This left the voluntary, non-compliance market to pick up the slack – but this demand has been insufficient to cover the initial surge in supply resulting from these early expectations.¹

REDD+ is at a crossroads. Discussions have advanced at the UN negotiations, readiness efforts are progressing with public financing, and bilateral and multilateral government are scaling commitments for “pay-for-performance”, but private capital is largely on the sidelines. The Global Canopy Programme estimates that demand for REDD+ credits could be as little as 3% of the estimated potential supply between 2015 and 2020.²

A PRICE GUARANTEE APPROACH FOR REDD+

Uncertainty over future climate poli-

cy poses risks to companies that may face future compliance requirements. Businesses are also vulnerable to extreme weather and other climate-related impacts. While private buyers are not willing to invest significantly in REDD+, some may be willing to pay modest sums to mitigate the risk of high future climate policy costs.

The challenge is for providers of verified emissions reductions from REDD+ to monetise their valuable climate policy risk-reduction services. One way to do this would be for REDD+ programme and project owners to offer potential buyers a guaranteed price at which they would have the right, but not the obligation, to access a designated pool of emissions reductions up through a certain contract expiration date (eg, until 2025). Companies and private investors would need to make an up-front payment, to secure this price guarantee (or long-dated “call option”).

DEMAND FOR REDD+ CREDITS COULD BE AS LITTLE AS 3% OF THE ESTIMATED POTENTIAL SUPPLY BETWEEN 2015 AND 2020

Locking in this price would help limit future compliance obligations in the event prices were to rise higher. Investors could also gain an asset that could rapidly appreciate with climate policy developments.

For example, a buyer with a long view on the introduction of a REDD+ compliance mechanism could purchase some credits outright for, say, \$5 – but some counterparties may be unwilling to transact a large volume at this price. Alternatively, a buyer could pay \$1 per tonne to temporarily reserve a large pool of emissions reduction credits from forests, along with the right to buy these reductions for a price of, for example, \$15/tonne anytime through 2025. This would contain outlays for buyers while still helping to manage their risks. At the same time, it would provide some finance for sellers, with the possibility of greater future upside.

However, this approach may not be sufficient to drive large-scale REDD+ implementation. A complementary solution would be for the public and perhaps philanthropic sectors to provide a guaranteed minimum price at which tropical jurisdictions and other developers would have the right, but not the obligation, to sell reductions from REDD+ by a certain contract expiration date, similar to a put option. The minimum price guarantee could help developers secure debt financing through bank loans or through the issuance of jurisdictional REDD+ bonds.

This minimum price guarantee would transfer the risk that demand does not sufficiently materialise by the expiration date onto those, in principle, most able to influence the development of a compliance market: governments. This signals to the market that the governments willing to provide this flexible commitment support REDD+, building greater credibility for the instrument.

These guarantees could be granted for free or could be auctioned to the highest bidder. Pizer (2011) lays out the multiple merits of this approach with auctions.³ Auctioning would generate additional finance as well as ensure the public price guarantees are targeted to the most cost-effective providers of emissions reductions. Such an approach is being tested via the World Bank's new Pilot Auction Facility for Methane and Climate Change Mitigation, and could be expanded to help support REDD+.

A public fund could guarantee a tropical jurisdiction the right, but not the obligation, to sell an emission reduction from avoided deforestation at, for example \$5/tonne CO₂ at the same time that a private buyer paid \$1 for the right to buy these reductions at \$15 apiece any time until 2025. This would provide the REDD+ jurisdiction \$1 up front and a guaranteed price of \$5, plus possible upside to \$15 if the private buyers exercise their purchase rights. It would also limit the private buyers' future compliance cost in the event that the price rises above \$15.

The combination of minimum price guarantee contracts, provided by governments, with maximum price guarantees, offered by REDD+ jurisdictions and purchased by private investors, can provide sufficient financing to protect forests in the near term while providing a cost-effective way for companies to manage future climate policy risks. The proposed approach can bring forward the deployment of private capital with limited up-front public finance. In fact, if the price rises above the minimum price guarantee, then no public funds would need to be disbursed.

This public-private approach could be scalable to reduce hundreds of millions or billions of tonnes of forest emissions over the coming decade. It can also facilitate the development of a well-functioning compliance market by ensuring that low-cost reductions are available to entities that will need them. The approach should complement, rather than substitute, the use of public finance to directly pay for performance in reducing emissions from deforestation and forest degradation.

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Luca Taschini is a Research Fellow at the Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science.

(1) Conservation International (CI). 2013. REDD+ Market: Sending out an SOS. Arlington, VA. (2) Global Canopy Programme (GCP), IPAM, FFI, & FI, U. 2014. Stimulating Interim Demand for REDD + Emission Reductions: The Need for a Strategic Intervention from 2015 to 2020. Global Canopy Programme, Oxford, UK; the Amazon Environmental Research Institute, Brasilia, Brazil; Fauna and Flora International, Cambridge, UK; and UNEP Finance Initiative, Geneva, Switzerland. (3) Pizer, William A. 2011. Seeding the Market: Auctioned Put Options for Certified Emissions Reductions. Policy Brief NI-PB-11-06. Duke University, Nicholas Institute for Environmental Policy Solutions. Durham, NC.



MONETISING CO-BENEFITS

Efforts are underway to quantify the value of additional benefits brought about by carbon offset projects. Will this be the door opener to broader participation in climate mitigation actions, ask Sophy Greenhalgh and Yiannis Kountouris

Over the past few years, governments are increasingly more engaged in utilising the voluntary offset market as an effective climate mitigation mechanism. There is evidence of governments around the world taking action to support voluntary offsetting (some 22 – and counting – governments are now establishing programmes to support voluntary carbon markets), yet challenges remain in broadening business engagement and mainstreaming carbon offsetting in to business-as-usual practices.

ICROA identified that one of the barriers to a broader uptake of offsetting was a lack of research and independent evidence on benefits the voluntary market delivers beyond emissions mitigation. Businesses voluntarily purchasing and retiring offsets as part of their carbon management programmes are often unaware of the full benefits of their investments, both to their own business operations and also to the local areas where the projects are developed. Indeed, reference to evidence of the benefits and impacts of the market are increasingly being demanded from business, government and broader stakeholders.

Educating businesses on climate change and the carbon market as well as promoting integrated carbon management programmes have resulted in many successes, but the golden ticket for “the business case” for voluntarily offsetting emissions has remained elusive.

Seizing the opportunity to attract further interest in the market by bridging this gap is increasingly important. With this in mind, in 2013 ICROA and Imperial

College London University set about to research the socio-economic impacts of the voluntary carbon market and gather evidence on the value and impacts of carbon offsetting beyond emissions reductions.

HOW THE STUDY WAS CONDUCTED

The study took a two-pronged approach. First, we collected data on the co-benefits of 59 offset projects, looking at employment creation, sourcing of local material and services, household savings, infrastructure development and ecosystem benefits. The study also identified and quantified other significant benefits delivered, such as air and water quality improvement, public health benefits and technology transfer, but could not monetise them in the scope of this study – this could be an area for future analysis.

To elicit information directly from project developers, who have more knowledge of project characteristics compared to what is usually disclosed in project documents, we developed a survey. The survey design was informed by a comprehensive academic literature review, internationally recognised sustainability standards, and industry experts through extensive consultation with 13 organisations.

A pre-test was carried out in the first week of December 2013 to identify shortcomings, which were addressed in the final version of the survey. Data collection took place between December 2013 and February 2014. Where quantitative data was available, we attempted to quantify the monetary value of the co-benefits using market and non-mar-

ket valuation techniques. The monetary values estimated for the co-benefits were then aggregated across the portfolio and normalised by the (annual or total) tCO₂ reduced to arrive at the co-benefit value per tCO₂.

The second part examined the preferences for voluntary carbon offsetting for 72 of the largest companies participating in the market, to elicit information on tangible business benefits that had come about by implementing an offset programme. The approach enabled us to estimate their willingness to pay for additional social and environmental benefits.

THE RESULTS

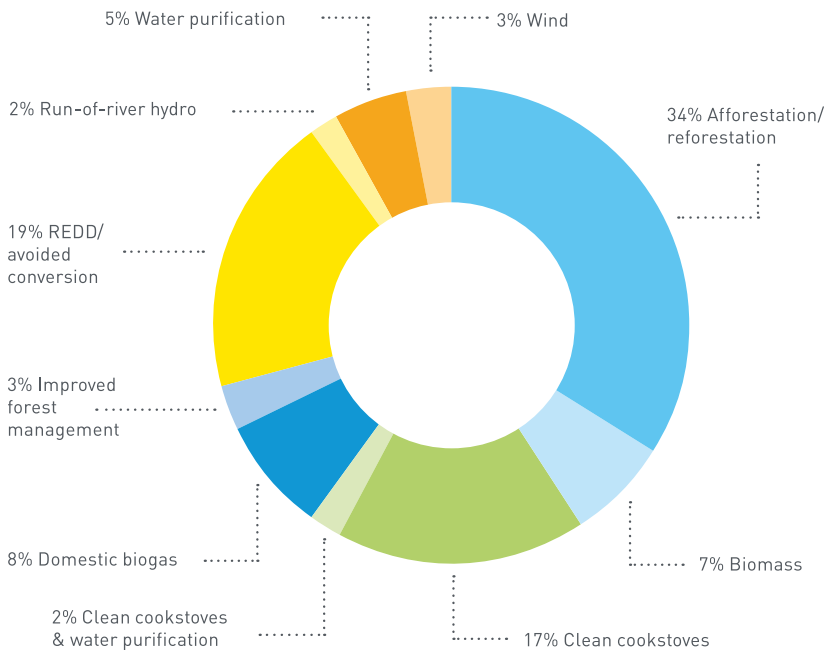
VALUE OF CO-BENEFITS:

The results of the first survey suggest that voluntary carbon projects deliver tangible benefits to local societies. The monetised value of co-benefits appears to be higher than the price paid for the emissions reduction, demonstrating the real value of the investment through carbon finance to certain offset projects.

In particular, from the sample of 59 carbon offset projects from around the world, we found that the projects:

- reduced 836 million tCO₂ of emissions in total;
- delivered an additional \$16 billion in environmental benefits;
- yielded \$2.8 billion* of household savings; and,
- brought \$110.4 million* to local economies during the development stages, and a further \$78.7 million* per year of operation, through local employment and sourcing of local services and material.

FIGURE 1. Projects sampled, by type.



Our figures have all been calculated conservatively using the data collected from respondents.

In total, for this sample of projects, this translates to \$664 of extra impact per tonne of carbon reduced.

It should be noted that a contribution of \$603 per tonne is through environmental conservation. However, this valuation has been reached using TEEB estimates. Monetisation of this type ignores the complexity of the relationship between the environment and the economy. As a result, the magnitude of the estimate should be considered with caution. Nevertheless, values are significantly higher and benefits significantly greater than what is typically communicated.

In the future, we plan perform the analysis at the case study level. This will give us the ability to study in greater detail and accuracy the value of co-benefits.

A report recently released by The Gold Standard Foundation against its own project portfolio sees similar figures. Economists captured and monetised the environmental and socio-economic net benefits of 109 Gold Standard wind, cookstove, water filter, biodigester and

afforestation/reforestation projects, finding that they deliver additional outcomes beyond carbon worth billions of dollars. These include improved human health, the 'services' of natural ecosystems, like water purification, improvements to livelihoods and the food and economic security of communities, regions or countries.

BUSINESS BENEFITS:

From a survey of 72 companies that voluntarily offset their emissions, the study found that 67% do so because of reported tangible measured benefits to their reputation/brand image; 48% because of positive employee engagement; 47% for enhanced and positive market differentiation 37% as part of their philanthropic activities; 15% for efficiency savings; and 4% were integrating programmes to support sustainable supply chain management. In addition, we found that market participants are willing to pay significant amounts for offsets that offer co-benefits.

However, the research also found that businesses weren't reporting all benefits simply as they weren't applying internal

metrics to measure those programmes. Quantification of business benefits from voluntary offsetting remains in the early stages, but there may be an opportunity for further evidencing of benefits over time.

FURTHER STUDY NEEDED

This research is innovative and we hope in time to widen our samples and expand and refine methodologies to give a more in-depth picture of the market.

We believe this information is of value, both to businesses that are voluntarily investing funds into projects, to arm them with knowledge about the impact of their investment, and to governments and others looking for a very effective channel to meet numerous sustainable development objectives whilst achieving additional emissions reductions beyond any regulatory targets.

We hope that this research draws some greater interest from a variety of businesses and governments that may not be aware of the value that a voluntary offset programme can bring.

In time, by going down this line of enquiry and getting more businesses to measure their internal impacts and benefits of offset programmes, we hope to encourage broader business and government action through voluntary offsetting.

Sophy Greenhalgh is the programme manager for ICROA, a global non-profit housed within IETA. Its members provide carbon reduction and offset services across the world to thousands of organisations, including household brands and multinationals supporting the reduction of global emissions towards the goal of avoiding dangerous climate change impacts.

Yiannis Kountouris is an environmental economist at Imperial College London University in the Centre for Environmental Policy. The Centre produces internationally recognised research and teaching that addresses key environmental and global policy challenges through the interdisciplinary study of science, technology and innovation.

* The valuation methods used are simplified to provide high level, indicative values of the co-benefits per tCO2 generated from the sample portfolio.



MARKETS MATTER

TECHNOLOGY



TECHNOLOGY NEEDS IN A 2°C WORLD

Dave Sawyer looks at the technological pathway ahead if global warming is to be capped at 2°C – with a focus on Canada

In the lead up to the Paris negotiations, there is much conjecture about the emission reductions countries can deliver post 2020. Separate from this, but clearly aligned, is a need for insight on how to slow global greenhouse gas (GHG) emissions to a level consistent with a 2°C world. The Deep Decarbonisation Pathways Project (DDPP) process, led by the Sustainable Development Solutions Network, asked researchers from 15 countries – including the US, China, India, Australia and Canada – to explore what a pathway to 2°C by 2050 for their country would look like, in terms of emissions.

To deliver the Canada chapter, researchers from Carbon Management Canada and Navis Research conducted economy-wide energy and emission modelling to envision a scenario consistent with a 2°C emission pathway where GHG emissions per capita are 1.67 tonnes CO₂e in 2050, the DDPP global target for all countries. For Canada, the DDPP sce-

nario requires reductions from a business as usual forecast of 790 million t in 2050 to under 80 million t.

Clearly, the scale of this reduction requires a level of technological deployment that is truly transformative. To model this, we developed a technical potential scenario that deployed best in class technologies in all energy supplying and demanding sectors in the 2050 forecast, setting aside issues of political and economic feasibility.

Technologies modelled across all end-uses in the economy include a mix that are commercial now and some that are in the early stages of development, such as carbon capture and storage (CCS), cellulosic ethanol and biodiesel. The resulting DDPP scenario is most definitely illustrative, identifying key technology levers, decision points, uncertainties and challenges associated with achieving deep GHG reductions in Canada.

The deep decarbonisation pathway re-

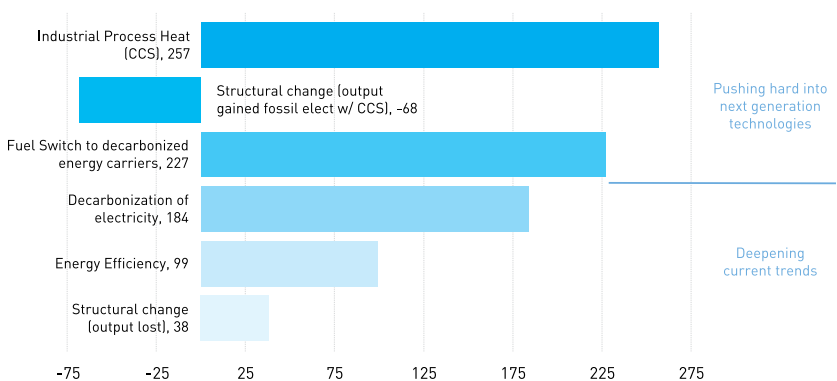
veals two views on technology deployment that lead to some interesting policy implications: a deepening trends pathway and a next generation technologies pathway (see Figure 1).

The deepening technology trends pathway builds on current technologies and policy trajectories. Standing out are energy efficiency trends in both vehicles and buildings. In Canada, building codes and vehicle efficiency regulations are continually ratcheting down, with current trajectories showing significant decarbonisation in the sectors in the baseline forecast. Contributing to this downward trend are global technological spillovers, as other countries also tighten standards and codes, sending signals that innovation pays, increasing energy performance and lowering technology costs in time. Deepening this trend is central to delivering on deep decarbonisation.

A second deepening technology trends pathway is decarbonised electricity. All jurisdictions in Canada currently have regulations and incentive programmes that are decarbonising electricity generation. Doubling down on this trend is a major pathway opportunity for Canada and the rest of the world, with widespread deployment of renewable technologies in the 2°C scenario.

But deepening current technology trends is not enough to align with the 2°C pathway. Instead, there is a need to push hard into next generation technologies in primarily three areas.

FIGURE 1. Deep decarbonisation pathway for Canada (Mt change by 2050)



The first is fuel switching to decarbonised energy carriers. This is particularly important in transportation, where energy efficiency measures only deliver so much and a move away from fossil based liquid fuels is needed. To achieve the 2°C pathway in our scenario, optimistic assumptions about the availability of next generation biofuels was a necessity, moving away from agricultural-based feedstocks and into cellulosic ethanol for example. The scale of this transformation in the 2°C scenario is akin to transforming Canada's pulp and paper sector into a woody biomass refining sector.

The next pathway is decarbonised electrification. In our scenario, renewable technologies can only go so far, necessitating the deployment of advanced forms of CCS. Expanded fossil electrification with some form of significant GHG controls is an important pathway.

The third component of any next generation decarbonisation pathway is controlling GHG emissions from industrial process heat and power, especially in Canada's oil and gas sector. In the deep decarbonisation pathway, virtually all industrial emissions in Canada need some form of CCS or another transformative technology to be widely deployed.

There are clearly inherent risks in this technology pathway. The first is the heavy reliance on next generation biofuels and CCS, which combined deliver more than half of all reductions in this scenario. However, technical feasibility is a significant question for both. While first generation biofuels have been commercialised, second generation and more advanced pathways to generate biofuels still face numerous technological hurdles to be able to scale up

commercially. As for CCS, all components of capture and geological injection and monitoring technologies are well deployed in the oil and gas industry – however, integrating CO₂ capture with numerous types of industrial emissions and power plant emissions has not been deployed widely. Furthermore, geological capacity is very specific to location and must be assessed carefully both for its capacity as well as integrity and safety.

Further compounding the risks are weak global and domestic policy signals to innovate. This combination indicates that a significant technology gap will likely remain for some time to come.

The technology narrative about deepening current trends and next generation technology gaps reveals four policy lessons that are of interest to policy-makers.

First, deep decarbonisation requires an increased level of global technology spillover and domestic innovation to drive down costs and increase feasibility. This is particularly the case for liquid fuels, industrial process heat, and fossil-based electricity, three important decarbonisation pathways.

Second, global demand for Canadian petroleum products and natural gas in a decarbonised world is a significant uncertainty. The challenge for oil production in a decarbonised world is not whether or not there is room for unconventional or conventional oil, but rather which oil can compete with significant GHG controls in place?

Third, access to low cost, globally sourced GHG reductions will be needed to backstop technology gaps and misaligned mitigation costs across

countries. This observation is resilient across any decarbonisation pathway for Canada, where industrial process heat requires high cost technologies, and in many cases technologies still classified as demonstration. As a result, Canada will need to look globally to smooth mitigation costs, and backstop gaps.

Finally, the DDPP initiative reveals the significant global opportunity that is emerging for low-carbon technologies. In looking at country after country assessments on deep decarbonisation opportunities within the DDPP, it is clear that the global demand for primary and precious metals, biomass derived fuels, efficient vehicles and a host of other technologies will be significant. Countries that both improve their carbon competitiveness and develop innovative low-carbon technology will be poised to excel in increasingly carbon constrained markets.

It is worth remembering that this work provides just one pathway to deep decarbonisation. There are clearly multiple pathways that will be influenced by politics, economics, and national circumstance. The ongoing work of the DDPP provides a touchstone for global thinking, delivering insight on how deep decarbonisation can work.

Dave Sawyer is a leading advisor in the economics of climate policy and clean energy futures. He has held positions with Environment Canada, Canada's Commissioner of Environment and Sustainable Development, and leading Canadian consultancies. Most recently, he was the International Institute for Sustainable Development's vice-president for climate, energy and partnerships, leading a team of specialists working on low-carbon, climate resilient development globally. Dave is now working with Carbon Management Canada to develop Canadian low-carbon pathways in a global context.



SIMPLIFYING EPA'S CLEAN POWER PLAN

Proposed regulations to curb power plant emissions in the US could see states using market mechanisms to comply – and transform the country's electricity sector. Scott Weaver, Peter Belmonte, Tree Raine and Sandra Seastream explain how this would work

In June, the US Environmental Protection Agency (EPA) issued the Clean Power Plan proposal for the regulation of greenhouse gases (GHG) from power generators, under Section 111(d) of the Clean Air Act (CAA). The proposal, which was negotiated as part of a legal settlement with 11 states and several environmental organisations, was also a key component in President Barack Obama's 2013 Climate Action Plan and is expected to reduce GHG emissions 30% from 2005 levels by 2030.

The EPA has already proposed GHG emission regulations for new power plants under CAA Section 111(b), in September 2013 (after a 2012 proposal was rescinded), using a traditional unit-level performance standard. The 111(d) proposal for existing plants would instead set state-level standards where each state would establish its own plan for reducing electricity carbon intensity through some combination of more efficient generation, use of lower carbon fuels and increased use of renewable technologies and demand side energy efficiency. This beyond-the-fence regulation is a novel approach, and it has already generated significant controversy.

Millions of comments will be filed during the public comment period, and lawsuits will be filed to test the legal foundation of the EPA's rules. The courts will eventually need to determine whether the CAA provides the EPA sufficient authority for this type of grid-based rule, and reconcile the interaction of that authority with federal and state ener-

gy regulators. However, the fact is that most states have already begun implementing the types of policies promoted in the EPA proposal, and the US power market is undergoing a generational transformation.

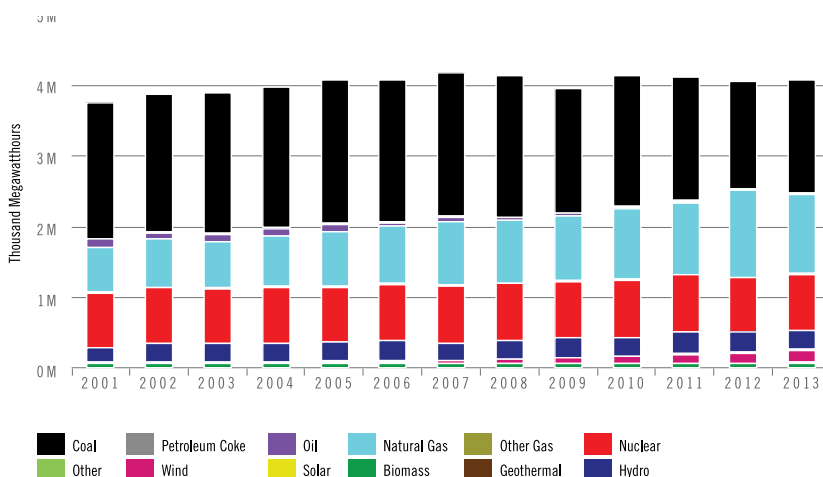
REGARDLESS OF STRUCTURE, ELEMENTS SHOULD BE SIMILAR

The EPA's four-block emission reduction options (improve power plant efficiency, coal-to-gas fuel switching, increased renewables and increased demand-side efficiency) do not obligate states to attempt to produce efficiencies to match each block. Rather, the bottom line of the rule is that each state is given an efficiency standard and can devise its own plan to meet the proposed limits. Hypothetically, a state might do that entirely through expanding its renewable energy capacity or by building additional natural gas-fired plants to replace coal units.

In reality, however, it is difficult to see how states will satisfy the standards without relying on more than one block. This is especially true of states starting from low carbon-intensity baselines which are nevertheless asked to achieve significant improvements, sometimes by completely phasing-out their coal generation, in the case of Washington State. For some states, the savings the EPA assumed for certain blocks may turn out to be unachievable, especially renewables growth, but it remains to be seen whether and how the agency would adjust its expectations of a state if it made a persuasive showing of impossibility (or prohibitive cost) for one of the blocks.

Some say that the EPA is looking to re-engineer each state's utility fleet. The EPA claims that states have flexibility – but the reality of mandated state budgets strictly limits options. A majority of the rule's reductions will come "outside the fence", by assuming fuel-switching

US FUEL MIX 2001-2013.



Source: EIA, year 2013 data

and increased renewables and efficiency. If states rely on renewables to make up the generation capacity, no doubt the addition of gas-fired generation will need to be co-located in order to supplement the renewable sources.

WHAT DOES THIS MEAN FOR THE AMERICAN ECONOMY?

Simply due to the nature of power generation, potential economic benefits and impacts are far reaching. Effects will likely be felt by power generators (cost of technology implementation, compliance/regulatory costs, opportunities for alternative fuel installations), consumers (increased electricity bills, benefits of energy efficiency implementations), and fuel markets (costs for purchasing and delivering traditional fuels).

As one would expect, the proposed measures implemented will likely have both positive and negative effects on consumers and the economy, largely dependent on the current ability of each state to implement various technologies and strategies. States with access to a wide range of power generation or with a larger number of newer power generators (which are typically more efficient units) within their portfolio will likely have fewer overall economic impacts.

In locations where there are power generation companies and a variety of power generation facilities (ranging both in fuels and age of facilities), there will be more opportunities to phase in the measures and “spread the costs” of implementation. In locations where a single power company owns a majority of the power generation facilities, compliance costs will likely be much higher. In this case, costs could also be passed onto consumers, resulting in higher localised rates.

A MARKET DRIVEN APPROACH COULD HELP BALANCE IMPACTS ACROSS MULTIPLE ASPECTS OF THE POWER GENERATION SECTOR

States that are a member of a power market (eg, ISO New England, California ISO, Southwest Power Pool, etc) could benefit from more weighting of their plans towards a market-based approach, making use of the mechanisms already in place for these markets. This could be a cap-and-trade programme, such as those already implemented through California’s AB32 legislation or the Regional Greenhouse Gas Initiative (RGGI) in the north-east, or a direct carbon tax such as those being considered in some northern states.

In these cases, a market-driven approach could help balance impacts across multiple aspects of the power generation sector by setting the cost of natural gas generation near compliance costs, providing a windfall for many renewable/alternative energy sources, and further increasing costs of coal-fired units. While several states discuss the possibility of expanding existing programmes or joining a neighbouring region’s programme, in any case where a market-based programme expands to meet the needs of the standards, great consideration will need to be made towards unit pricing and possible allocations in order to balance excessive costs (under allocation) with programme effectiveness (over allocation).

To minimise costs, states will have to consider what economic incentives will be provided, and how these will be funded. These benefits could balance out costs to both power generators and ultimately electricity consumers, minimising the overall economic impacts of the rule. Many of these incentives will likely

go directly to consumers to implement energy efficiency measures to counter rising costs of electricity associated with power generation compliance.

It is probable that several states will create or join an emissions trading programme. Currently independent system operators and regional transmission organisations efficiently manage approximately 75% of national demand, and could potentially be leveraged to manage regional carbon pricing. A carbon price-based regional approach could help balance the cost of compliance and provide a mechanism for states to collaborate. California and the RGGI states are already operating cap-and-trade programmes, and are a potential model for new programmes.

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CASE STUDY: ENERGY EFFICIENCY IN CHINA

China is turning to markets to improve its energy intensity. Karl Upston-Hooper and Emilie Yliheljo explain how it works

Energy is not only a scarce resource limiting growth in China, but also an increasing source of social friction; as a result, energy efficiency has climbed high on the Chinese political agenda. China is the world's largest electricity producer, with 4490 TWh of power produced in 2011. Consumption has grown 9.6% annually over the last decade, leading to a doubling of Chinese generation capacity in the last seven years. The primary energy source is coal and, accordingly, China is now the world's largest emitter of greenhouse gases. The country's potential for energy efficiency is vast, with an energy intensity per unit of GDP 4.32 times that of the EU.

A key policy response to the energy challenge faced by Chinese industry has been the adoption of the energy service company (ESCO) model, whereby an ESCO undertakes energy performance contracting (EPC) with energy users. The ESCO finances the energy efficiency investment in return for an agreed share of the value of energy savings for a set period, after which ownership of the asset is transferred to the energy user.

In China, the industrial sector is the predominant consumer of energy efficiency services and, unlike Europe and the US, public sector entities have yet to embrace the EPC model. In the Government's 11th Five Year Plan, spanning 2006-10, EPCs were prioritised. Investments increased during this period from approximately \$200 million to \$4.3 billion – at an average of 120% per year. This growth has been strongly supported by the IFC's China Utility-Based Energy Efficiency Finance programme

(and earlier capacity building by other international financial institutions).

Over 2300 ESCO companies have been registered in China, although the majority consist of "one project companies" while the largest ESCOs are subsidiaries of energy utilities, energy-intensive industrial companies or technology companies offering their own solutions. Between 2011 and 2015, China aims to grow its EPC market by 30% annually.

Underpinning this growth is the fundamental mechanism of price discovery provided by the nascent market in energy efficiency services. This monetisation of energy efficiency also enables participation (and leveraging) by domestic financial institutions in the goals of the 12th Five Year Plan.

GreenStream is one of the few technology-independent providers of energy efficiency services in China. By combining its Beijing-based project origination team with its longstanding relationship with Nordic technology partners, GreenStream is able to offer turnkey solutions to Chinese industrial entities, with the realised energy savings shared for a period of years before the entire benefit is passed to the project owner.

In addition to traditional project risks, the ESCO model does pose a risk of ex-post payment default. This risk can be mitigated through due diligence, relationship based contracting and partnering with local financial institutions. GreenStream has based its ESCO business in China on cooperation with large, often publicly-listed or state-owned compa-

nies in the key sectors of energy utilities, pulp and paper, steel and chemical industries.

GreenStream's first ESCO project was agreed in May 2013 with Henglian Shandong Guanghua Paper Group, a subsidiary of Shandong Henglian Group, one of China's top 30 pulp and paper companies. The project improves energy efficiency in the drying process of the paper mill by installing an energy efficient turbo blower, provided by Finland's Runtech Systems, in the vacuum system. The project became operational in December 2013. On an annual basis, the new equipment will save 2549 MWh of electricity, 688.800 m3 of water, 1503 t of steam and reduce emissions from by paper machine by 2670 tCO2e. GreenStream's second project at the Hongta Zhuhai paper mill involves the installation of four turbo blowers, expanding the scale of the savings.

The project also has potential to generate domestic Chinese CERs, offsets for use with the seven pilot emissions trading systems, and will be eligible for significant subsidies from both regional and national regulators. With other signed projects and a significant pipeline, GreenStream is committed to using the ESCO model to provide energy efficiency services and technology transfer to Chinese firms.

Karl Upston-Hooper is the the General Counsel of GreenStream Network plc, a role he has held since August 2006.

Emilie Yliheljo joined GreenStream Network plc as Legal Counsel in October 2013.



CASE STUDY: THE JOINT CREDITING MECHANISM

Takashi Hongo outlines how the Japanese government is using market forces to get low-carbon technology into developing countries - while preparing to meet its own domestic emissions reduction goal

The Joint Crediting Mechanism (JCM) was proposed by the Japanese government to support emissions reduction projects supplemental to the Clean Development Mechanism (CDM), in pursuit of technology-driven emissions reductions. The JCM is intended to accelerate the diffusion of advanced technologies.

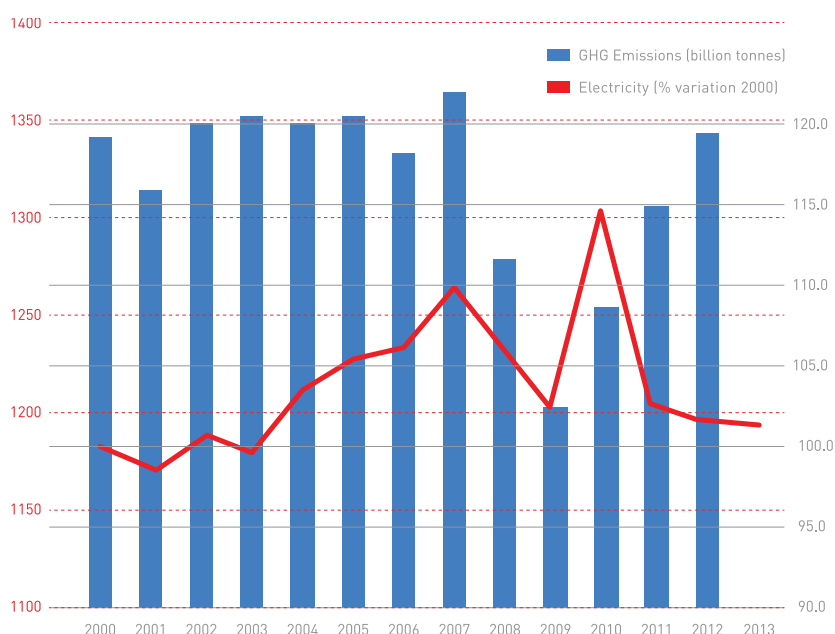
The Japanese government started informal discussions in 2010 with some countries and announced the JCM as a formal measure in 2011 as part of its "Vision and Actions toward Low Carbon Growth and Climate Resilient World". By the end of July 2014, Japan had finalised framework agreements with 12 countries: Mongolia, Bangladesh, Ethiopia, Kenya, the Maldives, Vietnam, Laos, Indonesia, Costa Rica, Palau, Cambodia and Mexico. Discussions are ongoing with several more countries.

STRUCTURE AND GOVERNANCE

The JCM is a bilateral scheme and everything, in principle, should thus be determined bilaterally. This is a big difference from the CDM's centralised system. A Joint Committee (JC), comprised of up to 10 representatives of each country, plays a central role in implementation and is expected to determine the necessary actions in a timely manner.

The JC also oversees emissions monitoring, reporting and verification guidance, accreditation of third party entities (TPEs) for validation and verification, and approval of projects and credit issuance.

JAPAN'S GHG EMISSIONS VS ELECTRICITY CONSUMPTION



Source: Ministry of Environment, The Federation of Electric Power Companies of Japan

Issued credits are held in a registry which is administrated by both countries. TPEs are required to be either ISO14065 certified or accredited for the CDM. In Indonesia, one of the most advanced partnerships, seven international entities are accredited.

METHODOLOGY AND PROJECTS

Reductions are, in principle, calculated and determined project-by-project, as the gap between Reference Emissions and Project Emissions. Both figures are calculated conservatively. For example, Reference Emissions shall be lower than business-as-usual emissions.

Two methodologies, for the installation of low-loss electricity transmission lines (Mongolia) and waste heat recovery (Indonesia), were approved as of the end of August 2014. The Japanese government is providing financial support for feasibility studies for and more than 100 projects – including energy efficiency, renewables, waste-to-energy, carbon capture and storage (CCS) and reducing emissions from deforestation and degradation.

LINKAGE WITH OTHER MARKETS

In July 2014, Mexico agreed to participate in the JCM. This could connect

decentralised carbon markets: Mexico introduced a carbon tax in 2013, which can also be met with certified emission reduction (CER) credits. Currently, only CERs from projects in Mexico are eligible, but if JCM credits are accepted, the carbon pricing and offset mechanisms of Mexico and Japan will be connected. When you consider that California's cap-and-trade programme plans to import credits from Mexico, an indirect link to markets in California and its linked partner Quebec could be in place.

NATIONAL REDUCTION POLICY AND DEMAND FOR CREDITS

The biggest challenge remaining for the JCM is demand for credits.

At the UN climate talks in 2009, then-Prime Minister Hatoyama committed to a 25% emissions cut by 2020, from 1990 levels. However, following the Fukushima nuclear power accident in 2011, all nuclear plants were shut down; previously, nuclear power accounted for more than 30% of Japan's power supply. Consequently, emissions rose by 6.3% in 2012, measured against 1990 levels, although electricity sales were down 6% from 2010 due to energy saving efforts.

Nuclear power heavily influences Japan's climate change policy and this is why, at the Warsaw talks in November 2013, Japan withdrew the 25% reduction target and replaced it with 3.8%. However, this will be revised when the national energy plan, including the future of nuclear power, is determined – the timing for which is uncertain at the time of writing.

It's worth noting one significant change with the lowered target: JCM credits can be used for compliance (although the government did not specify an amount). This is a departure from the Liberal Democrat Party's earlier policy that the reduction target should be achievable without international offset credits. (Before the Fukushima incident, the party had proposed a 15% reduction from 2005 levels without offsets.)

A 2030 target is needed for the UN negotiations by March 2015. This is a tough decision for Japan: nuclear power is a politically very sensitive issue and it needs further national debate. Key to connecting energy and climate policy is the JCM.

Another potential source of demand could be the Keidanren, a Japanese industry association. In July 2014, it announced it is considering sector-based voluntary reduction plan. In general, the Keidanren supports the JCM as it is an incentive for the diffusion of advanced technology. However, many of its members oppose emissions trading. Industry, with some exemptions, and the power sector are now subject to a carbon tax. Combining the carbon tax with an offset system could be a practical option: the carbon tax (¥289/tonne, or \$2.78) is more expensive than CERs (around €1, or \$1.30).

More demand could come from new coal power plants: the Ministry of Environment and Ministry of Economic, Trade and Industry agreed to restrict emissions from new coal power plants to the level of gas-fired plants and encourage the use of CCS and offsets. By

2020, 1600MW of coal power plants will be started and they are likely to purchase JCM credits.

NEXT STEPS

The JCM is progressing but is still in the development phase. Further improvement is needed, particularly on the methodologies and the future beyond 2020.

The JCM had two advantages against CDM: quick decision-making due to its decentralised governance and practical and investor-friendly methodologies. The CDM is improving though, and the JCM needs to be differentiated. One option is the adoption of sectoral benchmarking, for example energy efficiency standards. This could improve transparency and predictability of reduction, and would help scale up investments.

Uncertain demand and supply after 2020 is a big barrier. Projects' lifetimes are longer and the equipment will continue to be used after 2020, and investors expect to see reduction benefits after 2020. The Framework for Various Approaches under discussion could make a difference to the value of the JCM. It is important to accumulate outcomes, to prove its effectiveness, and team up with other decentralised mechanisms to increase acceptance and uptake.

Takashi Hongo is a Senior Fellow at the Mitsui Global Strategic Studies Institute. Before joining Mitsui in 2011, he worked for the Japan Bank for International Cooperation as Special Advisor to Governor. He participates in ICAO Global Market-Based Mechanism Task Force, Innovation LAB for Climate Finance and the Global Green Growth Institute. He is a member of several government committees, locally and nationally.

MGSSI

TECHNOLOGY, FINANCE AND MARKETS: MAKING THE LINKS

Will scaling up low-carbon technology deployment through the private sector be business-as-usual or are we entering a new era, ask Edwin Aalders and Matthew Jones

The role of low-carbon technologies and their effective transfer has been a central theme in the climate change fight ever since the earliest discussions were initiated. Many fundamental questions stubbornly persist, however, such as how to ensure that new technologies are transferred effectively and efficiently and how to make sure that their deployment is being actively engaged with.

The Clean Development Mechanism (CDM) has shown that, with the right incentives and market conditions, both money and new technologies are able to be deployed. It has also demonstrated a clear need to set up a mechanism that can effectively and efficiently scale up technology transfer to a level that can make a global impact and drive the transition towards a low carbon economy. At the same time, the experience of the Adaptation Fund has shown that the wrong incentives and objectives may lead to a lack of ambition and subsequent funding.

In recognition of the pressing need to rapidly scale up technology transfer and make available the funds necessary to support the deployment of new technologies, both the Climate Technology Centre & Network (CTCN) and the Green Climate Fund (GCF) have been set up by governments as part of a wider network of tools (Figure 1).

Both governments and the private sector have realised that traditional technology development and deployment will not be sufficient to remain within a 2°C increase in global temperatures and, as

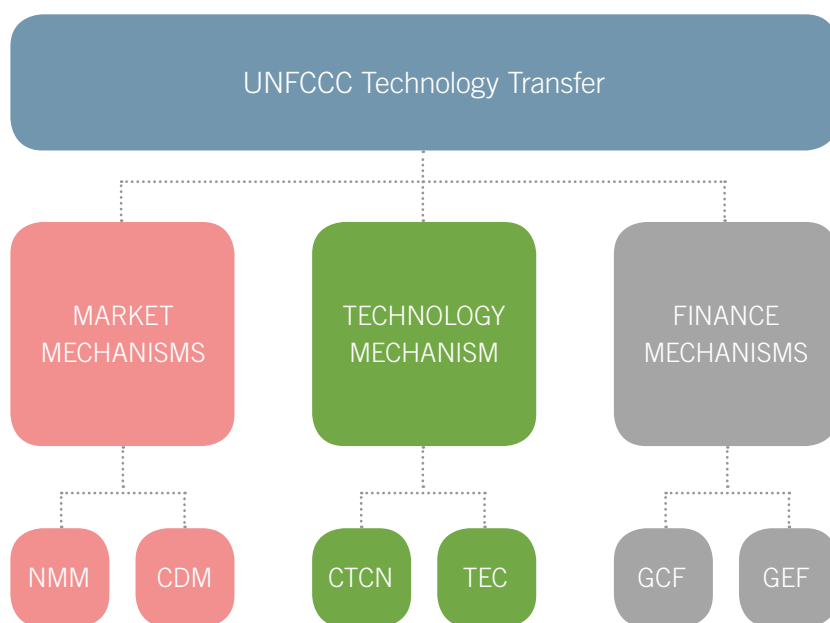


Figure 1. The UNFCCC Technology Transfer space.

such, current practices urgently need to be more effectively scaled up on all fronts. The active participation of the private sector will be a key component in this – as will the CTCN and GCF.

HOW WILL THE CTCN AND THE GCF MAKE A DIFFERENCE?

The CTCN is an enabling mechanism set up to facilitate an ‘infrastructure’ to foster investment and innovation. The GCF on the other hand will be directly involved in the financing of technology programmes and, as such, will be part of the selection of ‘winners’ and ‘losers’.

However, both of these programmes appear to have a focus predominantly on the needs and demands formulated

by the host countries. This is understandable and will potentially provide the host countries with the tools to shift their economies towards low carbon pathways whilst maintaining economic growth. Such an approach will not necessarily utilise the strengths of the private sector and its ability to identify cost efficiencies. In order to make a real difference, both the CTCN and the GCF will have to not only identify the needs of the host countries, but equally pay close attention to the private sector ways of operating and risk management. In both cases, the CTCN and the GCF still have a long way to go. A higher level of direct involvement of the private sector, as well as the provision of clear incentives to the private sector, is needed.

IMPACT OF GOVERNMENTAL SUBSIDIES

Recent subsidies in Germany for renewable technologies in its domestic market have led to a dramatic increase of solar panel manufacturing, both within and outside of Germany (eg, China). This has resulted in a significant reduction in the cost price per unit as well as an increase in technical performance, which in turn has led to an increase in the level of deployment within developing countries. Although in general this is seen as a positive example of technology transfer, the actual subsidies within Germany have led to an energy price distortion due to improved technology developments during the subsidies' lifetime.

Under the right circumstances, both the CTCN and the GCF will be able to provide new incentives to the private sector and engage them in technology transfer and its deployment. However, this is not an automatic given. This is not only a challenge for the CTCN and GCF, but also for the private sector itself.

WHAT SHOULD THE PRIVATE SECTOR DO TO MAKE THE CTCN AND GCF A SUCCESS?

Transfer of technology in itself is not new, and a significant amount of experience has been acquired by both governments and the private sector in recent years. This has generally been through mechanisms such as the CDM and TT:Clear. History has demonstrated that a number of basic processes have to be fulfilled in order to stimulate such technology transfer to take place (political stability, long term incentives, price on carbon, etc.) Strong domestic regulation to send long term price signals has been shown to provide a development platform for technology development; principally driven by the private sector.

BOTH THE CTCN AND THE GCF WILL BE ABLE TO PROVIDE NEW INCENTIVES TO THE PRIVATE SECTOR

It is notable that government supported pilot programmes or technology subsidies are able to play a significant role in the initial development and testing of technologies (see Box). Both in their own way will take away the risks associated with the development of new technologies which is crucial in any private sector risk and return decision making.

Developing countries often argue that the private sector is hindering the deployment of new technologies because it holds on to expensive intellectual property rights (IPR) licenses. However, the private sector is able to overcome IPR issues through the establishment of commercial contracts and/or provisions within the country to reduce the level of risk for the technology developer. Nonetheless, while we should consider that this will not be one of the key areas of attention for the CTCN, the private sector through its CTCN Network membership could provide valuable experience.

At the same time, it is interesting to consider that the nature and use of IPR is beginning to change within the private

sector; for example, the automotive company Tesla Motors has recently announced that it will make its research and IP available to all of its competitors. Tesla has argued that it has done this with a view to the long term interests of the company, whereby the development of the marketplace would not be able to reach to its full potential without the full participation of all of the research and development expertise from the automotive industry and beyond (one example would be battery lifetime extension). Such approaches by industry will also allow governments and organisations like the GCF to take a more proactive role in financing technology research, where in the past this would have been seen under the banner of competitive distortion subsidies.

There is still a long way to go and the broad topic of more effectively and efficiently implementing technology transfer will be with us for quite a while yet. The arrival of new mechanisms, such as the CTCN and the GCF, means more tools are available to both the governments and the private sector to enhance their intersecting interests on technology development and economic growth. Watch this space!

Edwin Aalders is a strategic advisor to the CTCN on private sector engagement and monitoring and evaluation. He has over 20 years of experience as an assessor in environmental auditing, policy and management, particularly in relation to forestry and climate change. Aalders has extensive experience with developing climate change strategies and in international climate change negotiations.

Matthew Jones is a strategic advisor to the CTCN on monitoring and evaluation and private sector engagement. He is a Chartered Physicist with 10 years of experience in the energy, environment and climate change sector in Europe, Russia, Central Asia, Caucasus and Sub-Saharan Africa. Prior to joining DNV GL, he worked for the consultancy AEA Technology and as an independent consultant to the European Commission.





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OVERLAPPING LOW-CARBON POLICIES: MIND THE GAP

Having endured two oversupplied compliance phases, many have questioned whether the EU ETS is able to encourage CO₂ abatement. Is a carbon price alone the correct measure to send a long-term investment signal, or does the EU ETS need to be complemented by other policies, ask Benoît Leguet and Emilie Alberola

The EU Emission Trading System (ETS) has two jobs: drive CO₂ abatement in both the short and long terms. According to its directive, the EU ETS is the central pillar of European climate policy and its objective is to promote emissions reductions in a cost-effective and economically efficient manner. In this framework, the implicit ambition of the carbon price-signal is to drive emissions abatements from short to long term, thus reflecting implied greenhouse gas (GHG) abatement costs. However, this centrepiece of EU climate policy is currently under scrutiny, as carbon prices have been too low to incentivise both short-term abatement measures (eg, coal to gas fuel-switching) and longer-term abatement options (eg, investment in the deployment of low-carbon technologies) that are required to follow the European Commission's 2050 low-carbon Roadmap.

In a few years, the EU ETS has moved from centre stage to the backseat of

THE EU ETS HAS TWO JOBS: DRIVE CO₂ ABATEMENT IN BOTH THE SHORT AND LONG TERMS

the EU's decarbonisation policy. When the 2020 Climate and Energy package was drawn up in 2008, the European Commission's impact assessment forecast that EU ETS sectors would emit 2.4 billion tCO₂ in 2020 if no policy was introduced. As such, the cumulated emission reductions required from the ETS sectors was established at 5.0 billion tCO₂ between 2008 and 2020.

Based on the same scope and period, the previous estimates had put emission reductions resulting solely from the development of renewable energies at 2.0 billion tCO₂. The addition of the new energy efficiency directive would further reduce the reductions required to around 2.5 billion tCO₂, (ie, to only 50% of the effort required.) By adding offset import limits allowed in the EU ETS, the residual need for domestic emission reduction was estimated at 0.9 billion tCO₂, or only 18% of the total effort. The subsequent severe economic downturn resulted in much lower emissions than expected, eliminating the need for a net emission reduction in the EU ETS in only four years.

As the allowance supply is fixed, the resulting shrinkage in demand has led to a sharp fall in the carbon price, which triggered a political debate on a possible intervention by the Commission, aimed

at "recalibrating" the EU ETS to enable the carbon price to support long-term low-carbon investments.

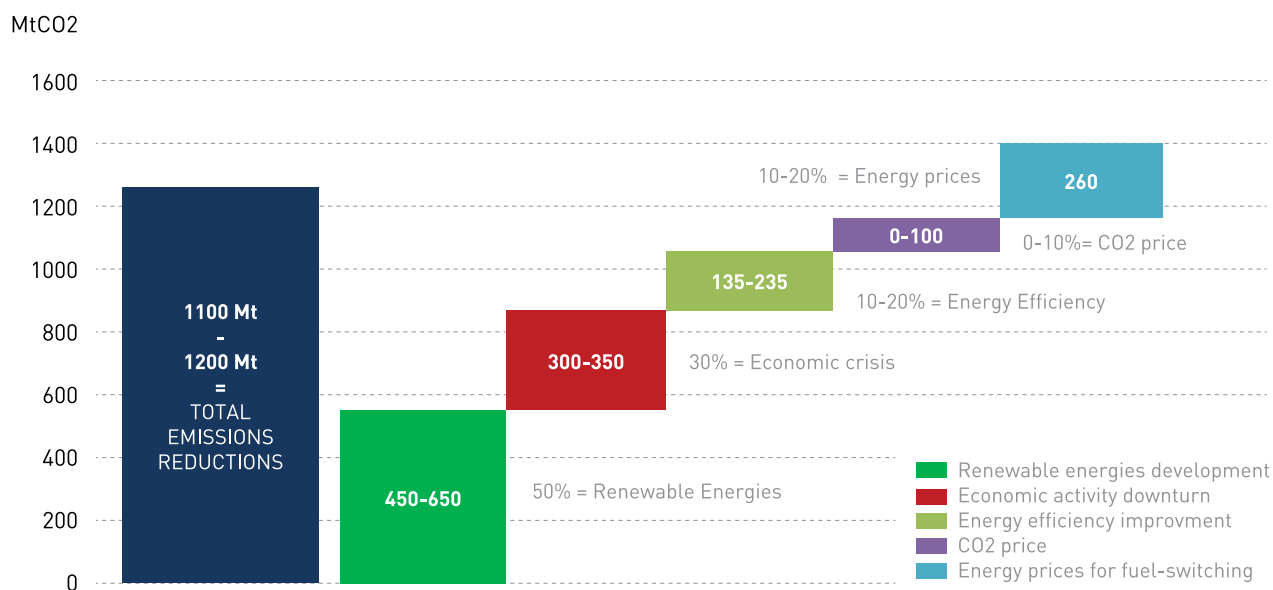
ASSESSING THE IMPACT OF THE CO₂ PRICE ON INVESTMENTS

According to the EU ETS Directive, the carbon price can stimulate investments in low-carbon technologies in Europe through three mechanisms.

First, it is expected that the carbon price has a direct impact on corporate investments of EU ETS companies. To date, this impact has been difficult to assess. Based on our analysis, we estimate that, between 2005 and 2011, the carbon price played a marginal role in terms of explaining changes in EU ETS CO₂ emissions.

Instead, EU energy targets for renewable energies and energy efficiency, supported mainly by national policies, had stimulated between 50-60% of emission reductions in the EU ETS, and the economic downturn explains around 30% of reductions. Furthermore, in a context of economic uncertainties, companies underline also that there are too many uncertainties on what the post 2020 ETS policy will look like to encourage further investment in new technology.

DRIVERS OF CO2 EMISSIONS REDUCTIONS IN THE EU ETS (2005-11)



Source: Gloaguen and Alberola, CDC Climat Research, 2013.

The second EU ETS-based mechanism which encourages the deployment of innovative low-carbon technologies is the dedicated New Entrants Reserve 300 (NER300) programme, under which some EU ETS allowances are auctioned to fund technology development. While the programme provides a dedicated revenue stream, which was supposed to be less vulnerable to the reduced availability of public funds after the economic crisis, the low allowance price means that there is far less funding available than was originally anticipated for technology development. The first stage of the NER300 sales generated €1.6 billion (\$2 billion), of which €1.2 billion was awarded to renewable energy projects. However, innovative, breakthrough technologies, including carbon capture and storage (CCS), failed to attract much financing through the mechanism.

The third mechanism is the use of carbon revenues from auctions by member states. Starting from 2013, 7 billion EUAs will be auctioned, and one of the

options to use (part of) these revenues is to invest them in policy programmes to stimulate investments and, hence, to reach the EU 2020 targets.

Here, again, the low price of allowances in the EU ETS means that there has been far less funding available than was originally anticipated. The use of these revenues by governments towards the support of low-carbon technologies is again difficult to assess without robust reporting coordinated by the Commission. The use of these auction revenues is left almost entirely to the discretion of member states. The EU ETS directive mentions that 50% of this income shall be dedicated to climate policies – but this provision is not legally binding.

A ROBUST CARBON PRICE IN A COORDINATED POLICY-MIX

With emissions reductions as the primary goal and primary outcome, in theory, carbon pricing is the solution to least-cost CO2 emissions reductions.

But a robust carbon price signal reflecting long-term abatement costs cannot emerge unless policy-makers credibly commit to a long-term emissions cap in the ETS. The formal adoption of a legally binding GHG target by 2030, in line with the 2050 Roadmap for a low-carbon economy, would help to build this much-needed political credibility.

In this context, given that EU objectives go beyond short-term emissions reductions, it appears questionable whether a carbon price alone is the right measure to achieve the EU's objectives. Therefore, if they address different policy objectives, overlapping policies could be justified. Indeed, beyond the climate motivation, a great variety of objectives, including improving energy security, reducing dependence on energy-exporting countries, employment and strengthening the competitiveness, can motivate a complementary policy support.

Coordinating the various climate and energy policies hence appears increas-

ingly necessary. Interactions between policies can render a number of them redundant, and thus cancel a portion of the expected mitigation benefits at the lowest cost.

In the case of the EU ETS, a first step would be to require impact assessments of policies addressing CO₂ emission reductions that overlap in the industry and energy sectors. These assessments could subsequently provide a basis to evaluate the need to adjust the EU ETS accordingly, in light of other climate and energy policies.

IF THEY ADDRESS DIFFERENT POLICY OBJECTIVES, OVERLAPPING POLICIES COULD BE JUSTIFIED

A second step would involve ensuring a better assessment process for the economic maturity of low-carbon technologies. It could, for example, seem helpful to establish or to provide indications regarding a timetable or the conditions

required for gradually abandoning policies to support renewable energy, in order to limit their costs and to enable competition between decarbonisation technologies. For instance, the roll-out of new low-carbon technologies like CCS requires economic and political support in order to help their development during the decade between 2020 and 2030, which is a key condition of the 2050 Roadmap.

Nevertheless, the policies' interactions should not be seen as a problem if the policy objective is to meet a short-term target at least cost. However, if the carbon price is also expected to send a signal for long-term investors, the carbon price could turn out to be insufficient in itself and need to be complemented by other policies in a policy mix to support the deployment of low-carbon technologies and address other market failures such as within the electricity market.

If overlaps between policies result in high cost long-term GHG reductions, the gap to the least-cost low-carbon pathway should be quantified and justified. If its sole justification is the urgency to accelerate the decarbonisation of the EU's economy, a more cost-efficient way to deal with this urgency would possibly

be either to raise the EU's GHG targets' ambition or to expand the time horizon of such ambition, such as by formally adopting the 2050 Roadmap.

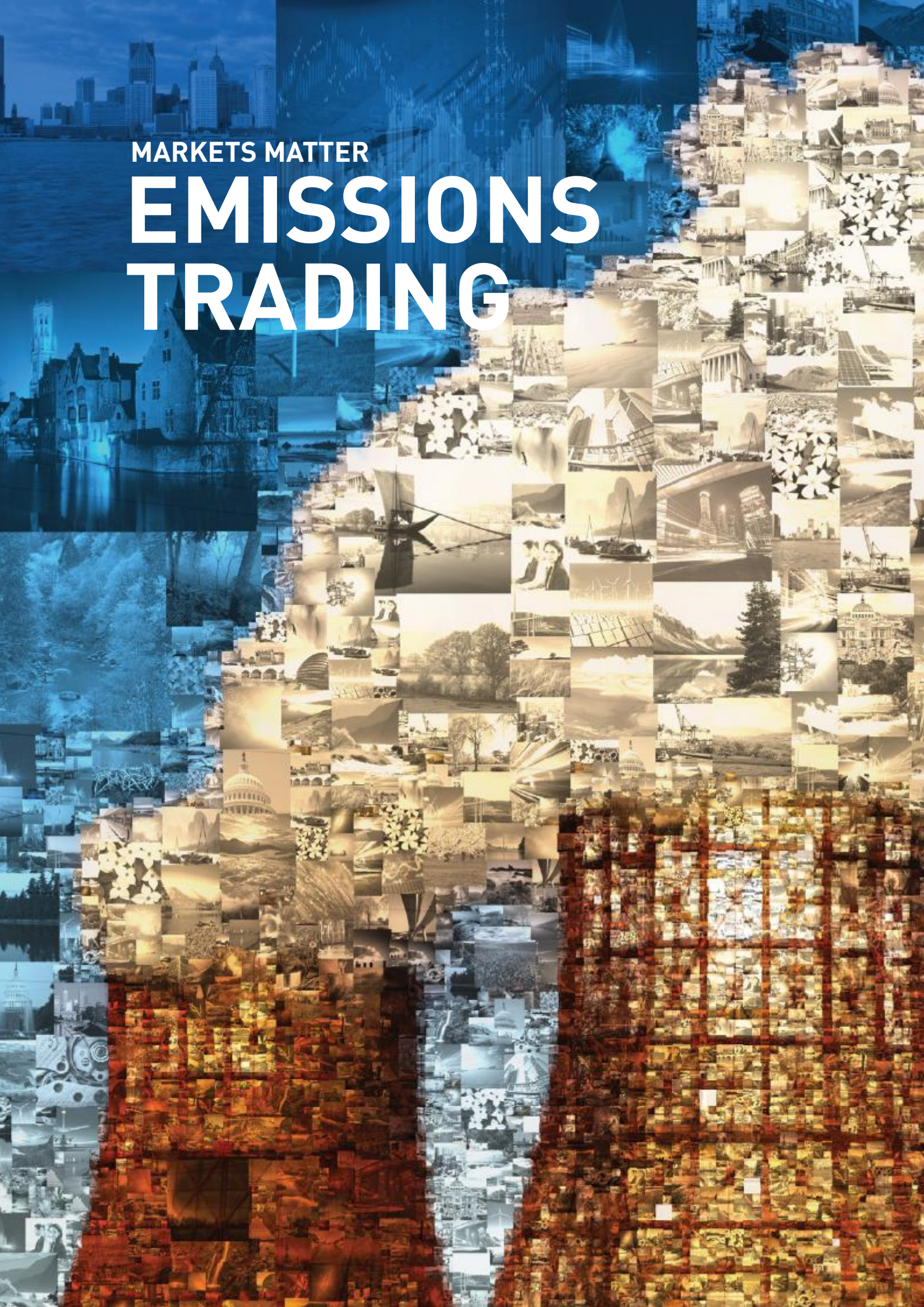
Benoît Leguet is the Managing Director, Head of Research of CDC Climat. He has been advising public and private decision-makers since 2002 on issues related to the transition to a low-carbon economy, including policies and economic tools. He has been a member of the Kyoto Protocol's Article 6 Supervisory Committee since 2008, and chaired the Committee in 2010. Benoît is an engineering graduate of the Ecole Polytechnique and the ENSTA Paris Tech, and holds a Master's degree in Environmental Economics from Paris-X University.

Emilie Alberola is an economist in charge of the research unit on carbon and energy markets of CDC Climat, including research programmes to support public and private economic decision-makers. Her research focuses mainly on the analysis of the development of carbon pricing in the world and the implementation of energy and climate policy in Europe towards the 2050 goals. She holds a PhD in economics from Paris School of Economics and graduated with a Master in Sustainable Development Management from HEC Paris. As Associate Professor at HEC Paris, she lectures climate change economics at HEC Paris and at Paris Dauphine University.



MARKETS MATTER

EMISSIONS TRADING



SETTING THE SCENE: EMISSIONS TRADING ON THE RISE

Jeff Swartz looks at the latest developments in emissions trading around the world

As it always seems in recent memory for carbon and climate change professionals, taking stock of the last 12 months reveals an extensive list of regulatory changes and policy announcements from governments and inter-governmental organisations around the world.

The past two years seem to me to be years of ‘precedents’. We now have non-Chinese companies trading in the Shenzhen carbon market, California has confirmed it is moving ahead with including transportation in its carbon markets and, unfortunately, we have Australia repealing its carbon price – setting a shameful precedent for other countries to hopefully never consider. Here is a brief wrap of events – most of which are elaborated on in this report.

THE EU EMISSIONS TRADING SYSTEM (ETS)

This year began with a huge bang, when the European Commission put forward its recommendations for the 2030 Energy and Climate Framework. Calling for a 40% binding reduction target in greenhouse gas (GHG) emissions by 2030, the target was agreed by heads of state at the political level with a pending decision by the European Council in late October.

Also on the table is the creation of a Market Stability Reserve which, if enacted, would delay the auctioning of allowances and hold them in a reserve in times of a surplus of allowances or remove them from the reserve in times of insufficient allowances in circulation.

THE UNITED STATES

The US Environmental Protection Agency (EPA) announced emissions regulations for the power sector on 1 June. Commonly referred to as 111(d) – after the clause in the US Clean Air Act that provides the EPA with the regulatory powers to address GHG emissions from existing power plants – it is an important milestone for the US, and puts US states in the driver’s seat to lower the country’s overall emissions for the years to come.

CALIFORNIA

The state of California kicked off its first year of compliance since formally linking its carbon market with Québec on 1 January 2014. A joint auction is expected to take place in November.

The Governor of California, Jerry Brown, has also been busy engaging other countries in support of their carbon pricing policies, including an agreement with the Mexican government to help reduce GHG emissions and combat climate change. At the centre of the agreement is the alignment of GHG reduction programmes and strategies between the two regions. This follows a similar agreement the governor has signed with the National Development and Reform Commission (NDRC) in China.

CHINA

Considering that the NDRC only announced the creation of seven ETS pilots in November 2011, the speed of development and implementation of an experimental carbon market has been outstanding. All seven pilots are now

operational, covering 27% of the country’s GDP (based on 2010 relative GDP levels), and non-Chinese companies are now eligible to trade in Shenzhen’s ETS. Additional cities and regions – notably the cities of Hangzhou and Qingdao, and Jiangsu province – are also working towards establishing an ETS.

Recent announcements on the possibility of a national ETS in China still look optimistic, with some officials saying China may have a national carbon market as early as 2016. One possible scenario is a second ‘phase’ of ETS pilots in 2016, as the original seven begin to link with each other, or absorb neighbouring regions where industrial output is larger. This ‘second phase’ of emissions trading in China would help scale-up activity ahead of a national ETS towards the latter end of the decade.

AUSTRALIA

Prime Minister Tony Abbott’s campaign ‘blood oath’ to repeal Australia’s Carbon Pricing Mechanism (CPM) came to reality in mid-July when the Australian Senate voted to repeal the CPM. This came despite industry proposals to speed up the introduction of market-based pricing, which would have brought lower costs to business, increased flexibility and aligned Australia’s climate policy closer to that of the EU, China, the US and its other trading partners.

Uncertainty surrounds the government’s proposed Direct Action Plan. It is intended to start from July 2015; however, it is lacking in political support, with Labor,

the Greens and the Palmer United Party – whose three senators hold the balance of power – favouring an ETS, albeit on different terms.

NO CORNER OF THE GLOBE HAS BEEN LEFT UNCOVERED BY THE RISE OF EMISSIONS TRADING

SOUTH KOREA

The South Korean ETS is set to go live on 1 January 2015, and is expected to become the world's second-largest carbon market, in terms of coverage, capturing around 813 million tCO₂e. With the Green Climate Fund now headquartered and operational in Songdo, South Korea is set to play an important leading role in Asia on carbon pricing and climate finance.

MEXICO

With its General Climate Change Law well into implementation phase, the Mexican government began implementing a multipronged effort to reform its energy industry – including a carbon tax, with offsets, for Mexican electricity producers and oil refiners to pay, which officially came into force on 1 January 2014.

National reporting of emissions in Mexico started in 2014 for direct and indirect emissions as a precursor for the government to explore the feasibility of implementing an ETS after 2015.

SOUTH AFRICA

In February, the South African National Treasury announced that it would delay introducing its carbon tax until 1 January 2016. The proposed tax will consider carbon offsets from projects under the CDM, Gold Standard, Verified Carbon Standard and Climate, Community and Biodiversity Alliance standards, and allow offsets to be used for 5-10% of a covered entity's liability.

BRAZIL

In May, the Brazilian government released regulations to help spur tradable forest credits as part of Brazil's Forest Code. Purchases of forest credits will be conducted by landowners and farmers when they clear forests in excess of what they are allowed to do under the Code. Credits will be generated when landowners exceed reforestation efforts than they need to be law.

KAZAKHSTAN

Reporting of emissions in Kazakhstan has now passed the one-year mark, and the first trades of allowances under the Kazakhstan ETS occurred in April. While the ETS officially commenced in 2013 as a 'pilot year', it still needs essential elements for it to be robust in the long-term. These include imposing penalties on non-compliance, offset protocols and best practices in benchmarking for allowances.

Moving forward, these countries – and several others that are considering using markets to cut emissions – will be looking for a way for their actions to count in the international deal due to be reached under the UNFCCC in Paris

in late 2015. Sadly, the Warsaw climate negotiations last year delayed decisions for a framework for various approaches (FVA) to tie these all together, and a new market mechanism (NMM).

Since Warsaw, a list of draft elements for the 2015 agreement has appeared. Included in this list are provisions that ask countries to state which mitigation policies they will utilise in their intended nationally determined contributions, and specifically if those policies will be carbon markets or another form of a carbon pricing policy. At the UN negotiations in June, negotiators were able to develop a 'straw dog' for the FVA and NMM, and the hopes are now that the negotiations in Lima will result in a decision.

The New York UN Climate Summit was a good 'kickstart' for the road to Paris, and one major highlight was the Carbon Pricing Statement signed by 74 governments and more than 1000 companies.

No corner of the globe has been left uncovered by the rise of emissions trading, and more policies are on the way. The Paris agreement needs to ensure these efforts are counted, so that more will flourish.

Jeff Swartz is director of international policy at IETA, based in Brussels. A fluent Mandarin speaker, Swartz coordinates IETA's China, emerging markets and international policy working groups as well as the Business Partnership for Market Readiness initiative. Prior to joining IETA in 2011, he held roles at NEFCO, Evolution Markets and the Association of Monterey Bay Area Governments. He has an MA in International Environmental Policy from the Middlebury-Monterey Institute.



REFLECTIONS ON MRV IN AN ERA OF CLIMATE POLICY SLUGGISHNESS

Through a couple decades of trial and error, we have come to appreciate and even brand the technical foundation of climate policy implementation — measurement, reporting, and verification (MRV) — which is a small achievement itself. Now that the carbon geeks have gained some recognition, they can educate the carbon market community with a more sophisticated understanding of MRV, writes Michael Gillenwater

In the global carbon community, reasons to lose optimism and reflect on lost potential are easy to find. The vision of a global market of linked cap-and-trade systems across developed countries, combined with a profusion of developing country offset projects, seems a distant dream. Rather than mourn a missed opportunity, let us step back and look at the big picture on one substantive aspect of carbon market infrastructure where permanent progress has been made: MRV.

CELEBRATE THE BRAND!

It was not long ago that what we now refer to as MRV had no commonly used nomenclature.¹ The topic was rarely central to discussions on climate change policy. There were 'greenhouse gas (GHG) inventories' in the world of national emissions reports under the UNFCCC, which were developed around a small and isolated community of IPCC scientists and engineers. We had 'carbon footprints', which hoped corporations might do what politicians would not. We had the somewhat rapid and chaotic emergence of methodology pioneers within offset programmes. For the most part, the work of these technical groups progressed in the shadows of climate policy – until a couple major events pulled MRV into the spotlight.

The first event was the oversupply in Phase I of the EU Emissions Trading

System (2005-07), due to insufficient care and attention to data quality in setting emissions baselines. Those preaching the importance of MRV and data quality had a manmade disaster to make their point.

The second event occurred over a number of years within the Clean Development Mechanism (CDM) market. A long running debate emerged surrounding the credibility of the CDM's offset credits, focused on the methodological aspects of reviewing, approving and calculating credits earned. Policy-makers were now not the only ones dragged into the technical weeds, but investors and the financial community were also forced to pay heed to another growing risk exposure.

Geopolitically, things were shifting as well, with developing countries being asked to do more in exchange for further development assistance. This shift gained momentum after the Copenhagen negotiations in 2009, and it became apparent that developing countries would have to more thoroughly, frequently and transparently measure and report their GHG emissions and submit that data to international review.

In the confluence of these events and trends, "MRV" was adopted as the catchall for the metrics and assurance processes covering the full range of emerging climate change initiatives.

WORDS DO MATTER

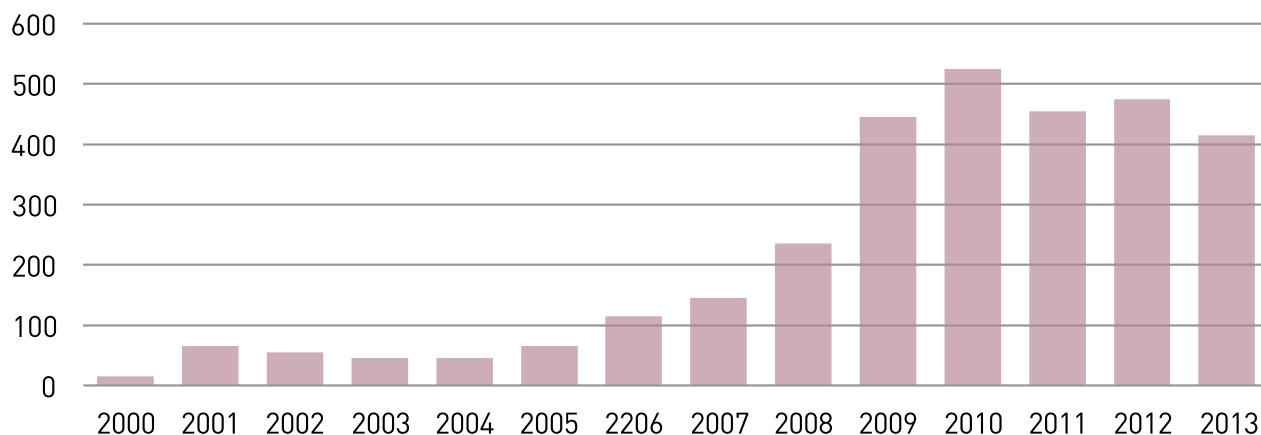
We can see the adoption MRV as a term of art over time in the frequency of web pages and documents using the term in

ISN'T MRV JUST A BUNCH OF DATA THAT AN AUDITOR REVIEWS?

There are a number of important dimensions to MRV that require serious thought, including the social and technical infrastructure necessary for an MRV system, which can be conceptualised as having the following components:

1. Scientific knowledge and technologies
2. Technical and management standards (rules, codes)
3. Legal and regulatory systems
4. Information management and decision support systems
5. Human resources and training systems

Google search frequency (Pages)



Note: Frequency of web pages by created year containing either the term “monitoring reporting and verification (MRV)” or “measurement reporting and verification (MRV)”.

a climate change context. It is easy to disregard the emergence of a new policy work term as unimportant. But words do matter. And the successful branding of MRV as a commonly used term with generally understood meaning across the climate change community is a significant achievement.

WHAT IS MRV?

MRV, in the context of climate change, is a scientifically guided engineering estimation exercise that has similarities to financial accounting and project monitoring and evaluation. Fundamentally, it is about developing performance metrics, collecting the data necessary to quantify those metrics, transparently documenting and communicating those metrics and applying quality assurance procedures in an arena containing actors with misaligned incentives.

MRV HAS BECOME A CORE PART OF THE CLIMATE CHANGE AGENDA

MRV is now accepted as being core to a wide range of climate change activities. The focus continues to be on mitigation, but it is increasingly spoken of in the

context of adaptation and other performance-based environmental markets.

When we talk about MRV, what we actually care about is data quality – this means describing the characteristics we desire our metrics to have, because only then can we properly design and select MRV infrastructure and systems which support carbon markets and other policies. The key point in thinking about MRV is that we are not looking for perfect numbers, and we do not necessarily need the number with the lowest possible absolute uncertainty. Data quality has more dimensions than is communicated by a simple statistical confidence interval.

Further, the intended application of the data outputs from MRV processes need to guide choices that affect data quality. Are we using data for scientific inquiry, corporate marketing and public relations, consumer information, voluntary programme tracking, regulatory compliance, or environmental markets? As we move along this list, our expectations for data quality, and the characteristics that define it, necessarily change.

Another aspect of MRV is the actors involved in the process of quality assurance, typically presumed to involve three parties: the data supplier (eg,

project developers); the data user (eg, management, investor, government, etc); and, the independent (“third-party”) auditor.² In reality, quality assurance systems need to address concerns and processes from a wider range of stakeholders, including:

- Climate programmes that may develop standards and/or provide recognition;
- An accrediting body that audits the auditors;
- Professional community institutions that provide further quality assurance over the personnel engaged in MRV work; and
- Public (watchdog) groups concerned with the intended and unintended effects of the data suppliers’ actions and overall policy or programme.

Lastly, any accounting exercise requires a clear definition of boundaries. There are a number of generic boundary distinctions or frameworks that are relied upon for just about any policy or programme: geographic, sector, product, entity, facility and project, to name a few.

FUTURE OF MRV ACCOUNTING FRAMEWORKS

MRV accounting frameworks still have a significant amount of maturing ahead of them, especially if we want to use them to support regulatory or carbon market tools to mitigate GHG emissions.

NATIONAL

What is the future of national GHG emission inventories in a world without a global treaty framework? Developing countries are beginning to prepare and submit emissions data biennially through the UNFCCC, which is a huge step forward. However, the current national reporting review process is not currently scalable. Even if a global treaty is reached, we do not have the infrastructure developed to verify it. The technical elements of the Kyoto Protocol compliance review system have been under enormous strain simply to process the few developed countries sticking to their binding commitments. A lesson that rarely seems to be learned is that MRV “on the cheap” will be regretted later.

ENTITY (CORPORATE OR ORGANISATIONAL)

Really, what is the purpose and role of corporate carbon footprinting? The honest answer is that it is unlikely that corporate accounting of GHG emissions can satisfy the data quality characteristics necessary for compliance applications. As such, it seems impractical that corporate-scale GHG data can be credibly integrated with financial statements.

VALUE CHAIN / PRODUCT

To date, the experiments with labelling products with carbon footprints have not been overly successful. Do we expect most products to have a GHG label on them in the future? Do we think that these metrics will be of sufficient quality for consumers to base decisions on them and for businesses to willingly participate because they recognise the system is fair?

A LESSON THAT RARELY SEEMS TO BE LEARNED IS THAT MRV “ON THE CHEAP” WILL BE REGRETTED LATER

PROJECT

There is reason to celebrate the enormous progress and proof of concept that MRV at the project level for carbon offset crediting programmes has achieved. A wealth of infrastructure has been developed and is being built upon by the voluntary offset market, including the push for more sophisticated and evidence-based methodological standardisation and a less intellectually sloppy understanding of additionality.³

FACILITY/INSTALLATION

The bedrock of MRV for both regulatory compliance and environmental markets is the installation, or point source of emissions. A lengthy history of environmental law is built around the selection of a smokestack as a unit point of regulation. After much experimentation, the future of climate change policy and carbon markets is likely to remain tied to this simple and legally well-established framework.

VERIFICATION

Much could be said about the challenges and lessons learned with GHG auditing. Clearly, the CDM demonstrated that the third-party auditor model, lifted from the financial world, was not a “plug and play” solution to quality assurance in carbon markets. Issues of competency and principal-agent problems, not to mention ambiguity in review criteria, plagued the CDM market from the beginning.

One fundamental question related to these challenges is the relationship between actors: do we have the relationships between third party verifiers, accreditation bodies and GHG programme administrators/regulators correct? Who should be working for or with whom? The current model has seen verifiers hired and paid for by data suppliers (eg, project developers). But, as we learned with the CDM, regulators and GHG programmes cannot blindly outsource data quality assurance. Part of addressing problems with data quality assurance may be to realign these relationships by having verifiers work for regulators and GHG programme administrators. Further, regulatory or programme staff should be integrated into the substantive work of auditing.

It is useful to stay abreast of how well individual trees are growing and which ones seem to have some disease or appear to be dying. But, as every good forester knows, it's imperative to reflect on the ecosystem overall. MRV has become a core part of the climate change agenda, which will hopefully mean that the future policies and programmes will avoid some of the technical mistakes and sloppiness of the past. With excellent MRV systems in place, a policy can still either succeed or fail miserably. Yet, the best policy, if it does not do MRV well, will at best have little beneficial impact, if not become a total disaster.

Michael Gillenwater, Executive Director and Dean, Greenhouse Gas Management Institute

(1) Although there is still the annoying lack of consensus with the “M”: is it monitoring or measurement? We consider monitoring a subset of the broader term measurement, and therefore use the latter. (2) In some situations, as with involving a regulatory agency, a single party may represent and serve as both the data user, on behalf of the public, and the independent auditor. This situation reduces the number of actors to two parties. (3) A sloppiness that entails a failure to rigorously think about interventions and causal inference. See three part series on the topic of additionality at: <http://ghginstitute.org/how-do-you-explain-additionality/>

LINKAGE CASE STUDY: CALIFORNIA AND QUÉBEC

California and Québec formally linked their cap-and-trade markets at the start of 2014, after years of planning. Jean-Yves Benoit and Claude Côté look at the challenges the two systems had to overcome and the prospects for further market linkages in the future

The Western Climate Initiative (WCI) regional carbon market finally became a reality this year when Québec and California officially linked their cap-and-trade systems. This market is now the largest in North America and the only one in the world to have been designed to be run by subnational governments from two different countries. The linking means that allowances from both systems are fully fungible and exchangeable, and that an emitter covered by either one can use them interchangeably to comply with its regulatory obligations.

The Québec and California governments have been very proactive in the fight against climate change and have made their market systems the centrepiece of their respective plans to mitigate greenhouse gas (GHG) emissions. They are the first in the world to have overcome the technical and legal barriers to linking two existing systems.

In 2012, each amended its cap-and-trade regulations to allow the linking of their system with the other. Less than a year later, the Québec and California governments concluded a linking agreement. This agreement was not only mandatory under Québec law; it also

THE WCI MODEL IS FLEXIBLE TO THE POINT OF ALLOWING DIFFERENT TYPES OR DEGREES OF LINKING

represented a milestone in Québec international relations and was approved as such, unanimously, by the Québec National Assembly.

CONDITIONS AND CHALLENGES FOR LINKING

It is important to state at the outset that the linking would not have been possible had it not been for the relationship based on trust and close collaboration the two jurisdictions built over several years, notably as a result of having been in constant communication to better understand each other's priorities, interests and concerns.

The conceptual foundations for the two systems were similar since they were both based on the design guidelines and operating rules for a regional cap-and-trade system that had been elaborated by the WCI partners. These rules and guidelines were inspired by the best practices and experiences of the EU Emissions Trading System and the Regional Greenhouse Gas Initiative.

However, since both jurisdictions had opted for a complete linking, several challenges remained before the systems could be completely integrated. The full harmonisation of the regulatory frameworks governing their respective systems was required to achieve this goal, but some of the differences between the two systems as well as the conditions under which they operated could be characterised as significant.

The two systems operated in two very different linguistic (French and English) and legal (civil code and common law) environments. This meant that every word, expression, sentence, article and legal terminology in the regulations, once translated, also had to be scrutinised to achieve agreement on their conceptual and practical meaning. In addition, the two systems were operating under different broader sets of environmental regulations and public consultation processes, and those had to be respected.

Second, regulatory provisions were divided into roughly three categories to facilitate the harmonisation process:

1. Those provisions that, for full linking to occur, had to be identical: for example, regarding the joint auction of allowances and the purchase limit that protect against market manipulation;
2. Those provisions that, for full linking to occur, had to produce similar results but did not need to be identical: for example, regarding emissions measurement, reporting and verification (MRV); and,
3. Those provisions that could still be different from one another without impacting the linking process: for instance, California's regulation contains provisions recognising GHG emission reductions from a voluntary offset programme that had started several years before the start of its cap-and-trade system, while Québec's recognises GHG mitigation efforts made voluntarily by industry prior to the implementation of its system.

EXPANDING NORTH AMERICAN CARBON MARKETS

Québec and California have demonstrated that they possess the required vision and political will to meet the challenge to tackle climate change. The collaboration they have shown within the WCI framework is an excellent example of North American regional cooperation that is economically and environmentally beneficial for both partners. Having successfully collaborated with one another and created a winning partnership model, both partners now see the carbon market they have created as a strong basis for the promotion of carbon pricing and carbon markets.

In that respect, Québec is actively reaching out to other governments within North America. The WCI cap-and-trade model is particularly appropriate for federated states on the continent since it has a proven track record demonstrating that it can provide the required flexibility to facilitate linking.

Indeed, the WCI model can accommodate a potential partner's economic circumstances and priorities, as well as its particular GHG emission and industrial profiles. The WCI model is, in fact, flexible to the point of allowing different types of linking; from the partial linking of a particular economic sector, for instance, to full linking.

LOOKING AHEAD TO PARIS 2015 AND BEYOND...

In the future, the WCI carbon market could expand even more by linking with similar markets around the globe.

The UNFCCC can play a constructive role in that regard by establishing in the Paris 2015 climate agreement a transparent framework containing rigorous principles, standards and guidelines

THE CASE OF A LINKING CHALLENGE: THE JOINT QUÉBEC/CALIFORNIA ALLOWANCE AUCTIONS

The first joint Québec/California auction of allowances is scheduled for 19 November, 2014. Participants who are registered in either system may participate in the joint auction using a common platform. The rules of the joint auctions presented interesting challenges for both parties whose systems operated in different currencies, and posted a different allowance reserve price.

Following negotiations, the partners decided that the minimum price for each joint auction will be the higher of the California or Québec annual reserve prices after currency conversion. For vintage year 2014, these prices stand at C\$11.39 (US\$10.14) in Québec and at US\$11.34 in California, and they will rise thereafter annually by 5% plus inflation. They also decided that Québec participants may make bids, deposit financial guarantees and pay for allocated emission units in either Canadian or American dollars, but not both.

They also agreed on the ways to set an Auction Exchange Rate prior to each joint auction, which will be made public the business day prior to the joint auction according to the most recently available noon daily buying rate for US and Canadian dollars as published by the Bank of Canada, and will be displayed in the joint auction platform.

that are highly concerned about environmental integrity. The framework should also be flexible enough to account for the specific needs and circumstances of a variety of economies and jurisdictions, whatever their level of development.

Such a framework should be drafted in such a way as to facilitate the fungibility of diverse emission allowances and credits, and thus the linking of carbon markets, which would reduce global GHG emissions more effectively. Last, the framework should officially recognise the diversity of carbon markets around the world, be they national or subnational, in order to facilitate the emergence and linking of such markets at all levels of governance.

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MAPPING CARBON PRICING IN NORTH AMERICA

With federal climate action lagging in Washington, DC and Ottawa, North America's subnationals have become star performers on climate leadership. Canadian and American provinces and states are using markets, carbon pricing and linking (to varying degrees) to get the job done. Katie Sullivan and Katie Kouchakji plot the various regional programmes underway across the continent

1. CALIFORNIA

California has been able to operate the most rigorous cap-and-trade programme in the world, while continuing to outpace the nation's economic growth and attracting more than 50% of investment capital in the US. Covered entities are successfully complying with the regulation, and the nascent market so far remains stable and healthy, as is demonstrated by reliable allowance auctions and robust secondary market trading. The upcoming year holds plenty of critical milestones, including the cap extending to transportation fuels on 1 January 2015 and 2030 target-setting discussions.

State officials are pursuing climate policy bridges with other national and subnational jurisdictions, and have signed agreements or closely engaged with Chinese, Korean and Mexican officials (among others) on carbon market design, implementation and information-exchanges. As Governor Jerry Brown noted before the 2014 UN Climate Summit: "What happens here [in California] doesn't stay here. It goes all around the country and all around the world."

2. RGGI

When it comes to cap and trade, the Regional Greenhouse Gas Initiative (RGGI) is the new world's old kid on the block. Launched in 2009, the programme covers CO₂ emissions from the power sector in nine north-eastern states. (The programme included 10 states, before New Jersey's exit in 2011.)

In 2013, RGGI Inc – the programme's administrator – introduced changes, following extensive government and stakeholder consultations and modelling efforts. The most significant changes included a tighter cap, gradual reductions to allocations until 2020 (to account for surplus units held over from early phases) and modifications to more closely align with California's programme.

With US federal regulators potentially accepting flexible state-level greenhouse gas reduction programmes as part of their proposal for reducing carbon emissions from power plants, observers hope to see more states consider adopting or adapting to the RGGI approach.

3. EPA CLEAN POWER PLAN – 111D PROPOSAL

In June 2014, the US EPA released proposals to cut emissions from power plants according to each state's energy profile. The rules, proposed under section 111(d) of the Clean Air Act, allow each state to convert its rate-based emissions standard (ie, Xlbs CO₂/MWh) to a mass-based one.

The proposal also allows for multi-state approaches, such as cap-and-trade markets as in the north-east and California. In developing the proposal, the EPA said that it "considered the states' experiences and lessons learned regarding the design and implementation of successful GHG mitigation programmes".

As a result, the EPA's "toolbox" for the states to use in meeting their targets

includes a section on how to design a market-based approach for compliance. The EPA intends to finalise the rule by 30 June 2015. Each state will then have until 30 June 2016 to submit to EPA its plan for how it will meet the existing source performance standard. If the plan includes a multi-state approach, the deadline is extended until 30 June 2018. The EPA has one year to review the plans; if no decision is issued in this time, the plan is deemed approved.

Legal challenges to the rule are expected, but it remains unclear at the time of writing how these will affect the timelines for implementation.



4. ALBERTA

Alberta, along with British Columbia and Québec, took the Canadian lead in signing the World Bank-led carbon pricing support statement, unveiled at the UN Climate Summit in September. The province, the first jurisdiction in North America to regulate GHGs, has cumulatively reduced 40 million tonnes from 2007 to 2012.

While the Specified Gas Emitters' Regulation (SGER) has been extended to the end of this year, its future is unclear, with modifications potentially on the horizon. At present, emitters have four compliance options, including paying a C\$15 (US\$13.35) per tonne fee into a clean technology fund, purchasing offsets from projects in Alberta, or purchase emissions performance credits from participants that have reduced their emissions beyond what was mandated. The province should signal proposed changes to SGER before it expires at the end of 2014, including a price per tonne increase, sectoral target changes, and (hopefully) modifications to enable linkage with neighbouring offset markets. Watch this Western space.



5. ONTARIO

In mid-2014, the premiers of Ontario and Québec (both holding Liberal majorities in their provinces) agreed to strengthen bilateral cooperation on a range of issues, including climate change and carbon pricing. In the August 2014 joint statement, Québec emphasised the need to recruit new partners to California-Québec's linked cap-and-trade programme, and that "any successful strategy aimed at reducing emissions should include determining a price for carbon". The two have since created a group, chaired by Deputy Ministers, to support Ministers responsible for environment and climate change on both sides of the border.

6. BRITISH COLUMBIA

In 2008, BC introduced a revenue-neutral carbon tax (now capped at C\$30/t) and soon thereafter launched a crown corporation to help meet climate neutral targets by procuring eligible BC-based offset credits from the proceeds of the tax. Projected long-term offset demand for BC's public sector is around 700,000 offsets per annum.

In May 2014, the government announced that it will introduce legislation to regulate the expanding liquefied natural gas (LNG) industry's GHG emissions. This legislation, expected to be adopted in late 2014, will likely see BC's existing carbon tax expanded to cover emissions from LNG facility-linked combusted fossil fuels, as well as first-of-its-kind LNG emissions intensity targets.

For covered entities unable to achieve the target, a suite of flexible mechanisms are expected to be available to meet compliance obligations, including offsets and technology fund contributions. This intensity-based approach and use of flexible mechanisms is becoming familiar terrain in Canada, given Alberta's SGER approach and Ottawa's proposed, but not yet publicly available, blueprint for tackling federal oil and gas emissions.

7. QUÉBEC

Québec's climate leadership is undeniable. At the start of 2014, the province finally linked to California's carbon market, after years of planning (see preceding

article). The province continues to reach out to other regions in the continent on potential links – including Ontario.

In addition, Québec not only joins a number of World Bank Partnership for Market Readiness workshops to showcase cap and trade and linkage design options and experiences, but the province continues to appear at UNFCCC negotiations to meet potential market partners while providing subnational perspectives on the UNFCCC Framework for Various and New Market Mechanism negotiations.

PROVINCIAL COOPERATION

At the 2014 Canadian Premiers' conference, the leaders of all 10 provinces and three territories released an updated Canadian Energy Strategy (CES) showcasing renewed vision and principles for enhanced actions on clean energy and climate change from coast-to-coast. CES work, expected to wrap-up in summer 2015, includes an enhanced focus on subnational cooperative climate change mitigation action and highlights carbon pricing and carbon capture and storage as critical building blocks.

Partially driven by IETA's co-hosted Canadian provincial-industry dialogue series, all provinces and territories have now started to undertake defined efforts to harmonise greenhouse gas reporting, monitoring and verification. This latest phase of this work is expected to conclude in mid-2015, before entering the communications and implementation phases.

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THE EU ETS: CAN IT BE GENUINELY REFORMED?

As debate continues in Europe about changes to its pioneering emissions trading system, Richard Folland looks at the rocky road for reform

The fact that this question is being asked suggests clearly that the EU Emissions Trading System (ETS) has major problems which need to be resolved. That said, the open question also indicates that the ETS is not “dead” - as its critics have been quick to claim over the last two years - and that there is still hope that substantive changes can make it the central policy instrument for decarbonisation its advocates have always wanted it to be.

The EU ETS can be genuinely reformed, and it actually requires less structural changes than is sometimes supposed. Policy-makers have been prone to fudging the objectives and purpose of the ETS, and they have been ambiguous - these problems need to be addressed. There is a credible political process - without which reform will be impossible - to underpin the step-change proposed. But the ETS probably still needs a big new idea to help give it the unifying purpose to go forward with a confident future.

HOW DID THE ETS GET HERE?

“Learning by doing” is a maxim often (perhaps too much, thus becoming an excuse) used in association with the EU ETS. The notion of the ETS in a constant state of flux must stop: if there is one thing which investors can’t stomach, it is ever-present regulatory change. After nearly 10 years of operation, policy-makers

really ought to have a decided view on where the system has worked and where it has failed. This doesn’t mean that every single rule and regulation should remain unchanged for the next 30 years. But all this experience, plus the underlying political conditions (see below for more on this) should most definitely signify that: a) this next period is the right time to proceed with major changes; but b) these changes have to be right and, in that sense, the ETS is not far from the last chance saloon—patience with the system, like any other big policy initiative, can’t be limitless.

So what key lessons have we learned from the market’s history which can be put to use in reforming it?

- The design of the system, especially how it determines the supply/demand balance, is fundamental to its effectiveness. This means *inter alia* that it has to be re-made into a more flexible and responsive mechanism. It’s hard to think of any other market which operates on a fixed supply over a period of years.
- Delaying the auction of allowances via the backloading process was only ever a temporary measure aimed at stabilising the ETS after the nightmare of 2012/13, when prices plunged and credibility hit rock bottom. The system may not have been dead but it did appear to be on a path of steady impo-

SUBSTANTIVE CHANGES CAN MAKE THE EU ETS THE CENTRAL POLICY FOR DECARBONISATION ITS ADVOCATES HAVE ALWAYS WANTED IT TO BE

tence and irrelevance which could have effectively rendered it dead by the latter part of the decade. In that sense, backloading was a success. But the current market price of less than €6 (\$7.61) a tonne is way below where it should be if it is to price greenhouse gas emissions appropriately.

- This leads on to probably the single biggest failing of the EU ETS to date, and which must be tackled head-on if policy-makers aren’t going to mess it up all over again: the ambiguity about its objectives. It is striking how, even in 2014, there is no universal agreement on this. Yes, everyone accepts the primary objective of reducing emissions at least economic cost. But there is by no means a consensus on the second objective: that the ETS supports a robust carbon price which incentivises investment in low-carbon technologies and alternative sources of energy. If it is to be the central policy instrument of decarbonisation, there should be no

THE EU ETS IS NOT FAR FROM THE LAST CHANCE SALOON — PATIENCE CAN'T BE LIMITLESS

argument about this second objective. The point about emissions trading and carbon pricing being the core mechanism to drive the low-carbon transformation also has to be tackled alongside consideration of other principal low-carbon instruments - renewables and energy efficiency policy measures based on whatever targets (binding or non-binding) political leaders agree for the 2030 climate and energy framework. We know that overlapping policy instruments was a problem in Phase II (2008-12); we've heard no satisfactory solution yet about how to fix this issue in Phase III and beyond.

- It's pointless bemoaning the regulatory process. The market and business understandably got frustrated with the drawn-out backloading affair. However, the decision-making structures of the EU are in place for good purpose: to ensure that legislation proceeds on democratic lines and that differing perspectives are well-represented. The strengthening of the European Parliament over recent years was agreed in order to bring decisions and law-making closer to the people. Whether that has worked or not, a lesson for the private sector and other stakeholders surely has to be the value of systematic engagement in a constructive way, working with the EU institutions in accord with long-term policy goals. Shouting from the sidelines achieves nothing.

- Finally, the prolonged backloading debate did at least settle that cap and trade is the preferred European carbon pricing route. Politicians spent the 1990s arguing over an EU-wide carbon tax. Despite the severe mauling which the EU ETS has suffered, most participants on both sides of the debate agree that a harmonised tax is simply not realistic, and that an EU-wide trading system is infinitely preferable to 28 national systems.

WHERE CAN THE ETS NOW GO?

If this is what we have we learned, how can we translate these lessons into effective policy for the longer-term?

Certainly, the Market Stability Reserve (MSR) is a decent start, and builds on the momentum of backloading. It introduces a facility to respond to supply/demand imbalances (other markets, such as California's, have adopted such a facility). Details such as the parameters for allowance removals/returns need to be ironed out. But the MSR would represent a significant improvement in the design of the EU ETS.

Moreover, there is a strong argument now for the Parliament and member states to move quickly on the proposal from the Commission and set a start date - say 2017, as the German government has proposed. Early clarity on the decision and timing would be welcome to many private sector participants, who need to be making their business and investment planning for the longer-term

There is an equally strong case for the 900 million backloaded allowances - due to return to the market in 2019 and 2020 - to be placed straight in the MSR, provided it is in place by then. This is the elephant in the room which can't be ignored. Returning the allowances to a market most likely still to be substantial-

ly over-supplied would make no sense and seriously dent the ETS's credibility (again).

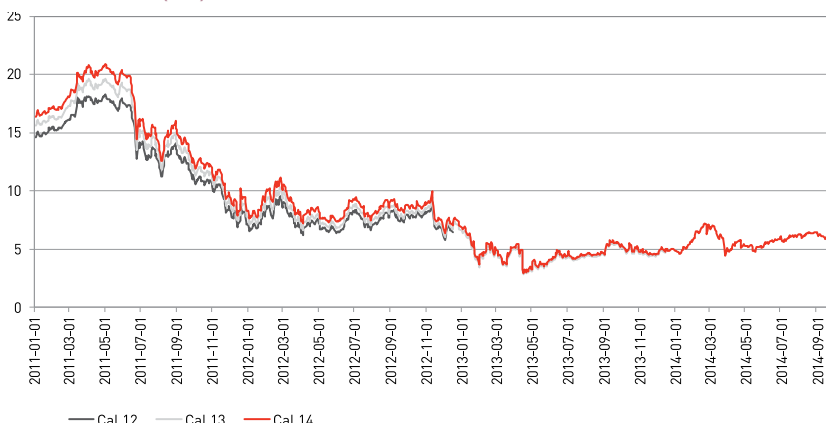
As suggested above, the ETS may not require much more in the way of structural reform. Phase IV rules from 2020 will be important, and the proposed steady tightening of the EU ETS cap (in technical language, the Linear Reduction Factor) between 2020 and 2030 should further enable the system to have its desired impact. But this is where the wider policy environment will be crucial, and the associated political decisions and policy measures will have a decisive effect on giving the system the necessary springboard to address its twin objectives of cutting emissions and spurring low-carbon investment.

As this piece goes to press, we don't know if heads of government will agree the 2030 climate and energy framework on 23/24 October. The signs are promising; and it's no exaggeration to state that a 2030 agreement will be essential if MSR legislation is to move forward quickly without hindrance (even if, strictly speaking, it's part of a separate legislative process).

The MSR Rapporteur in the EP has set out a timetable which goes into early 2015. Against that background, and if there is political agreement on 2030 in October, a plausible timetable could be:

- MSR legislation passing through reasonably speedily, by summer 2015;
- MSR establishment in 2017; backloaded allowances placed straight in the reserve in 2019;
- Final rules adopted of the framework and allocations for Phase IV of the EU ETS in 2017, enabling regulated entities and market participants to factor their obligations into their investment plans at an early stage.

EUA PRICES (€/t)



Source: EEX

IN CONCLUSION: WE NEED ANOTHER BIG IDEA

That is the ideal scenario. But there will inevitably be obstacles in the way: continuing strong reservations from central and eastern Europe about the nature and pace of decarbonisation as they struggle with the low-carbon transition; energy security concerns, generated above all by Europe’s energy relationship with Russia; continued low EU economic growth and, alongside that as both a symptom and a consequence, high energy costs.

There are unknown factors too. The new European parliamentary committees are an unknown quantity at this stage. The same could be said of the new Energy and Climate Change Commissioner, the Spaniard Miguel Arias Canete. Possibly overshadowing all this: the international climate change negotiations and the December 2015 deadline for a global deal.

So, a 2030 agreement may not suffice to underpin the step-change. There is still division on the basic purpose of the ETS. This is therefore the time to think big about the ETS and what else it can do in a transformative sense.

One of the most depressing lines in the leaked draft 2030 non-paper appearing after the summer (clearly the forerunner of the 2030 heads of agreement, if not the final version) was the line of text proposing that “the existing NER300 facility which focuses on low-carbon demonstration should be renewed in the period 2020-2030”. Unfortunately, this doesn’t reflect the view that the NER300 - especially on propelling European decarbonisation - has botched it. This may be partly because the low carbon price has resulted in much-reduced NER300 auction revenues which could be put to use. But the NER300 (the uninspiring name

would sit better in a science fiction novel) has also singularly failed to capture the imagination. Something bolder is therefore needed which can be both a more effective mobiliser of capital for low-carbon deployment but in addition “sell” the ETS and carbon pricing more convincingly to a half-sceptical/half-uninformed public.

Ideas about a low-carbon innovation fund have been floated. The most convincing proposal so far has come from the UK’s Institute for Public Policy Research, for a clean energy “super fund” which pools monies from existing EU low-carbon budgets and projects into an overall vehicle to drive the low-carbon transition at a strategic level and which aligns with energy and industrial policy.

And that ultimately is the challenge for policy-makers in reforming the EU ETS: agree the objectives; create a unifying purpose which matches the EU’s wider economic goals as well as its climate policies; and genuine reform may then be achievable - and more easily than we might think.

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RESUSCITATING THE CDM

Despite the eagerness by some to write the CDM's obituary, the mechanism still has a lot of life in it, say Hanna-Mari Ahonen and Ulrika Raab

The Clean Development Mechanism (CDM), a tool enabling international collaboration in reducing greenhouse gas (GHG) emissions, has been declared dead countless times since its conception by the Kyoto Protocol in 1997. Yet in 2014, it remains in active use and is undergoing a comprehensive reform. Are we dealing with a zombie, operating on a terminally ill patient, or have we managed to create an unexpectedly resilient mechanism with nine lives like the proverbial cat? How did the CDM manage to take off and evolve into a mechanism capable of mobilising climate-friendly investments of an order of magnitude greater than even the most incurable optimists dared to dream of – unleashing over \$400 billion, mostly from the private sector, to reduce emissions by over 1.4 billion tonnes to date, and potentially much more into the future pending further demand, through more than 7,500 projects and programmes across more than 100 developing countries? And how did it manage all of this despite its voluntary nature and much criticised complexity, in a hostile terrain characterised by the lack of collective ambition, a strong tradition of punishing early movers, and unprecedented layers of critical scrutiny by stakeholders worldwide?

The short answer is: by offering functions that are relevant and useful far beyond its original role as a mechanism for offsetting emissions in a context where only some countries commit to climate change mitigation. The CDM serves as a pioneering UN standard for quantifying and certifying additional emission

THE CDM

The Clean Development Mechanism (CDM) was originally set up to quantify, certify and issue certified emission reduction (CER) credits for reductions achieved in developing countries, measured against a baseline scenario that “reasonably represents the [emissions] that would occur in the absence of the” CDM projects. Kyoto Protocol rules enable developed countries to transfer and use such units to offset a proportion of their emissions, thereby enhancing flexibility and cost-effectiveness of meeting their commitments under the Kyoto Protocol to limit emissions. Since developing countries had no such commitments, the motivation to host CDM projects arises from the mechanism's objective to promote sustainable development in the host country.

reductions which is driven by the private sector, endorsed by investors, host countries and the international community, and subjected to extraordinary global scrutiny.

The future context is potentially much more diverse and dynamic than the Kyoto Protocol landscape, and the core function of the CDM – quantification and certification of mitigation outcomes – may increasingly be de-coupled from the original use of CDM, namely as a compliance tool to offset developed country emissions. The diverse and continued use of the CDM beyond this original purpose, from delivering results-based finance and achieving voluntary targets to implementing domestic policies, is a testimony to the versatility and robustness of the underlying concept – which is more visible now, in the face of a lack of demand.

The CDM has proved to be a powerful search engine, harnessing the private

sector to search and implement cost-effective mitigation opportunities, ranging from testing new innovations to speeding up deployment of existing low-carbon technologies, uncovering abatement potential beyond that estimated by theoretical studies¹

Through promotion of early and concrete mitigation projects and programmes in developing countries, the CDM has avoided locking in carbon-intensive capital, demonstrated the possibilities and benefits of climate action, built valuable capacity worldwide, and paved the way for climate policies in host countries. It has served as a reference for several domestic emission reduction standards, and it features as an optional element in national climate policies of an increasing number of developing countries. These diverse uses are a powerful manifestation of the CDM's value, which has persisted despite the collapse of the secondary market.

THE CDM SERVES AS A PIONEERING UN STANDARD FOR QUANTIFYING AND CERTIFYING ADDITIONAL EMISSION REDUCTIONS

A meaningful reform could allow the CDM to maintain its relevance and add value to international mitigation efforts in the future, serving as a mechanism for identifying and covering gaps in mitigation incentives, and extending incentives across national and sectoral borders to mitigate earlier, faster and more than what is nationally required. A reformed CDM would need to be able to incentivise and robustly quantify additional mitigation outcomes in an increasingly diverse and dynamic context where all parties contribute to mitigation.

The reform should facilitate versatile use of the CDM also beyond offsetting, for example for implementing domestic mitigation policies, enhancing ambition beyond international commitments, serving as a state-of-the-art model for other flexibility mechanisms, and delivering results-based finance, including through the Green Climate Fund.

A key task of reform would be to enable transparent sharing of quantified mitigation outcomes between participants, including by ensuring that baselines take into account the host country's international contributions and domestic climate policies. Within the scope of contributions and policies, the CDM could serve as an incentive to outperform domestic requirements, and also offer incentives for mitigation beyond their scope.

An equally important, albeit less glamorous, task for future reform is to develop a state-of-the-art CDM rulebook that reflects the extensive evolution of the mechanism since the adoption of the original rules in 2001, including programmatic and standardised approaches for scaling up mitigation incentives, enhancing consistency and predictability, and reducing transaction costs. The reform also needs to strike a balance between strengthening the role of host countries and utilising the CDM's ability to provide direct incentives to the private sector. Finally, the reform should establish guidelines for local stakeholder consultations and monitoring of sustainable development impacts.

Perhaps the strongest argument for maintaining and reforming the CDM lies in the value of the experience, evolution and capacity embodied in the mechanism – in CDM standards, processes, institutions and capacity – which are direct results of an extraordinary ongoing collective effort by experts, investors and other global and local stakeholders to develop and scrutinise the mechanism which, in turn, has been enabled by the mechanism's regulators' exceptional transparency and responsiveness to criticism and concerns as they arise, particularly since 2010.

Some of the most valuable work done under the CDM has relevance much beyond the scope of the mechanism. CDM standards embody the most systematic and advanced thinking to date on baselines, additionality and measurement of emission reductions at project, programme and even sector level in accordance with common principles but customised application. Recent work on standardisation and consolidation has enhanced the CDM's consistency and predictability across activities, welding

together bottom-up experience and top-down expertise. These themes have relevance for many central building blocks: for target-setting, policy design, and modelling and quantification of impacts of mitigation actions, market-based and otherwise.

The CDM embodies the result of a decade of criticism and that is precisely why it is so valuable. It also is developing a number of innovative approaches that stretch its original mandate and are applicable well beyond its original functions. A meaningful reform could enable continued use of CDM as a power tool for harnessing the innovation and resources of the private sector for the benefit of the climate, as well as a model embodying over a decade of collective efforts and experience in quantifying and certifying additional mitigation outcomes.

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Ulrika Raab, Swedish Energy Agency. Ulrika Raab is Senior Advisor for Climate Change Policy at the Swedish Energy Agency. Educated at the Royal Institute of Technology in Stockholm, she holds a M.Sc. degree in Chemical Engineering with a major in Environmental Engineering. She has been involved in climate change policy development on national and international level since 1998 and as a negotiator for Sweden since 2001. She has been a member of the CDM Executive Board and was chairwoman of the CDM EB Small Scale Working Group 2007-08.

PROGRESS OF CHINA'S REGIONAL EMISSION TRADING PILOTS

Yang Xuan and Caspar Chiquet analyse the performance of China's pilot emissions trading programmes, how they will inform a national market – and the country's contribution to the Paris agreement

In the last decade, China has surpassed the US as largest emitter of greenhouse gases, largely driven by the unparalleled growth of the Chinese economy in recent years. China has been hesitant to reflect this new reality in its international commitments for the fight against climate change. Chinese negotiators rightfully demonstrate that China's per capita emissions are still far lower than in many industrialised countries, and that the historic emissions of developed countries still outweigh China's own emissions to date.

CHINA'S DOMESTIC CLIMATE CHANGE AGENDA IS BY FAR ONE OF THE MOST AMBITIOUS

However, China's domestic climate change agenda is by far one of the most ambitious. While other drivers such as energy security and long-term economic stability have influenced China's policy decisions, the direct impacts of climate change already damage the Chinese economy. Droughts, floods and other extreme weather events take an increasing toll and accelerate a transition to a less carbon-intensive economy.

TURNING TO CAP AND TRADE

China has identified cap and trade as the policy tool of choice in its fight against climate change. The government has already approved seven pilot cap-and-trade systems in five cities (Beijing,

Shanghai, Tianjin, Shenzhen, Chongqing) and two provinces (Guangzhou, one of the manufacturing hubs of China, and Hubei). With the exception of Chongqing, which only witnessed trading activity on the kick-off day, trading activity is taking place, and several have already completed a full compliance cycle.

With the exception of Hubei and Chongqing, which start surrendering allowances next year, the published data shows that the other five pilots performed well with regards to compliance. Only a dozen or so companies out of hundreds of regulated emitters did not surrender the required amount of allowances, and have been fined in accordance with the rules.

Another aspect of performance is market liquidity and effectiveness of the price signal. Most of the pilots are struggling with low liquidity, small transaction volumes and even declining prices towards the end of the compliance cycle. Such behaviour hints at an overallocation of allowances, but could also be attributed to other factors, such as limited public availability of compliance levels and emissions data. Finally, the decision to pre-allocate allowances according to historic emissions with a correction at the end of the compliance cycle compounds these challenges, and makes it difficult for market participants to establish a forward price curve.

CHALLENGES TO OVERCOME

The driver for these markets is the emissions target itself. In the absence of an absolute cap on CO₂, China formulates its energy efficiency and CO₂ targets

in relation to GDP output to allow for continued economic growth. However, such relative targets (or intensity targets) require far more interventions from the supervisory body than a simple cap based on an absolute target. Allowances pre-allocated to emitters at beginning of each compliance cycle are adjusted right before the compliance deadline according to real production output, which complicates the supply-demand analysis and injects more uncertainties into an already complicated and opaque market.

For some pilots (eg, Tianjin, Chongqing), laws have not been passed yet and the regulating body can only rely on administrative measures to enforce the cap. This results in limited enforcement capability as the regulator can only issue comparably small fines. It is not an issue at the moment since supply is abundant and compliance costs are low. But should the market become short in the future and costs rise, enforcement will be difficult.

Conflicts of interest are also abundant and demonstrate a clear need for further regulation. In the primary market, where carbon auditing influences allowance allocation, issues of conflict of interests and information transparency exist. In principle, if a company is selected by the regulator to perform a carbon audit for a certain emitter, this company should be banned from providing allowance management advisory services for the same emitter. However, there is no such regulation and the potential for abuse or market manipulation exists.

TABLE 1. Trading volumes, price averages and sample transaction volume of Chinese ETS pilots

PILOT PROGRAMME	PERIOD	CUMULATIVE VOLUME TRADED (T)	PRICE RANGE (CNY)	AVERAGE PRICE (CNY)	LATEST PRICE (CNY/T) (AS OF 14/9/14)	LATEST TRANSACTION AMOUNT (T) (AS OF 14/9/14)
Beijing	28/11/13-14/9/14	960,655	48-70	60	50	5,000
Shanghai	19/12/13-14/9/14	1,239,221	29-48	40	29	5,000
Guangdong	19/12/13-14/9/14	1,103,619	38-74.70	59.41	38.7	24,487
Shenzhen	18/6/13-14/9/14	1,615,785	29-122.97	66.56	47.88	701
Tianjing	26/12/13-14/9/14	994,720	17-52.27	29.74	27	500
Hubei	2/4/14-14/9/14	7,405,735	22-26.59	23.68	24.01	6,645

Source: official websites of exchanges - Beijing www.bjets.com.cn; Shanghai www.cneex.com; Guangdong www.cnemission.com; Shenzhen: www.cerx.cn; Tianjing: www.chinatcx.com.cn; Hubei: www.hbets.cn.

The secondary market, where the trading happens, is currently constrained by the fact that the role of registry provider and exchange platform is not separated. None of the seven pilot exchanges allow over-the-counter transactions or a transfer of ownership of allowances without a purchase/sell operation. They all lack a central registry where you are free to allocate your credits to any other account (maybe for a small transfer fee), while trading activity is done somewhere else. This shortcoming increases transaction costs significantly and prevents portfolio managers from providing trading services to emitters.

China has also its own offset mechanism, to generate Chinese certified emission reductions (CCERs), similar to the Kyoto Protocol's CERs. However, it is still not clear yet what types of credits are acceptable for each pilot. The regu-

lators of each pilot have indicated that there will be certain limitations on the usage of CCERs, leading to a virtual fragmentation of the offset system, which originally had the potential to function as a link between the pilots. And considering the theoretically almost unlimited supply versus limited demand, CCERs may meet a similar fate as CERs.

All these challenges have a direct impact on the performance of the pilots, especially the aspects related to market performance and price signals. However, one of the main goals of establishing the pilots in the first place was the identification of such challenges to address them ahead of a national emission trading system (ETS). On top of that, the pilots have already demonstrated in their first year that they can work reliably as compliance instruments and that the necessary infrastructure to operate an

ETS in China can be put in place quickly and effectively.

TOWARDS A NATIONAL ETS

Currently, the National Development and Reform Commission is preparing regulations for a national ETS. Experts have been called in to study a national cap and allowance allocation plan, trading rules and infrastructure requirements, such as a registry, and climate change legislation is on the government's agenda.

China's pilot ETSs form the second-largest carbon market in the world, and the first of its kind for a developing country. By 2015, there will be plenty of lessons and experiences to share with other developing countries that are looking to China for leadership. When a national ETS starts, it will take the lead as the biggest cap-and-trade system in the world. These promising policy developments can form the backbone for a more assertive Chinese negotiating position in Paris, and hopefully help politicians to reach a global deal on protecting the climate.

Yang Xuan has eight years of experience in the Chinese carbon market. He leads South Pole's Chinese operations, supervising a pipeline of offset projects in China and Southeast Asia, as well as providing consulting services to domestic and international clients.

Caspar Chiquet is managing South Pole's advisory team, which is consulting for development banks, multilateral agencies and the private sector, developing products and solutions for climate change mitigation and adaptation.



CARBON PRICING STARTS TO GO GLOBAL

As the 2015 deadline for a global climate deal draws nearer, policymakers are increasingly looking to carbon pricing to meet the challenge – particularly in developing countries, where participation in the Partnership for Market Readiness is starting to deliver results on the ground, says Maja Murisic

As the world seeks to enhance climate mitigation efforts to hold warming below 2°C and countries are progressing toward a global climate agreement in 2015, the sense of urgency – as well as of opportunity – is growing.

Whether countries focus on improving “carbon pricing readiness” or choose to design and pilot various carbon pricing instruments, putting a price on carbon emerges as an essential element to achieve global mitigation targets, providing the necessary incentives for investments in low-carbon and resilient growth.

But with great opportunities come great challenges. Even though the pace at which the carbon pricing initiatives around the world are being introduced is faster than ever, the challenges countries face when preparing for and implementing various carbon pricing instruments are not to be underestimated.

THE PARTNERSHIP FOR MARKET READINESS (PMR) AT WORK

The PMR is stepping up to the challenge. Bringing together more than 30 countries¹ whose actions are critical to global climate mitigation efforts, the World Bank’s PMR programme supports them as they prepare and implement carbon pricing and other innovative instruments to scale up domestic greenhouse gas mitigation. The PMR also serves as a platform for country-to-country exchanges that inform collective pioneering of cost effective approaches to combat climate change.

While “one size fits all” solutions do not exist, the PMR’s experience highlights important lessons.

First, in order to ensure that carbon pricing policies are cost-effective, as well as consistent with other climate policies, policy mapping and interactions matter.

Second, building carbon pricing readiness is a “no-regrets” measure, as improvements in technical and institutional capacity have cross-cutting benefits that support domestic climate change policies and low-carbon and resilient growth.

Furthermore, the choice of carbon pricing instruments depends on each country’s unique circumstances and development priorities.

Finally, country-to-country exchanges and knowledge sharing facilitate cooperation and innovation, ultimately facilitating a successful implementation of carbon pricing instruments.

EXAMPLES OF DOMESTIC CLIMATE ACTIONS AND CARBON PRICING INSTRUMENTS

A growing number of middle income countries, many of which are supported by the PMR, are in the process of introducing carbon pricing instruments, such as a carbon tax or an emissions trading system (ETS), to reduce emissions cost effectively and shift toward a low-carbon pathway.

CHINA announced its plan to develop seven official ETS pilot programmes (Beijing, Shanghai, Tianjin, Chongqing,

BUILDING CARBON PRICING READINESS IS A “NO-REGRETS” MEASURE

Guangdong, Hubei and Shenzhen) in 2011. By June 2014, all seven pilots were operational. With that, China now houses the second-largest carbon market in the world, covering 1,115 million tonnes of CO₂e. The pilots, which differ in terms of economic structure and development, the sectors covered, as well as the thresholds to determine covered enterprises, are based on each jurisdiction’s respective economy and emission profile.

That said, the experience with China’s seven ETS pilots demonstrates that all face somewhat similar challenges. The experience also illustrates that building “fundamentals” (eg, a reliable and transparent emissions monitoring, reporting and verification framework) is a critical albeit time-consuming process. Despite impressive progress by China over the past two years, more needs to be done. All will be valuable lessons to feed into developing a national ETS, expected to be launched by 2020.

SOUTH AFRICA plans to introduce a carbon tax at R120 (\$11.20) per tonne of CO₂e in January 2016, with annual increases of 10% until 2019/20. The tax is envisioned to be a fuel input tax, based on the carbon content of the fuel used, and will cover all stationary direct greenhouse gas (GHG) emissions from

both fuel combustion and non-energy industrial process emissions, amounting to approximately 80% of the total GHG emissions.

The carbon tax and accompanying tax incentives, such as an energy efficiency tax incentive, are expected to provide appropriate price signals to help shift the economy towards a low-carbon and sustainable growth path. A complementary offset scheme is also proposed, with its parameters yet to be finalised. The development of the offset programme, which is being supported by the PMR, aims to provide flexibility for tax-payers and lower their tax liability, as well as incentivise mitigation in sectors not directly covered by the tax.

The government is currently conducting technical analyses of the tax design and an assessment of its potential impact. The design of these interventions is not expected to compromise the competitiveness of the country's economy, minimising potential negative impacts on households.

MEXICO'S introduction of a carbon tax and a recent announcement of a potential ETS in its energy sector significantly contribute to the global landscape of carbon pricing instruments. A carbon tax on fossil fuel import and sales by manufacturers, producers and importers, which came into effect in 2014, covers approximately 40% of the country's total GHG emissions. Mexico's carbon tax is not a tax on the carbon content of fuels, but rather on the additional amount of emissions that would be generated if fossil fuels were used instead of natural gas. Accordingly, the level of the tax fluctuates between \$10-50/t CO₂e. The tax also allows for the use of offsets, and companies may choose to comply

with their commitments by buying offset credits from domestic Clean Development Mechanism projects, therefore promoting the growth of mitigation projects in Mexico and the creation of a domestic carbon market.

In addition, in February 2014, the government introduced the possibility of developing an ETS for the power generation sector and/or a renewable energy certificate mechanism to support the country's Renewable Portfolio Standards, with further design features to be determined in the coming months.

CHILE, as part of a major tax reform, is introducing a carbon tax which will regulate CO₂ emissions, as well as local pollutants, produced by fixed sources used for thermal power generation. The carbon tax is expected to enter into force in 2017 and is envisioned to be designed as a tax on emissions from boilers and turbines with a thermal input equal or greater than 50MW.

With an additional analysis to examine the impact of proposed carbon tax in the works, initial assessments suggest that approximately 50% of energy in the country will be taxed. While further analytical work is needed, it is clear that carbon tax design and implementation will carry a number of challenges – from technological changes in the energy sector to the implications on international competitiveness, to name a few.

PUTTING A PRICE ON CARBON: A CHALLENGING YET INEVITABLE PATHWAY

The examples of China, South Africa, Mexico and Chile are just some of the countries that are taking action to price carbon. In reality, many more are adopting innovative and cost effective ap-

proaches to GHG emissions' mitigation. The central feature of such approaches are actions that put a price on carbon. By 2014, almost 40 national and over 20 subnational jurisdictions had already implemented or scheduled ETS or carbon taxes, together accounting for more than 22% of global emissions. In addition, 73 countries and 11 states and provinces – together responsible for 54% of global GHG gas emissions and 52% of GDP – joined 11 cities and over 1,000 businesses and investors in signaling their support for carbon pricing through a series of initiatives announced at the UN Secretary-General's Climate Leadership Summit in September.

Despite facing many challenges when designing and implementing carbon pricing instruments, the progress countries have shown so far is undisputable, providing a strong and robust signal for innovation that supports low-carbon and resilient growth. These on-the-ground efforts to use market forces to curb emissions will be critical for global mitigation efforts, with carbon markets still having an important role to play in the Paris climate agreement.

Maja Murisic, Partnership for Market Readiness, Climate Change Group, World Bank². Maja Murisic works for the World Bank's PMR programme. Since she joined the World Bank in 2010, she has been working on a number of technical assistance programmes in the areas of low emission development, energy efficiency and climate resilience, mostly in Europe and the Central Asia Region. She holds a master's degree in International Economics and Relations from the Johns Hopkins University's School of Advanced International Studies and a bachelor's degree in International Relations from the University of Belgrade.



(1) PMR Participants are: Brazil, Chile, China, Colombia, Costa Rica, India, Indonesia, Jordan, Mexico, Morocco, Peru, South Africa, Thailand, Turkey, Tunisia, Ukraine, Vietnam, Kazakhstan, Australia, Denmark, the European Commission, Finland, Germany, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. For more information about the PMR and its participants, please visit www.thepmr.org (2) The findings, interpretations and conclusions expressed herein are those of the author and do not necessarily reflect the view of the World Bank Group, the Partnership for Market Readiness or the governments they represent.

THE B-PMR: WORKING TOWARDS PARIS

IETA's Business Partnership for Market Readiness is expanding its activities, with an eye on ensuring a role for carbon markets in the Paris climate agreement. Dan Barry, Eric Boonman and Karl Upston-Hooper report on a busy 2014



Building on the success of 2013, IETA's Business Partnership for Market Readiness (B-PMR) expanded its activities during 2014. Since its inception in October 2012, it has undertaken five "missions" to share the experiences of some of the world's leading companies with the business community in countries implementing carbon pricing. This initiative continues to play a key role in bridging the gap between private and public sectors, to enable the development of robust market-based policies for managing carbon.

At its core, the B-PMR was created to complement the World Bank's Partnership for Market Readiness (PMR), a grant-based, capacity building trust fund that provides funding and technical assistance to 16 emerging economies for the collective innovation and piloting of market-based instruments to reduce greenhouse gas (GHG) emissions. The PMR brings together developed and de-

veloping country governments, as well as other key experts and stakeholders, in order to provide a platform for technical discussions on market instruments, facilitate collective innovation for pilot efforts and harness financial flows to implement and scale up efforts. The proactive co-operation between the PMR and B-PMR was best illustrated at a joint meeting of the two programmes in May 2014, providing a platform for B-PMR representatives to share experiences from the missions directly with national policy-makers.

The B-PMR complements and supplements the PMR's activities in selected jurisdictions (determined by the B-PMR Steering Committee) by offering a business-to-business perspective, recognising that business engagement is critical to effective GHG policy success. It draws from the expertise of IETA's 140+ global members, comprising major energy, industrial, financial and service com-

panies in virtually every PMR partner region, and helps fulfil the critical role of building business capacity by sharing real-world experiences, both positive and negative.

B-PMR execution primarily involves missions to host countries who have invited the B-PMR to share experiences with local companies that will be covered by a new emissions trading system (ETS). These missions provide a forum where experts are on hand to engage in robust conversations with local industry stakeholders. They include business-to-business dialogues on key topics, such as policy assessment, market fundamentals and evaluation of market trends and data. Other focus areas include the identification and evaluation of emissions reduction opportunities that form the basis of a market engagement strategy, as well as a review of how various trading instruments work in practice.

The expected outcome of these missions is increased participation in and better overall performance of the emerging emissions trading programmes; encouragement of common approaches in new trading systems, leading to better harmonisation in future international policy frameworks which is vital as we approach a new deal in 2015; improved understanding by IETA members on the directions PMR countries are taking in market design; stronger business-to-business networks in host countries; and links to the international carbon market community. Most importantly, the B-PMR creates a foundation for enduring relationships and communication after the missions have been completed.

MISSIONS IN 2014

FEBRUARY 2014:

BEIJING & TIANJIN, CHINA

The B-PMR got off to a strong start in 2014, with a successful week-long mission to the Beijing and Tianjin in China, home of two of the country's seven pilot programmes. Invited by local government leaders, the B-PMR organised a team of IETA experts to meet and exchange views with local businesses and policy-makers in the capital and its sister city. Over 20 IETA member companies participated in the Beijing and Tianjin mission, enabling dialogue with 235 Chinese companies.

In Beijing, IETA partnered with the Beijing Environment Exchange and the British Embassy, and the mission was opened by Sir David King, Special Representative for Climate Change for the UK.

At both sessions, discussions with the local business community focused on:

- Preparing and participating in an ETS: lessons from Europe and the US;
- Compliance readiness;
- Experience with emissions monitoring, reporting and verification;
- Trading strategies and carbon asset management; and,
- Registries and infrastructure.

Break-out sessions were also held for the power and heat, chemicals, cement, petrochemical and steel industries

In Beijing, attendees included not only compliance entities but also other industry stakeholders, such as Sinopec, Baosteel and major Chinese banks, seeking to ensure that emissions trading is successful in the city.

In Tianjin, IETA again partnered with the British Embassy as well as Tianjin Climate Exchange. This mission was notable for the strong political support for the ETS from the Tianjin Municipal Government, with a keynote address from Deputy Secretary Chen Zongsheng.

MAY 2014:

MEXICO

In May 2014, the B-PMR undertook its fifth mission, this time in Mexico City. This mission expanded the scope of the B-PMR's work away from the large pilot ETSs of China and South Korea to the innovative carbon pricing programme being implemented in Mexico.

In a slightly more informal format, IETA members were able to discuss the developments in Mexico with key government ministries, including the environment ministry SEMARNAT and the ministry for finance, energy and foreign affairs). On the second day, a business-to-business dialogue took place between IETA's member companies and representatives of more than local companies. Discussions were particularly focused on the interaction of Mexican carbon policy with climate developments throughout North America.

OCTOBER 2014:

SHENZHEN AND GUANGZHOU

At the time of writing, the B-PMR was planning a mission for late October, having been invited back to Shenzhen in China for a follow-up mission to that conducted earlier in February 2013, as well as its first visit to Guangzhou. A key tenet of the B-PMR is that the nature of the dialogue with local industry will evolve in conjunction with the maturing of the relevant carbon pricing tool.

Emitters covered by Shenzhen's ETS have now experienced a compliance

cycle and is the first in China that will allow foreign (non-Chinese) trading participation; several IETA members are preparing to start trading in Shenzhen by the end of 2014. We hope that the success of the Shenzhen ETS can serve as a constructive model for other regions in China to follow when they implement an ETS.

THE ROAD TO PARIS

From the climate summit in New York to the UN negotiations in Lima, all climate roads lead to Paris in 2015 and the need to form a global agreement to tackle climate change. Many issues remain to be resolved but one block in the foundations of such an agreement must be carbon markets, a policy tool that is only effective with the support of affected industry.

By leveraging the considerable breadth of IETA's global business and market experience, the B-PMR has continued to show that it can provide a channel for robust conversations between businesses with experience of operating within emissions trading programmes and those who are now starting on that learning curve. This communication is essential in avoiding domestic intransigence to market mechanisms and to enable local businesses to recognise the opportunities inherent in trading based GHG abatement policies. Hopefully the B-PMR is, in some meaningful way, able to contribute to the success of the PMR in the lead up to Paris, and to the adoption in key economies of market solutions to solve environmental challenges.

Dan Barry, Eric Boonman and Karl Upston-Hooper are joint chairmen of the B-PMR Steering Committee. The authors would like to thank the IETA Secretariat for its hard work and initiative which has been the foundation of the B-PMR's success to date. For more information on the B-PMR, please see www.ieta.org/b-pmr.



SOUTH KOREA ETS: PREPARING FOR LAUNCH

Intaek Yoon, Jinna Kim and Kate Yoon look at how preparations for the Korean ETS are going, with just weeks until it starts

South Korea's emissions trading system (ETS) is now just weeks away from its 1 January 2015 launch. Preparations have been ramping up this year, with the Korean government publishing its master plan for the ETS, which sets out a mid-to-long term direction for the ETS – the main policy tool for the country to meet its pledged 30% cut in greenhouse gas (GHG) emissions by 2020, compared with business-as-usual (BAU) levels.

The road to here has not been smooth, however, and the ETS has been met with last minute challenges and hiccups, including vociferous industry opposition which prompted eleventh hour changes to the rules.

KOREAN ETS: THE BASICS

After several months of debate, the government released the final National Allocation Plan (NAP) in September, setting out the detailed rules for the ETS, including allowance allocation, banking, borrowing and offsets, among other things. According to the NAP, the ETS will apply to companies in the power generation, industry, public-waste, building and transportation sectors which have emitted more than 125,000 tonnes CO₂ on an annual basis for last three years (direct and indirect emissions, scope 1 and scope 2) or facilities in these sectors emitting more than 25,000 tCO₂ which the government designates as eligible.

The Ministry of Environment (MOE) calculated the cap by considering the re-

cent emissions and prospective growth based on a 'roadmap'. The cap during the primary planning period (2015-17) was set at approximately 1.69 billion allowances, each representing 1 tCO₂. The emissions allocations for each individual company are mostly based on historical emissions with some use of benchmarking, but also take into account planned new builds or expansions. Additional allowances may be given due to unplanned new facilities or extensions during this period, from a reserve of about 89 million allowances.

Korea's ETS allows allowance banking, borrowing and the use of offsets. Reductions achieved under the pre-ETS target management system (TMS) will be credited as early action. Various market stabilisation measures have been included, such as the allowance reserve mentioned above, setting a retention limit for allowances and restrictions on allowance borrowing and offsets.

OPPOSITION AND SETBACKS

By law, the competent authority, the MOE, should have established the allocation plan before the end of June, leav-

TABLE 1. Korea ETS at a glance

FEATURE	DETAILS
Coverage	Companies with annual GHG emissions exceeding 125,000 tCO ₂ e or companies with installations emitting more than 25,000 t
Sectors	Power generation, industry, public waste, building and transportation
Commitment Periods	Primary planning period: 2015-17 Secondary planning period: 2018-20 Third planning period: 2021-25
Cap	Primary planning period: 1.69 billion tCO ₂
Allowance allocation	<ul style="list-style-type: none"> • Grandfathering for most business areas • Benchmarking for cement, oil refining and aviation sectors • Benchmarking will be more widely used in the future
Free allocation	Primary planning period: 100% free
Reserve	For new entrants, market stabilisation measures, early action credits and expansions
Banking / Borrowing	Unlimited banking allowed; participants can borrow up to 10% from a future year's allocation
Offset	Up to 10% of allocation
Early action	Recognition for previous reduction or additional reduction achieved during the TMS phase, limited to 3% of the primary planning period allocation

ing a gap of at least six months before the beginning of the primary planning period. The companies covered by the ETS should have submitted an allocation application by the end of August, with notification of their allocation by the end of October.

KOREA HAS AN OPPORTUNITY FOR AN EARLY MOVER ADVANTAGE

However, the final NAP was only published in September following strong opposition from industry, leading to a setback in the process.

Industry's opposition stems from the BAU assumptions used in setting the cap. They claim that the use of 2009 data in the BAU assumptions has resulted in a significant underestimation of BAU. Industry requested the government to reexamine the BAU – but with the ETS start date imminent, recalculating at this point would make it impossible to comply with legal requirements for the ETS. Instead, the government has indicated its willingness to ease the degree of enforcement.

In addition, some within the Federation of Korean Industries have argued

against early action on emissions trading by Korea, as it only accounts for 1.8% of global emissions, while those countries with greater emissions, such as China (28.6%), the US (15.1%), India (5.7%) and Japan (3.8%), are not yet implementing a national ETS.

LESSONS FROM INTERNATIONAL EXPERIENCE

Whilst many companies affected by the ETS will no doubt welcome proposed relaxations to the rules, it will be important to promote clarity and consistency in the operation of the ETS in Korea, and changes and flexibility can create uncertainty, ultimately adding to compliance costs and potentially discouraging investment.

Setting initial allocations is challenging but, as we saw in the initial phase of the EU ETS, overallocation tends to discourage action on emissions, and can lead to windfall profits for companies selling excessive allocations of allowances. Challenging emission reductions are achievable in most sectors, but companies need a clear understanding of the shape and direction of emissions policy over the medium and long term, so that they can invest in a low-carbon future without impacting competitiveness unduly.

Key to this is more effective communication between government and industry. Many stakeholders do not feel that the views they expressed in the stakeholder forums established by the MOE are adequately reflected in the ensuing policies. The EU, by comparison, discloses publicly the matters discussed and views expressed during the design of its ETS, and discloses how opinions gathered are reflected in the policy.

If they get this right, both the government and industry in Korea has an opportunity for an early mover advantage, by being amongst the first to establish an ETS in Asia.

Intaek Yoon is a director at KRICCCS, a post held since 2010. He has 12 years of experience in the climate change field, with a special focus on emissions trading. Intaek has a Master's degree in Applied Science, Environmental Engineering, McMaster University.

Jinna Kim has over three years of experience in the field of climate change and carbon markets and is currently working at KRICCCS as a senior researcher. Jinna holds a Master's degree in Economics from the graduate school of international and area studies, Hankuk University of Foreign Studies.

Kate Yoon is a student at Harvard and is interested in human rights and climate change.

CASE STUDY: MOVING FROM TAX TO TRADE IN MEXICO

The introduction of a carbon tax in Mexico does not necessarily preclude the country from developing an emissions trading system in the future – with international links. Emily Spears, Julio Valle and Enric Arderiu take a closer look

Mexico's adoption of a carbon tax this year marks the start of an emerging trend among developing economies to pursue carbon taxes, while not discounting a future transition to move to a national emissions trading system (ETS). The Mexican government hopes to use the tax "as the start engine for a Mexican carbon market"¹, while South Africa is also considering transitioning its carbon tax to an ETS in the long term.²

A carbon tax can appeal as a simpler solution to spur emissions reductions, and can also be favoured by developing countries as it provides an additional, and potentially significant, source of government revenues. The revenue from Mexico's carbon tax in 2014 is expected to be MX\$11.5 billion (US\$851 million), or about 0.8% of 2012 total Federal Government tax revenue.³ However, a carbon tax provides no certainty that emissions reduction targets will be met unlike a cap-and-trade market.

Recognising the longer term advantage in emissions trading, increasingly carbon taxes can be seen to be evolving into a hybrid state between the traditional 'tax versus ETS' dichotomy. Built correctly, carbon taxes can lay necessary market infrastructure and capacity building foundations for an eventual ETS. Governments and industry value the flexibility to meet compliance obligations, and as such domestic offsets programmes

are increasingly featuring within carbon tax designs. This demonstrates a desire to develop a domestic low-carbon industry, mobilising additional resources towards low-carbon development and building upon the learnings of existing domestic Clean Development Mechanism and voluntary market projects.

OVERVIEW OF MEXICAN CARBON TAX

The tax covers around 40% of Mexico's total greenhouse gas (GHG) emissions, and is a key policy initiative aimed at helping Mexico achieve its voluntary emissions reduction targets of 30% below business-as-usual levels by 2020 and 50% below 2000 levels by 2050.

The amount of carbon tax to be paid varies, based on incremental emissions of the fuel relative to natural gas, which is exempt. The tax is set at US\$3.50 per tonne of CO₂, but effective tax rates, and thus recognised emissions, can be far lower and in some instances advantage some fossil sources over others (see Table 1). Ensuring the true carbon intensity of each fuel is recognised, and full carbon price applied, will be a likely precursor to international linkage.

THE STRUGGLE TO SUPPORT FLEXIBILITY ALONGSIDE A TAX

The legislation allows taxed companies to use a corresponding amount of certified emission reductions (CERs) generated from projects in Mexico. Instead of

TABLE 1.
Mexico carbon tax rates (Source: SEMARNAT)

FUEL	TAX (MXN)		IMPLICIT PRICE PER TONNE OF CO ₂ (MX\$)	IMPLICIT PRICE PER TONNE OF CO ₂ (US\$)
Natural Gas	0	cents per m3	0	0
Propane	5.91	cents per 1	39.78	2.94
Butane	7.66	cents per 1	42.1	3.12
Gasoline	10.38	cents per 1	45.26	3.35
Jey Fuel	0.00*	cents per 1	46.84	3.47
LP Gas	6.59	cents per 1	40.68	3.01
Diesel	12.59	cents per 1	46.46	3.44
Fuel Oil	13.45	cents per 1	45.84	3.40
Petroleum Coke	1.56	cents per kg	5.8	0.43
Coal Coke	3.66	cents per kg	13.4	0.99
Mineral Coke	2.75	cents per kg	10.92	0.81
Others			39.8	2.95

allowing for offsets to represent a fixed proportion of total emissions volumetric liability, as traditionally seen in ETSs, taxed companies can use offsets to reduce their overall tax bill by an amount equivalent to the market value of the CERs at the time of paying the tax.

CARBON TAXES CAN BE SEEN TO BE EVOLVING INTO A HYBRID STATE BETWEEN THE TRADITIONAL 'TAX VERSUS ETS' DICHOTOMY

Determining the market value of a Mexican CER this way is fraught with difficulty and is unlikely to accurately reflect the true costs. Through the potential for the government to under-estimate the value of the offsets, they risk indirectly disadvantaging entities who participate directly in the offset market. Thus while the passage of the carbon tax coincided with the launch of an offset trading platform on the Mexican stock exchange, MEXICO2, activity has to date been limited as the rules and valuation criteria are not yet clear.

Ensuring the liquidity of offset trading is necessary to support the development of the exchange and build necessary infrastructure and capacity, as precursors for a future ETS.

ENSURING SUCCESS

Success of any climate mitigation initiative by an emerging economy depends on its ability to support domestic environmental objectives while achieving sustainable economic growth. This challenge is exemplified in Mexico as it becomes the first major oil-producing, emerging economy to introduce a carbon tax.

It is for this reason that it will be critical to ensure that the carbon tax infrastructure can be transitioned to a domestic ETS which can link to international systems. Linkage is necessary to mobilise financing and technology transfer from developed countries. Developed countries will be incentivised by lower cost abatement options in developing countries. In this way, developed nations can help to ensure economic growth by developing countries is not compromised in the process of achieving global emissions targets. Coupled with robust measures to adequately address the risk of carbon leakage, ultimate policy acceptance and long term sustainability is more likely.

Given the current oligopolistic structure of the energy sector in Mexico and other developing countries, Mexico may struggle to achieve sufficient market liquidity to support efficient price discovery and lowest cost abatement without linkage.

Developed countries need to be ready to lend support and ensure that, in pursuing a hybrid approach, the building blocks are laid to enable transition to an ETS capable of being internationally linked. The recent memorandum of un-

derstanding on climate change between Mexico and California, which aims to encourage collaboration on developing and implementing carbon pricing systems, is an important step in the right direction.

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Julio Valle holds a BA in Mechanical Engineering from the Monterrey Institute of Technology and, since 2004, has worked in the energy sector in Mexico. Among other things, he was in charge of coordinating and managing the energy policy on renewable energy, environment and climate change, as well as promoting renewable energy projects and investment in the sector at the Ministry of Energy. Currently, Valle works at the Investor Relations Office of PEMEX, providing a line of communication between investors, ESG rating agencies and PEMEX, to promote and improve the sustainability agenda of the company.

Enric Arderiu is a Carbon Originator at BP where he structures and trades carbon products as well as managing BP's exposure under multiple emissions trading systems. Previously, he was an Originator at JP Morgan EcoSecurities, focusing in carbon trading in South America, Africa and the Middle East. Arderiu has a BA in Economics from the Universitat Pompeu Fabra in Spain and a Master in Finance by the London Business School. He is fluent in Catalan, Spanish, French and English.



(1) World Bank (March, 2014) Press Release: PMR Counties Develop Strategies for Climate Action. Available at: www.worldbank.org/en/news/press-release/2014/03/05/mexico-advances-carbon-pricing-scheme-climate-change (2) Legote, Mpho (2012) 'South Africa's Carbon Pricing: PMR Technical Workshop', National Treasury Department, South Africa, (3) Belausteguioitia, Juan Carlos (May, 2014) "Economic Analysis to Support the Environmental Fiscal Reform", Centro Mario Molina. Available at: www.thepmr.org/system/files/documents/Economic%20Analyses%20to%20Support%20the%20Environmental%20Fiscal%20Reform.pdf

CASE STUDY: MAKING OFFSETS WORK FOR SOUTH AFRICA

Keith Regan looks at the prospects for South Africa's hybrid tax-and-offset system

South African industry facing the country's carbon tax may use carbon offsets to cover up to 10% of their emissions. This policy is widely regarded as positive and broadly welcomed by industry. The modalities are still under design and consultation, and basic information such as qualifying project types is yet to be finalised. However the programme is ultimately designed, offsets are poised to ease the economic burden of the carbon tax – if a sufficient supply of credits is available.

THE POWERFUL ECONOMIC ADVANTAGES OF CARBON MARKETS LIE IN THEIR GLOBAL STRUCTURE

The carbon tax, originally proposed to start in 2015 but now scheduled for 1 January 2016, is of interest to the international community for several reasons. The scale of the programme is significant. While there can be no fixed emissions reduction target under a tax, the price of ZAR120/tCO₂e is around €8.39 (\$10.61). The effective rate will be lower as a result of tax-free thresholds and exemptions. This price level should be sufficient to focus industry's attention on the quick wins: energy efficiency projects with positive paybacks and other low hanging fruit. Thereafter the price

will need to increase depending on the effectiveness of the tax price signal in reducing emissions.

We have seen a common conflict in South Africa: the desire to use offsets to reduce compliance costs, while at the same time minimising the role of international offsets (and flows of capital out of the country). Outside of Europe and the widespread use of certified emission reductions (CERs) within its emissions trading system (ETS), we have seen the US (California) and Australia demonstrating a political reluctance to use international offsets. This is a shame, because the powerful economic advantages of carbon markets lie in their global structure, not in limited application of market principles. It would be an improvement if South Africa widened the geographic net and allowed the use of offsets from the entire African continent. For example, bilateral relationships with forest nations within the Southern African Development Community region could secure a low-cost forestry-based offset supply.

There is another clear challenge facing offset mechanisms: it is hard to be both a compliance market and a source of offsets. Carbon offset projects from within the European market were exceptionally rare, with most of the large emitters (and hence sources of reductions) covered by the EU ETS. With the exception of reduced emissions from deforestation and degradation and some renewables,

there are few project types available in South Africa that allow for the creation of low cost carbon credits.

Within South Africa, it is not clear how the demand and supply can be balanced. We estimate that the overall offset demand under the carbon tax could be in the range of 25-30 million carbon credits per annum. South African offset projects currently under development, or registered under the Clean Development Mechanism (CDM), will not be able to supply this level of offsets. Roughly 8.3 million carbon credits were issued from CDM projects in South Africa between 2005 and the end of August 2014 – an average of around 836,000 offsets issued per year.

The forecast pipeline from CDM projects looks stronger, but it is not clear how many of these projects will actually happen. With low carbon finance streams on the back of sustained low CER prices, many of these projects (including wind, fuel switching, energy efficiency and landfill gas) would no longer be economical. While there is (theoretically) an average annual issuance from projects located in South Africa of 12 million tCO₂e in this pipeline, only a fraction of this will come to market.

Additionally, many projects in the pipeline might not be eligible for carbon tax compliance – either because they could create double-counting issues, or because they might not meet the criteria to

IT IS HARD TO BE BOTH A COMPLIANCE MARKET AND A SOURCE OF OFFSETS

be determined by the government. Several will be reducing the tax liability of the covered entity (for example, a project that improves energy efficiency within a covered entity will already produce a tax benefit). And it is possible that the South African government could apply qualitative restrictions, thus excluding projects such as industrial gas capture

which have limited sustainable development benefits.

In the short term, it is difficult to see how the supply of offsets will meet demand.

With demand greater than supply, the offset price will therefore be close to ZAR120, nullifying entirely the potential benefit of offset use for industry. In order to encourage investment in offset supply and bring those credits into the market, the government needs to provide the project developer and investment community with clear signals on offset eligibility, and more regulatory certain-

ty on the precise workings of the offset mechanism. In this low-supply scenario, allowing credits from elsewhere in Africa has obvious advantages but is not currently part of the proposals.

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PREPARING FOR AN AVIATION EMISSIONS MARKET

Michael Gill charts the path to a global market mechanism to control emissions from aviation

As the aviation industry celebrates the 100th anniversary of the first commercial flight, it stands on the brink of an unprecedented era of development in international air travel. The scope of the industry's operation today is impressive: nearly 1400 airlines operating services to around 4000 airports with a commercial fleet of over 25,000 aircraft, helped through the skies by 173 air navigation service providers. In 2013, the aviation industry carried over 3 billion passengers on 36 million flights and nearly 5000 routes. The industry supports over 58 million jobs and generates 3.4% of global GDP (or \$2.4 trillion in economic activity).

But going beyond the bare numbers, what is often overlooked are the social benefits that rapid, safe and economic air travel brings to the wider economy and to society. The numbers do not tell the real stories of what air transport means to people all over the world. Our modern lives rely on easy transport across continents in order to do business, to bring families together and to maintain friendships. The industry comes into its own for remote communities, where for education, medical treatment and business, air transport is the only feasible option.

With those undoubted benefits comes a responsibility for the environment. The industry's total jet fuel consumption in 2013 was about 73 billion gallons, producing some 697 million tonnes of CO₂,

which is around 2% of the annual global man-made CO₂ emissions. In order to grow sustainably, the aviation industry needs to address its climate impacts – which presents some significant challenges. Aviation emissions include other components, besides CO₂, which have climate effects, including nitrogen oxides (NO_x). However, a lot of scientific uncertainty remains around the nature and extent of their impacts.

Global efforts to reduce CO₂ and other GHG emissions have been ongoing since 1992, when the UN Framework Convention on Climate Change (UNFCCC) was adopted. The 1997 Kyoto Protocol to the UNFCCC specifically recognised the unique and international nature of the aviation industry by excluding it from the scope of the Protocol. Instead, it asked for international aviation emissions to be dealt with by the International Civil Aviation Organization (ICAO).

While ICAO has proposed projects to deal with emissions from international aviation through various kinds of market-based measures on a number of occasions, political considerations delayed further work for a number of years.

At the same time, the aviation industry has taken a proactive and far-reaching approach to dealing with its climate change impact. The aviation industry has been transparent and open in owning up to the challenge that it faces. In 2007, the industry adopted a four pillar

strategy for reducing its CO₂ emissions:

1. new technology, including sustainable low-carbon alternative fuels;
2. improving operational efficiency;
3. better infrastructure; and
4. appropriate market-based measures.

In 2009, the aviation sector committed to cap its net CO₂ emissions from 2020 and to halve its net emissions by 2050, compared with 2005 levels. Those targets remain some of the only carbon goals relating to a single business sector in the world.

IN ORDER TO GROW SUSTAINABLY, THE AVIATION INDUSTRY NEEDS TO ADDRESS ITS CLIMATE IMPACT

At the 38th ICAO Assembly in 2013, the industry reaffirmed its commitment to working with government and to build a firm platform for the sustainable development of the industry. After two weeks of intense negotiations, the ICAO member states agreed to a landmark resolution charting the way forward for tackling aviation's climate change impact. That resolution agreed on the development of a proposal for a global market-based measure (MBM) for international aviation to be effective from 2020. This is essential if the carbon neutral growth

THERE IS SOME UNDERSTANDING THAT AVIATION'S INTERNATIONAL NATURE REQUIRES A LESS DIVISIVE APPROACH THAN IN OTHER CLIMATE AREAS

target from 2020 is to be met. It also requested that the work on the specific design elements of that MBM be completed by the next ICAO Assembly in 2016.

THE APPEARANCE OF THE STRAW MAN

The process at ICAO has found states and industry working together in a concerted effort to develop the proposal for a global MBM. Two streams of work are ongoing: political and legal questions are dealt with through a sub-committee of the ICAO Council called the Environmental Advisory Group (EAG), and more technical discussions are being held through task forces convened under the ICAO Committee on Aviation Environmental Protection (CAEP), notably the Global Market Based Measure Technical Task Force (GMTF).

As an aid to the process, an informal straw man proposal was developed rapidly following the ICAO Assembly in 2013. This proposal has been used as a means of soliciting ideas and provoking discussion and an updated version is currently in development to pull together states' current thinking. Moreover, there has been positive progress in the more political discussion on issues such as the emissions baseline calculation, the form of the scheme, possible exemp-

tions, the special needs of low emission states and emerging markets, and enforcement.

Meanwhile, under the GMTF, discussions on the development of standards for the monitoring, reporting and verification of emissions and the eligibility criteria of emissions units that could be used for the global MBM are well advanced. Industry's view, shared by many others in the process, is that access to emissions units (both offsets and allowances) should be kept as broad as possible, as long as certain minimum quality criteria are respected.

The perennial issue of accounting for the different levels of development amongst states is being looked at as part of the EAG process. Whilst this discussion is always going to be politically charged, there is some common understanding that aviation's international nature requires a less divisive approach than in other climate areas. The industry has outlined the way it thinks some of these issues can be addressed, whilst also ensuring minimal market distortion.

The ICAO process is considering a number of principles for determining individual operator (airline) responsibilities under the system for achieving carbon-neutral growth from 2020 to try

and ensure that the collective industry commitment is equitably and fairly distributed among carriers.

THE WHOLE PACKAGE

The aviation industry is within touching distance of an historic agreement to implement a global MBM for international aviation – no other industry is in that position. But it is necessary to build on the momentum gained at the 2013 ICAO Assembly.

It is worth bearing in mind that the global MBM is only one pillar of the strategy, just one part of a broader package of measures, which includes new technology (such as lighter weight materials and advanced engine and airframe designs, sustainable alternative fuels), more efficient operations and better use of infrastructure.

IATA strongly believes that partnership between governments, industry and civil society working together on these areas is key to addressing aviation's environmental challenges and to allow the economies of the 2020s and beyond to take full advantage of the benefits that aviation has delivered to the world over its first 100 years.

Michael Gill is the director, aviation environment of IATA, responsible for leading the association's work particularly on climate change. He was previously senior legal counsel for IATA. Gill holds law degrees from the Universities of London and Edinburgh and the Sorbonne. He is also the executive director of the Air Transport Action Group.



THE NZETS: CHANGE IS IN THE AIR¹

John Carnegie outlines what September's general election means for the future of the New Zealand ETS

New Zealand's general election is over; the fog of climate and emissions trading policy options from the campaign has now lifted. What its lifting has revealed – with the re-election of the centre-right National Party – is an unremarkable view of the status quo.

It pushes aside proposals aimed at halting the decline in New Zealand unit (NZU) prices, which tracked certified emission reduction (CER) prices down (see Figure 1), which can be used for 100% of compliance. This frees up NZUs to be banked (or carried forward) to later years of the ETS (see Figure 2), sparking concerns by some about the system's effectiveness.

But is this picture of policy inertia true?

At one level, the answer is yes. A returned National-led government² will continue to deliver 'what's on the box' – an ETS that carefully manages the impact of a carbon price on the economy and that ensures businesses are not disadvantaged relative to their international competitors.

It also signals the probable continuation of the transitional features introduced by the government in 2009 to help moderate the impact of an economy-wide carbon price on fuel and electricity consumers and on trade exposed businesses, such as only being required to surrender units to cover 50% of emissions and the price cap.

There appears to be little desire to 'turn up the dial'. This is not driven by a lack

of willingness to act; the National Party is one of the few conservative parties globally to retain and, in fact, embed an ETS into the domestic economic architecture.³ Rather it reflects a combination of New Zealand's unique circumstances (around 46% agricultural gases, its high proportion of renewable electricity generation at over 70%, and large forestry estate), and its small contribution to global emissions (around 0.2%).

Importantly, one of the government's guiding principles is its strong desire to calibrate domestic action with international progress – on which there has

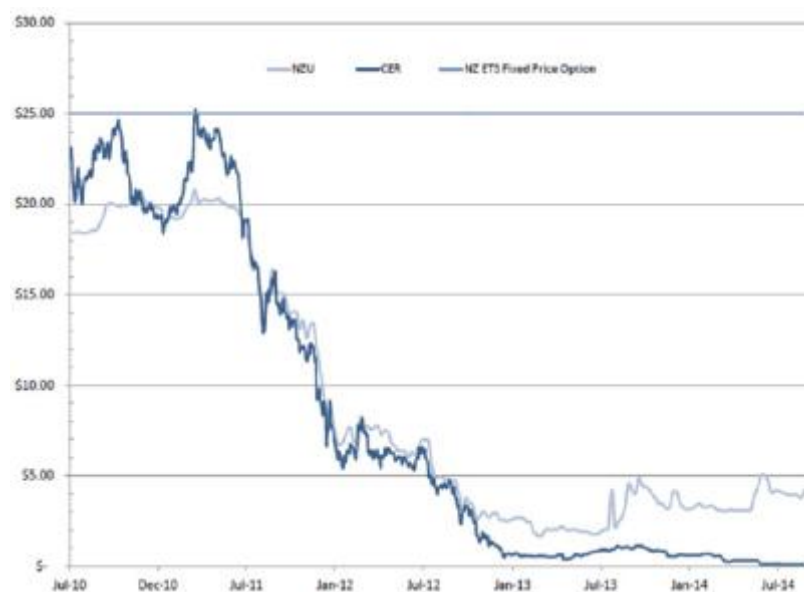
been glacial progress and underwhelming ambition, let alone real action.

None of this implies imminent major change to the NZETS. Instead the engine is on, but only idling. The focus is on ensuring that the system continues to function from a technical and administrative perspective, while retaining the ability to increase its stringency.

While the above is undoubtedly true, it belies closer inspection. The widespread expectation is that the price of NZUs will now start to rise on a sustained basis. A number of forces are at play here. Fore-

NEW ZEALAND'S NATIONAL PARTY IS ONE OF THE FEW CONSERVATIVE PARTIES GLOBALLY TO EMBED AN ETS INTO THE DOMESTIC ECONOMY

FIGURE 1. NZETS price trend (NZ\$)



Source: Thomson Reuters, Frazer Lindstrom

FIGURE 2. Annual unit surrender

EMISSIONS UNITS SURRENDERED IN NZETS (MILLION UNITS)	2013	TOTAL 2010-13
Emission reduction units	41.29	64.73
Certified emission reductions	2.05	9.66
Removal units	1.98	8.67
Other NZUs	0.09	5.35
Forestry NZUs	0.14	8.17
NZ Assigned Amount Units	-	0.71
NZ\$25 Fixed Price Option	-	0.14
Total	45.54	97.43
International Total	45.31	83.06
Domestic Total	0.23	14.28
International %	99.50%	85.33%
Domestic %	0.50%	14.67%

Source: ETS 2013 Facts and Figures, New Zealand Environmental Protection Authority

most is the impact of the decision taken at Doha in 2012 to exclude countries which did not take a target for the Kyoto Protocol's second commitment period from access to trading second commitment period Kyoto units. This short sighted decision both reduced demand for units at a time of massive oversupply and signalled to countries thinking about using UN trading mechanisms that other Parties could be capricious.

In the absence of links to other ETSs and access to Kyoto units after 31 May 2015, the NZETS becomes a domestic programme. Forestry units will become the main source, with some NZUs also being freed up via abatement as the carbon price rises.

This has implications for the demand-supply balance and the price of NZUs. Based on the available data, the quantity of NZUs allocated by the end of 2013 but not yet surrendered or sold offshore (eg, forestry NZUs converted to Kyoto Assigned Amount Units) is

approximately 118 million units. The balance of demand has been met with cheaper imported Kyoto units.

This excess of banked units will diminish over some years and the NZETS will eventually become short under current policy settings, including:

- agriculture remaining outside of the ETS until after June 2015;
- no access to Kyoto units after June 2015;
- a return to 'trend' deforestation – forestry is expected to move from a carbon sink to an emissions source around 2020.

Under this scenario, there is progressive – but not dramatic – upward pressure on the carbon price.

However, if the economy and emissions continue to grow strongly and deforestation accelerates, the surplus erodes quicker. In this scenario, the NZU price rises and, in the absence of an alternate supply of low cost units, could move towards the NZ\$25 price cap.

Other influencing factors on the shape of the NZETS over the next three years or so include:

- a more stringent international emission reduction target – New Zealand has an unconditional 5% target to 2020, which it expects to meet with excess AAUs, should it be able to carry them over, and a conditional 10-20% reduction target to the same date;⁴ and,
- other domestic sources of units – the government might introduce auctioning, create new sources of domestic offsets and/or place a greater emphasis on complementary measures – we saw this starting earlier this year with announcements aimed at reducing transport emissions.

Internationally, the government might look to reissue Letters of Approval, allowing business to access Kyoto units within the constraints agreed at Doha, or look to the Asia-Pacific region and opportunities from the emergence of emissions trading in countries such as China and South Korea.

The extent to which any, or all, of these are credible alternatives will, of course ultimately be guided by the current government's view of international progress. A possible change of government in 2017, making the NZETS more stringent, would also weigh heavily on the forward price curve. Some things change, some things stay the same. Which will it be for the NZETS?

John Carnegie is Head of Climate Change and Environmental Policy at BusinessNZ. John has attended several UN climate change negotiations, and has been a member of the New Zealand official delegation to COP since 2010.

(1) For a comprehensive overview of the NZETS, please see the joint EDF-IETA New Zealand case study guide at www.ieta.org. (2) The National Party has, as it did in its previous term, formed a coalition government with like-minded, small centre-right political parties. (3) One need only to think of Australia in this regard. One of the National Party's coalition partners, the ACT Party, has the abolition of the NZETS as one of its policies. (4) In 2013, the government made a political commitment (the legislative requirement to regularly review the NZETS was removed in 2012) to review the ETS in 2015. It is possible that this will not take place until 2016, or not at least until after the nature and size of the New Zealand post-2020 international emission reduction commitment is determined, given the need to calibrate this with the NZETS design features.

KAZAKHSTAN: LEARNING BY DOING

As Kazakhstan's ETS prepares for its third year, Robyn Camp and Aleksey Cherednichenko track the system's progress to date and prospects for the future

Kazakhstan continues to reiterate its commitment to putting a price on carbon: the government launched its economy-wide emissions trading programme in 2013, following the path it started with its national Green Economy programme in pursuit of a 40% reduction in carbon intensity from electricity production, as well as the 5% cut in emissions, against 1990 levels, announced at UN climate talks in Qatar in 2012. Most recently it added its support to the World Bank's carbon pricing statement delivered at the UN climate summit in September 2014.

Kazakhstan's economy, while growing, has not performed to expectations and there seems to be belt-tightening and pressure to increase natural resource extraction to help GDP. In an effort to streamline, a government reorganisation in August 2014 saw the integration of the former Ministry of Environment and Water Resources into a new Ministry of Energy. The emissions trading system (ETS), which continues to be managed by the Department of Climate Change, has also moved to the new energy ministry – although the ETS administrator continues to be the Joint Stock Company Zhasyl Damu.

KAZAKHSTAN ETS: A SERIES OF FIRSTS

Kazakhstan's ETS, in 2013, placed caps on enterprises emitting more than 20,000 tonnes of CO₂e each year, including energy, industry and natural resource extraction (coal, oil, gas). This covers about 77% of the country's total CO₂ emissions, and over half of all greenhouse gas emissions.

In 2013, starting with a one-year pilot phase, installations were required to verify their emissions and report to the Ministry of Environment, using recommended reporting and verification methodologies, and prepare to surrender quotas by 1 April 2014, assigned based on an unverified 2010 baseline. Without specific reporting or verification requirements, submitted reports varied in quality and level of detail. Both the regulator and enterprises were thus not sure about the ultimate level of emissions. As was allowed under existing regulation, enterprises filed applications requesting additional allocations. In response, Zhasyl Damu was required to distribute an additional 18.1 million allowances.

During the same year, emissions for 2011-12 were verified, and averaged together to inform allocations for the second National Allocation Plan (NAP), to cover 2014-15.

Heading into this year, enterprises were uncertain about both whether they had sufficient allowances for 2013, and what their allocations would be for 2014 and beyond. By early February, enterprises received their 2014 and 2015 allocations. Enterprises are required to hold their emissions at 2013 levels in 2014, and to reduce their emissions by 1.5%

in 2015. Following the 2013 reporting year, the number of firms covered by the ETS was found to have decreased from 178 to only 166 companies. At the same time, the government also waived penalties for insufficient quotas of 2013 emissions.

Despite initial concerns, most enterprises fully complied with the reporting requirements; 94% of the reports were completed on time. Also, most companies had sufficient allowances – in fact, 72% of companies had a surplus and Zhasyl Damu found that 6.83 million units were unused. The 28% of companies that had a shortfall in emissions collectively lacked 2.7 million tonnes of CO₂, or just 2% of total allocations.

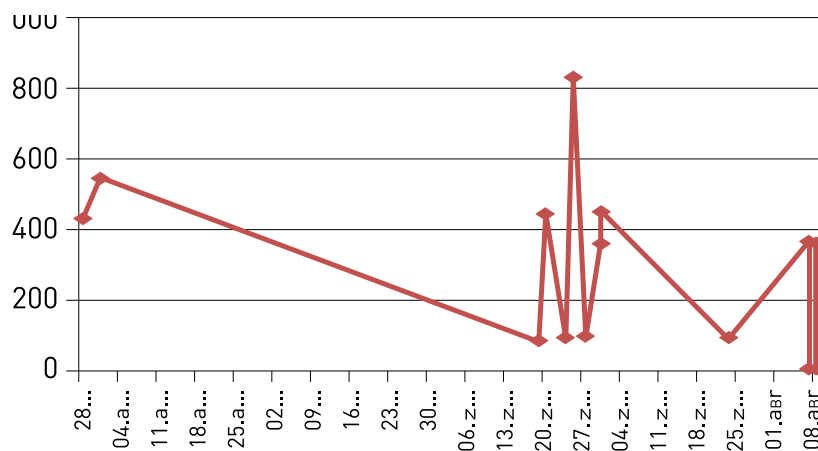
The ETS became a bona fide trading system when, on 28 March 2014, the first trades were conducted through the Caspian Commodity Exchange. Due to a one-time loophole, the 2013 vintage reconciliation window extended through 8 August, and June-August saw a smattering of trades of 2013 vintage allowances, with prices ranging from 10–800 tenge (\$0.055–4.60). Figure 1 shows the changes in allocation prices. (Sales of quotas from the New Entrants Reserve were also completed but, as of the time of writing, information on those is not yet available.)

In total, 20 companies completed a total of 54 sales or purchases, with a total of 1,432,737 tonnes of CO₂ transacted. With the average price of one tonne of CO₂ at 301 tenge (about \$1.63/t), the trading market remains relatively small. Review of the transactions indicates that most sales were within corporate families, suggesting that companies new to

SNAPSHOT: KAZAKHSTAN ETS

Coverage: 166 businesses
2013 cap: 147.2 million tonnes CO₂
2014 cap: 155.4 million tonnes CO₂
2015 cap: 153.03 million tonnes CO₂

FIGURE 1. Kazakhstan ETS allocation prices (tenge) in 2014



Source: Caspian Commodity Exchange, September 2014

emissions markets are still considering what positions they want to take in a broader market.

BUILDING ON THE FOUNDATIONS

The Kazakhstan ETS was not all firsts – 2014 was the second year of reporting and verification. Experiencing this process for the second time, the Department of Climate Change and Zhasyl Damu refined the systems and procedures. Analysis shows that the quality of reports and verifications improved dramatically as both the regulated enterprises and the regulator improved their experience.

Ten companies were accredited by the Department of Climate Change to carry out verifications for the 2013-14 reporting season, a sufficient number of firms to provide competitive market conditions.

With this foundation in place, the government of Kazakhstan is now taking steps to expand the tools and instruments available to market participants and refine the processes and systems

for current ETS activities. It is moving forward with plans to register the first domestic offset projects, update accreditation requirements and provide more detailed guidance for reporters and verifiers. In addition, it is exploring the feasibility and benefit of switching to a benchmarking approach for future allocations and working to clarify its allocation procedures for new entrants.

Kazakhstan continues to press on with amendments to the ETS's framework legislation and secondary regulations, update relevant definitions, and harmonise the ETS requirements with other regulatory programmes such as the Law on Energy Savings.

LOOKING AHEAD TO 2015

Given some of the growing pains, there have been calls to postpone or cancel the ETS, but the government has informed businesses that there will be a third NAP following 2015. It is pressing forward with elements and features that will improve the ability of capped entities to reduce their GHG emissions cost-effectively, such as standardised offset methodologies.

THE GOVERNMENT IS TAKING STEPS TO REFINE THE SYSTEMS FOR CURRENT ETS ACTIVITIES

Efforts are also underway to expand the register to better manage compliance and allocation tracking, and collect installation-level data. It will provide more automation throughout the system, all of which will be required if a benchmarking-based allocation approach is used. These changes will also require legislation supporting electronic reporting and signatures.

To help support the important progress of these programs, the US Agency for International Development (USAID) launched the Kazakhstan Climate Change Mitigation Program (KCCMP), a three-year effort to help the government achieve its low-carbon development goals. Based in Astana, KCCMP has a team of resident advisors working closely with the Ministry of Energy, Department of Climate Change and Zhasyl Damu as they implement these important programmes. The USAID KCCMP is working in close collaboration with other donors to provide analysis, training and research support as requested by the government of Kazakhstan.

With all these efforts, Kazakhstan continues to be a regional leader with its first-of-a-kind economy-wide ETS. The system remains a work in progress but is on track to help the Republic achieve its green economy goals and to attract external investment in clean and efficient technologies.

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LONG LIVE EMISSIONS TRADING

The boom times of the carbon market have been followed by the near bust of the EU ETS, and the ensuing malaise has caused many to question their continued involvement in carbon markets. But the markets are through the worst – welcome to the inflection point and the bright future of emissions trading, says Louis Redshaw

To most observers, carbon markets have been in decline for a long time, beginning with the market's failure to shake off negativity since VAT fraud and allowance thefts in 2009 rocked the EU Emissions Trading System (ETS). Slowly evolving US markets have been beset by legal challenges and politically motivated scepticism about the need to even solve the problem of climate change. Prices have fallen, banks have been driven out of commodities by ever-tightening regulatory burdens and capital requirements. The threat of a triple-dip Eurozone recession and the low carbon price that naturally follows a fall in demand have both dented confidence and added to pessimism.

THE BUILD-UP AND ENACTMENT OF BACKLOADING IS THE POLITICAL SHOT IN THE ARM THAT CARBON MARKETS EVERYWHERE WERE CRYING OUT FOR

The negative picture is vividly painted by a number of observations: lower attendance at events, the exit of familiar companies, decreasing traded volumes, massive oversupply in the EU ETS and talk of the need for political intervention to save it from itself. All of this negativ-

ity was reinforced by Australia walking away from emissions trading altogether. The last year was as bad as it can get – but those companies that have taken a step back from the market are probably already behind the curve. Activity in the carbon markets has reached its inflection point and here's why.

EUROPE

The politicians have intervened. That the carbon price went down during a recession is a positive – it shows the market is working as it should – but it is fair to say that the EU ETS suffered some form of market failure as the impacts of zealous support for the Clean Development Mechanism (CDM) and overallocation were finally felt. As a short-term measure, the European Commission is postponing the auctioning of 900 million allowances until 2019-20 to allow demand to pick up.

However, this backloading is only temporary. The idea of cancelling the excess carbon inventory is unlikely to gain sufficient support so the Commission has embarked on a longer term solution, the Market Stability Reserve. This envisages the excess inventory being held in, and released from, a reserve according to pre-established and known rules. The desire in Brussels to repair the EU ETS seems so strong that enactment of the draft legislation feels more like a 'when' than an 'if'. While this will disappoint the free market purists, it is the lesser of two evils (the second being a carbon central bank).

The intervention is significant because, since the financial crisis, the idea of trading being a solution to pretty much anything has been out of favour, especially in political circles. So much so that banks have been dissuaded by regulation and capital requirements from continuing to trade commodities, prompting the closure of several carbon desks. The build-up and final enactment of backloading are the political shot in the arm that carbon markets (that are political constructs) everywhere, not just in Europe, were crying out for. The impact of this vote, in 'socialist' Europe, supporting emissions trading should not be underestimated. It has provided the political cover for other countries to take leaps forward towards emissions trading, widely acknowledged as the most efficient way to combat climate change, after years of being out of favour.

A vote of confidence in the long term viability of the EU ETS has also been provided by the most cautious of market participants, pension funds, in the form of their participation in so-called 'carry' trades. Not so long ago, it was only the banks that were prepared to 'lend' money to the market by buying spot carbon and selling back the higher priced forward contract one, two or three years out. The structured trades that facilitate these deals are also evidence that the market is maturing at a pace, despite recent problems.

Demand for hedging in the EU's carbon market is actually growing. To the un-

derstandable frustration of industrials, free allocation is slowly being phased out. As allocations get lower every year, industrials are forced into the market to source their shortfall. According to our own analysis of installations' positions, around 30% are already short in 2013 and a massive 60% will be short by 2020.

Finally, a once near unutterable proposition in the corridors of Brussels, inclusion of road transport emissions in the EU ETS, is at long last being considered. This is a glaring and embarrassing omission from the EU ETS – even California will include transport emissions from 2015. Including road transport emissions in the EU ETS will increase its size (and thus liquidity, emissions reduction potential and ultimately price stability) by around 40%. It would also come with the additional benefit of providing convenient cover for 'cancellation' of some of the system's excess inventory by reducing auctioning to the sector.

CHINA AND THE US

Chinese support for emissions trading is going from strength to strength, with seven pilot regional ETSs operational and a stated desire for a national ETS by as early as 2016.

Poor liquidity with around 70% of traded volume changing hands in the month before the compliance deadlines have dogged these early efforts. However Shenzhen's authorities, at least, have realised the importance of participation by experienced market makers. They have promoted the inclusion of foreigners (trading in foreign currencies) in their market with as many as nine foreign companies being considered for admission or already allowed.

A consequence of the national ETS ambition is a burgeoning interest in what are termed Chinese Certified Emission Reductions, domestic offset projects that are expected to generate carbon credits eligible for compliance in the domestic ETS. Those project developers that managed to weather the CDM storm are reaping the rewards as they originate new or convert existing projects.

Meanwhile, emissions trading is finally being championed by US President Barack Obama as he seeks a legacy in his second term. His efforts centre on Environmental Protection Agency regulations mandating emissions cuts for the power sector, while providing a choice of how to achieve them. It seems inconceivable in the land of the free and the home of the brave that states not already doing so won't turn to some form of emissions trading given that it is the easier, more efficient, more cost effective and generally the most efficacious means by which the mandated emissions reductions can be achieved.

Consequently the Regional Greenhouse Gas initiative and California's cap-and-trade programme are likely to expand to include other states. Longevity and trust of the existing ETSs is building, with each of them trading well above their floor price despite both looking overallocated in the near to mid-term.

Crucially, that these two powerhouses (each one's ETS is likely to dwarf the EU's) are so publicly supporting cap and trade puts both developed and developing nations' efforts to join in firmly in the spotlight. Positive noises from all corners of the globe, in the form of the recent World Bank organised declaration in support of carbon pricing made by 74 countries and over 1000 business-

es, and emerging markets from the likes of South Korea and Kazakhstan, all add to the apparent coming-of-age of emissions trading. Carbon markets may well enjoy a snowball effect as the quantity of emissions captured by trading systems accelerates rapidly.

AIRLINES

The only global game in town, aviation, under the auspices of the International Civil Aviation Organization, seems to be making some progress towards its commitment to implement a market-based mechanism. In all likelihood, some form of offsetting with international carbon credits (ie, a sub-selection of certified emission reductions) will be the main currency of such a system. Whichever way it goes, international aviation will be included in at least the EU ETS by 2017 and it will give carbon markets a further injection of growth hormone.

Despite the recent outward signs of contraction, there's a lot going on in the carbon markets. The panacea of a global market may well be as much of a pipe-dream as it ever was, but the steps taken towards regional systems are more real and meaningful than they have ever been. Regional systems will ultimately be linked. The cornerstone of cap and trade, the EU ETS, is actually growing and very much supported by the politicians that created it. The future is bright and as we go through the carbon market inflection point, it is down to individual countries and companies to make sure they don't do an Australia and get caught 'behind the curve'.

Louis Redshaw is founder and Director of Redshaw Advisors Ltd. Redshaw Advisors Ltd is a leading carbon finance and trading company that specialises in helping companies captured by emissions trading schemes to manage their risks and optimise their carbon allocations.



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