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GHG. GREENHOUSE GAS MARKET 2015/16 REPORT

MAKING WAVES

GREENHOUSE GAS MARKET **2015/16**

MAKING WAVES

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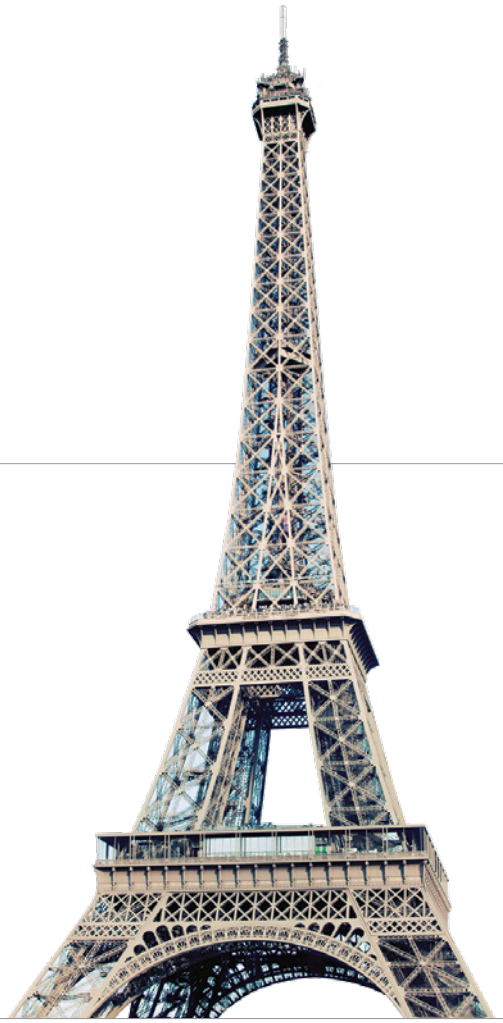





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DIRK FORRISTER
President and CEO, IETA

MAKING WAVES: LET'S MAKE SOME NOISE

Business is ready to amp up its efforts in cutting emissions – the right policy framework can truly unleash the power of markets to combat climate change. Paris is the opportunity to set the course for years to come and create the right signals, says Dirk Forrister

This year is pivotal for climate change policy. With the Paris climate summit and follow-on activities across 2016, the business community will hear a signal of change. It will respond in a measure corresponding to the clarity of the call. After a few years in the doldrums, many business leaders are ready to "make some waves" in protecting the climate – with new investments, technologies and market solutions.

We've grown all too familiar with bad signals. "Can you hear me now? Can you hear me now?" Whether it is a mobile phone, a Wi-Fi connection or a television signal, we know that a clear signal can make it all work. But a muddled signal means delay, frustration and anxiety.

To be frank, after a four-year negotiating process began in Durban in 2011, the signals from Doha, Warsaw and Lima were pretty weak. Will Paris be any different?

As 2015 began, the scientific community – led by the Intergovernmental Panel on Climate Change – had already signalled the powerful need for action. Limiting the average global warming this century to 2°C could protect against the worst outcomes. This implied maintaining a carbon budget of no more than 1 trillion tonnes of CO2 equivalent since the industrial revolution – roughly equal to concentration levels of 450 parts per million in the atmosphere.

These numbers might not resonate with the general public, but business leaders should be educated enough to appreciate what it means for growth prospects in key regions. Given fossil fuel usage rates, countries will need to cut emissions at a massive level – as much as 80–90% below 1990 levels in the developed world and 50% from major developing countries. That means huge deployment of renewables – and use of serious levels of carbon capture and storage as well as storage in forests. It will also reward entrepreneurs who bring new innovations to a market hungry for a low-carbon era.

INDCs WILL SHAPE THE NEXT POLICY WAVE – AND COULD PROMPT A LARGE CHUNK OF THE NEW BUSINESS OPPORTUNITIES

Business listened throughout the year for new signals from policy-makers, just to see if they would truly rise to the challenge laid down by science. How much action would be undertaken? How would national responses be structured? How would policy seek to attract investment to the action?

The Paris "signal" finally began to gather its strength at the end of March, with the first set of Intended Nationally Developed Contributions (INDCs). By October, the signal was stronger as over 150 countries had expressed their intentions. These INDCs will shape the next policy wave – and they could prompt a large chunk

of the new business opportunities and investment in climate action and protection in the 2020s.

Business leaders continue to assess the force build behind this wave of policy-making, because it is sometimes drowned out by louder policy challenges – the refugee crisis, the Syrian conflict, elections and political polarisation. Will policy-makers stick to their aspirations? Or will the "intended" levels slip in view of other priorities? Might Paris provide the momentum for even more change, perhaps through cooperative approaches?

Standing alone, the INDCs will likely fall short of the scientific need. But, taken together, they could stimulate a great deal of collective action – and on their face, they offer a path for doing even more through the power of markets. Over 70 INDCs indicate potential to do more ***IF*** *they gain access to carbon markets and climate finance.*

That means that the real strength of the Paris agreement will be in whether it offers the route to ***markets and finance*** *so many are seeking.*

Over the long haul, the Paris agreement should instil confidence in countries to cooperate on large-scale emissions control efforts, given the massive wave of clean energy investment needed to achieve the 2°C level of ambition. From the atmospheric perspective, national borders should not matter – and cooperative action is essential.

What kind of policy framework would accomplish that goal? What fundamental element of the Paris agreement would create a whole new wave of investment and partnership around the world, delivering the clean energy revolution?

History gives us the answer.

With an environmental problem as widespread as greenhouse gas emissions

THE MAGIC OF THE PARIS OUTCOME WILL BE IN HOW WELL IT UNDERGIRDS THE MARKETS OF THE FUTURE

– where the cost effective opportunities to reduce or store emissions do not appear evenly across the globe and where the technologies and financing are not available to all – it takes a carbon price to bring it all together.

That's why hundreds of businesses, organisations and governments joined forces this year to form the Carbon Pricing Leadership Coalition, to advocate pricing approaches that will make a difference.

Market mechanisms can produce the right price. Market mechanisms can deploy capital and technology efficiently across the globe. They did it before, they are doing it now – and they can do it even more powerfully in the future.

This edition looks into the history of carbon markets. It recalls that under the Kyoto Protocol, governments stimulated a tiny ripple of action with the early "prompt start" era of the Clean Development Mechanism (CDM). Eventually, with the Protocol's entry into force and the launch of the markets driven by the European Union's emissions trading system and Japanese voluntary commitments, international investments took off under the CDM and, later, Joint Implementation as others began to ride the wave of the early market. These responses to Kyoto's policy signal proved that markets can deliver the desired benefits.

As my friend Fred Krupp describes in this edition, a new wave of market activity is underway. Major jurisdictions from China to the US and Canada are joining the EU in using emissions trading solutions to prompt new waves of investment. These programmes will report results under the Paris agreement – and they could grow even more robust through market linkages in the future.

That's why the magic of the Paris outcome will be in how well it undergirds the markets of the future – and how it helps them connect to do the enormous job ahead. The Paris package could unleash this wave of business opportunity, if the signal is clear and convincing. It also aims to sustain regular signals by establishing a mechanism for target setting for future phases of reductions, so a consistent pattern of reduction targets should emerge.

Most in the business community want to be part of the Wave of the Future on climate action. It appeals to the entrepreneurial nervous system that makes businesses come alive with creativity and ambition.

In some ways, it's not so much a problem of finance (there is tons of capital on the sidelines, looking to be put to work for good returns) or technology (many of the solutions are available and ready to be deployed) – it is a problem of signals and frameworks, which are the stuff of policy. Well, good policy that is! We can only hope that after Paris, you can see the wave building in terms of policy signals.

Like a surfer in the water, many businesses want to ride the "wave of the future" to experience the satisfaction of accomplishment. They know that building the market itself isn't the accomplishment; it is just necessary infrastructure. The true accomplishment will be achieving the emission reduction goals and delivering climate protection.

That will be the true legacy of Paris: if the signal is received and the goods delivered. And whether it will produce a new mode of cooperation through markets that can do the job faster and cheaper.

THE RIPPLE EFFECT

The past few years has seen emissions trading ripple out throughout the world. The Paris agreement is an opportunity to leverage these efforts to inspire greater ambition, say Fred Krupp and Nathaniel Keohane

Shared global prosperity depends on robust growth in the world economy — without the carbon emissions that have fuelled growth in the past. By capping and pricing carbon emissions, we can align economic incentives with lower-carbon growth to help achieve this vision. Market-based policies such as emissions trading channel capital and entrepreneurial effort to the fastest and cheapest ways to cut emissions, making deeper reductions possible.

It's not hard to see why many companies have been staunch supporters of emission trading. Indeed, the private sector — with IETA's leadership — has played a critical role in catalysing and championing market-based approaches. Well-designed carbon markets offer the combination of flexibility, incentives, and guaranteed results that ensures that pollution targets are met while leaving it up to the market to figure out the best way to meet them, driving costs down.

As advocates for the environment, meanwhile, Environmental Defense Fund has long championed markets because they can drive ambition *up*.

A good illustration of how market-based policies can promote greater ambition is the landmark US cap-and-trade programme for sulphur dioxide, which has reduced national average concentrations of the pollutant by 76% since 1990 — taking an enormous step toward solving the problem of acid rain ahead of schedule and well below the estimated cost while creating hundreds of billions of dollars in annual benefits. Market mechanisms also played central roles in the phase-out of lead from gasoline, the implementation of the Montreal Protocol, and the dramatic reduction in nitrous oxide pollution from power plants.

GLOBAL LEADERSHIP

More recently, momentum on carbon markets has been building fast. Cap and trade has helped California be a global leader in climate action. Nearly three years into the programme, California has the world's most comprehensive cap-and-trade system, covering 80-85% of state-wide emissions. At the same time, the state's economy is in the midst of an impressive recovery. Since 2006, when California's

AS ADVOCATES FOR THE ENVIRONMENT, WE HAVE LONG CHAMPIONED MARKETS BECAUSE THEY CAN DRIVE AMBITION UP

climate change programme was signed into law, the state has received more clean tech venture capital investment than all other US states combined. Bloomberg News recently ranked the Golden State the best place in the US to do business, citing the state's visionary leadership on climate change as one of the markers of its success.

California's success has attracted the interest of its North American neighbours. Québec and California have linked their carbon markets, creating North America's largest cap-and-trade system and the first example of sub-national jurisdictions in different countries launching a joint market. Ontario, Canada's most populous province

and home to a significant manufacturing base, is developing a cap-and-trade programme to launch by 2017 and link to California and Québec's market by 2018. Having the largest US state and Canadian province in a formal, linked carbon market will help lay the foundation for further carbon market collaboration in North America and beyond.

Emission trading remains a cornerstone of the EU's plans to step up its own ambition. Despite well-publicised ups and down — attributable in large part to the worst recession since the 1930s — the EU ETS is now performing well: it has overachieved its goals, leading to more reductions at lower cost than expected. The fact that allowance prices are low is a clear indicator of the low cost of emissions reductions — and an opportunity to ramp up ambition by tightening the EU's cap further, and even expanding the coverage of the ETS.

Perhaps the biggest development is in China, where in September 2015 Chinese President Xi Jinping announced plans for a national emissions trading programme by 2017. The insights gained and lessons learned from the country's seven large-scale pilots already in place will be put to use to help the world's largest emitter meet its target of peaking emissions by 2030 at the latest.

Climate progress in the US and China is changing the global dynamic. Gone are the days when the two largest emitters blame each other for inaction. And bilateral progress is inspiring commitments around the world. All told, cap-and-trade programmes are in place in over 50 jurisdictions worldwide that are home to nearly a billion people.

And more programnes are in the works. One of the most exciting opportunities is in international aviation. To meet the sector's stated commitments to carbon-neutral growth from 2020 and a 50% cut by 2050, and help drive net emissions even lower as will be needed to turn the corner to climate safety, the International Civil Aviation Organization (ICAO) is developing a market-based mechanism for consideration at its next Triennial Assembly in 2016. That would cap emissions from a global sector that accounts for roughly 2% of carbon emissions, and is growing fast — and would set a powerful precedent for international cooperation on climate change.

Another opening is in the forest sector. Tropical forests are not only crucial to stabilising the climate — they are critical to sustainable economic development for the communities and nations that rely on them. Carbon markets can play a key role in driving a new model of green growth in the tropics. By allowing jurisdictional REDD+ credits into their compliance markets, California and ICAO have the opportunity to create positive economic incentives for forest protection at a landscape scale.

TAKING THE MOMENTUM TO PARIS

Fuelled by these on-the-ground successes around the globe, markets have moved back to the centre of political discussions with a pace that has surprised even us. One of us (Fred) was at the third Conference of the Parties to the UNFCCC (COP 3), when the market mechanisms of the Kyoto Protocol were negotiated — and we were both at COP 15 when the hopes of a "global deal" evaporated in Copenhagen. For a few years afterward, market-based approaches seemed to fall off the radar in discussions of climate policy.

Now markets are back. More than 1000 businesses, nearly 100 national, state, provincial, and city governments, and over 30 NGOs signed the carbon pricing statement released at the New York Climate Leaders' Summit in September 2014. In October 2015, World Bank Group President Jim Yong Kim and IMF Managing Director Christine Lagarde launched a high-level panel on carbon pricing, including German Chancellor Angela Merkel, Chilean President Michelle Bachelet, French

CLIMATE PROGRESS IN THE US AND CHINA IS CHANGING THE GLOBAL DYNAMIC

President François Hollande, Ethiopian Prime Minister Hailemariam Desalegn, Philippines President Benigno Aquino III, Mexican President Enrique Peña Nieto, Governor Jerry Brown of California, and Mayor Eduardo Paes of Rio de Janeiro.

How can we capitalise on this political moment and build on the momentum we are seeing, to keep carbon markets growing around the globe?

The first step is a Paris agreement that provides a solid footing for markets in the post-2020 climate regime. By markets, we don't have in mind some form of centralised mechanism under UN oversight. To be sure, there are a number of Parties who would like to have such a mechanism available — and properly designed, with provisions ensuring that any credits generated by such a mechanism meet the highest standards of environmental integrity, it could have an important role to play.

But the more powerful role for markets will be in the new decentralised world that is emerging. Markets not only provide a powerful way for individual countries to meet their own commitments. Over time, as jurisdictional emissions trading systems mature and take root, international linkages can promote greater robustness and liquidity, attracting new countries into a growing global market, and driving greater ambition – as well as certainty of environmental outcome, one of the signature benefits of a mandatory declining cap.

Ideally, Paris will provide a political signal that such international cooperation will be a core part of the new regime. But it's not

A DURABLE CLIMATE REGIME WILL BE ONE THAT HARNESSES MARKET FORCES IN THE HUNT FOR SOLUTIONS

needed. As sovereigns, Parties already have all the authority they need to use markets in meeting their commitments. The UNFCCC enshrines cooperation as a central principle. And more than 70 countries have already expressed an interest in using markets as part of their Intended Nationally Determined Contributions (INDCs) submitted to the UNFCCC.

Where the Paris agreement does have a role to play is in making sure that, when markets are used, they have integrity. In particular, the Paris agreement (and the associated COP decision) should articulate clear principles — on accounting, transparency, and monitoring, reporting, and verification — that rule out "double-counting" of emissions reductions. To ensure the integrity and credibility of the climate regime, and keep the atmosphere whole, emissions reductions achieved in one country and transferred to another must only be claimed once.

Even if the Paris agreement meets this standard, however, much work will remain to lay out clear guidelines for integrity of international carbon markets. As momentum grows, coordination among jurisdictions with carbon markets will be increasingly crucial to maximising cost-effectiveness and environmental integrity – which in turn will give jurisdictions the confidence to go faster and farther in reducing emissions.

A CLUB OF CARBON MARKETS

So far, the UNFCCC process has failed to make much progress on this front, through the so-called Framework for Various Approaches discussions that have taken place since COP17 in Durban. An alternative approach may be needed — one that starts small and engages only those countries and jurisdictions that actually have an interest in implementing emission trading.

Much as the General Agreement on Tariffs and Trade (GATT) helped promote trade liberalisation by attracting broad participation in a plurilateral trade system, a voluntary coalition or "club" of carbon market jurisdictions could promote climate action by attracting broad participation in mitigation effort. Such a coalition would complement efforts under the UNFCCC, encouraging enhanced ambition by countries and allowing participation by sub-national jurisdictions as well as national and regional ones. Indeed, drawing on the similar experience of the Forest Carbon Partnership Facility, the trust and expertise gained from shared experience in a carbon markets club could lay a deeper foundation for cooperation on markets within the UNFCCC itself.

A durable climate regime will be one that harnesses market forces in the hunt for solutions, mobilises private sector energies, enhances national self-interest and, through rigorous and transparent reporting, allows countries to demonstrate to each other that they are meeting their commitment. The Paris agreement can help on each of these fronts, but the model here is an incremental one: Rather than seeking to solve climate change in one fell swoop, a successful outcome in Paris would contribute to growing momentum in the scope and effectiveness of climate action around the world, over time. A UN agreement is only one of many tools available to address climate change. It will take continuing strong action by leading emitters and leading carbon market jurisdictions to spur the technological, political and institutional transformations that will support more ambitious action in the years to come.

*Environmental Defense Fund president **Fred Krupp**, who has guided EDF for more than three decades, is a widely recognised leader of the international environmental community. He is an influential voice on climate change, energy, and sustainability issues, and an eloquent champion for harnessing the power of the marketplace to protect our environment.*

***Nathaniel Keohane** is a Vice President at Environmental Defense Fund, where he leads EDF's Global Climate programme and helps to shape the organisation's advocacy for environmentally effective and economically sound climate policy. Nat's areas of expertise include US and global climate and energy policy, the economic impact of climate change, the benefits and costs of reducing GHG emissions, and the design and performance of cap-and-trade programmes and other policy instruments.*

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COMPARISON AND LINKAGE OF HETEROGENEOUS MITIGATION SYSTEMS IN THE PARIS REGIME

With the Paris agreement set to enshrine a bottom-up framework for international climate policy for years to come, Joseph Aldy, Robert Stowe and Bianca Sylvester outline how different approaches to cutting emissions can be compared and linked

At the UN climate talks at the end of 2015, the 196 parties to the UNFCCC intend to finalise a new agreement to reduce GHG emissions[1] that will become effective in 2020 and that will be very different from the Kyoto Protocol. Most notably, mitigation effort will be voluntarily specified by the parties themselves, as they deem appropriate to their national circumstances, rather than being cast—as in Kyoto—as legally-binding, economy-wide, quantified emissions-reduction obligations. While efforts to share information and experience will continue to be valuable inputs to domestic decision-making, ultimately each government is, and will continue to, make decisions about mitigation based on what is the best fit for its specific situation.

All parties are expected to submit Intended Nationally Determined Contributions (INDCs), which must include mitigation plans, to be incorporated into the Paris Agreement, whereas only developed countries had emissions-reduction obligations under Kyoto. This "bottom-up," voluntary, pledge-based policy architecture will be characterised by highly heterogeneous mitigation commitments. Mitigation components of INDCs will vary with regard to target type (eg, peaking, intensity, or quantified, absolute emissions-reduction); level of ambition; time period over which the INDC is implemented; and policies that parties expect to use to achieve their goals, to the extent that these are specified in the respective INDCs.

This heterogeneity makes it difficult to compare INDCS and their mitigation impact, either before the Paris agreement is implemented or during implementation. Transparent comparison would be valuable; it could facilitate participation and compliance in an agreement if it could illustrate that all parties are doing their "fair share." In addition, transparent comparison through periodic reviews of INDCs and their subsequent implementation would prompt increased national mitigation ambition over time.[2]

Transparent approaches to comparing mitigation effort will also be essential to enable the transfer of "mitigation-effort units" from one UNFCCC party to another — that is, broadly speaking, to enable linkage. Linkage between and among mitigation systems is in turn likely to reduce aggregate abatement cost across the linked jurisdictions[3] and thereby promote increased ambition (separately from any review mechanisms specified in the Paris agreement); if parties can achieve more environmental benefit with equal or lower aggregate cost, there is a good chance they will try to do so.

Novel techniques for comparison are not needed when two or more jurisdictions are assessing potential linkages between or among their cap-and-trade systems (that is, for "bottom-up" linking, prompted by the jurisdictions themselves). In that case, "mitigation units" (permits, allowances)

TRANSPARENT COMPARISON COULD FACILITATE PARTICIPATION AND COMPLIANCE IN AN AGREEMENT IF IT COULD ILLUSTRATE THAT ALL PARTIES ARE DOING THEIR "FAIR SHARE"

represent the right to emit actual emissions (totalling, in aggregate, to the cap in each jurisdiction's system), and relative (market) allowance prices across the jurisdictions serve as a transparent guide to policy makers as they consider or implement a link.

The extent to which the design of the systems must be harmonised, for example, with regard to sectoral scope and ambition, is determined by the linking parties (in large part to avoid significant price discrepancies). In addition, adequate technical means must be in place to report upon and monitor emissions, which would be the case regardless of what types of systems are being linked.[4] If one party considers another party's cap to be too high (with resulting lack of environmental ambition or integrity), as captured in large part by relative prices, the first party can choose not to link.

Techniques may be available — or possible to construct — to compare disparate mitigation systems; for example, a cap-and-trade system in one country and a performance standard in another. Once such a comparison is made, it may be possible in some cases to reduce these efforts to common mitigation units, which may then be traded.[5]

Current research suggests four principles for evaluating possible metrics for comparing heterogeneous mitigation effort.

1. An ideal metric should be comprehensive, capturing the entire effort undertaken by a country to achieve its mitigation commitment.
2. A metric should focus on observable — and preferably quantifiable — characteristics of effort.
3. Individual countries or stakeholders should be able to reproduce a metric given (a) the inputs used by analysts, and (b) available public information.
4. Given the global nature of climate change, a metric should be universal, constructible by and applicable to as broad a set of countries as possible. Candidates are emission-related metrics, abatement cost, and carbon- or energy-price metrics. Each may have its advantages, disadvantages, and appropriate potential applications in a system of voluntary, heterogeneous mitigation commitments.[6]

In a heterogeneous system, it may also be necessary to more explicitly assess and compare the degree to which jurisdictions achieve environmental objectives. This has been the case for emission reduction projects under project-based emissions-reduction-credit (offset) systems, which can serve to indirectly link two or more cap-and-trade systems that choose to accept offset credits for compliance purposes. Offset systems are fundamentally different from cap-and-trade systems, in that "mitigation units", or offset credits, represent an emissions reduction from an unobservable emissions baseline, rather than the right to emit actual emissions that total to a cap. Put differently, offset projects must be shown to reduce emissions "additional" to whatever (calculated or hypothetical) reductions might have occurred in their absence.

The most prominent example of an offset system, by far, has been the Kyoto Protocol's Clean Development Mechanism (CDM). For the CDM and other project-based offset systems, a number of organisations have attempted to develop and apply techniques for assessing and rendering more transparent the environmental quality of projects, and better calibrating the value of resulting credits in compliance and voluntary markets.[7]

Somewhat analogously, a Paris regime will be characterised by highly heterogeneous mitigation systems — including many that will measure progress by comparing actual emissions to a calculated "business-as-usual" baseline or other type of counterfactual benchmark. Depending on the specific characteristics of a national mitigation system, absolute metrics (prices, abatement costs, actual emissions) may be deemed insufficient by other parties for comparison purposes and for evaluating opportunities for exchanging mitigation units. When considering linkage between such disparate systems, robust metrics that meet the aforementioned criteria are crucial for ensuring that governments and market participants have the information they need to determine the real mitigation value of the carbon assets they import, or plan to import.

Governments could choose to recognize the real mitigation value of carbon assets to avoid trading with certain systems altogether. An alternative approach is being explored by the World Bank Group's Networked Carbon Markets (NCM) initiative. It is exploring the feasibility of using mitigation value to ensure that system differences are properly accounted for and, therefore, that the environmental integrity of a stronger programme would remain even if it was linked to a weaker system. The advantage of this approach is that it allows more systems to participate in an international carbon market, while still preserving the environmental integrity of trade in carbon assets.

Other (and somewhat related) relative approaches to linkage would be to identify exchange rates for units in two or more countries or to assign discount rates to one or more units.[8] Even with credible, independent and transparent assessment processes, however, if systems are sufficiently different (for example, a technology standard and a cap-and-trade system), such identification might not

IF PARTIES CAN ACHIEVE MORE ENVIRONMENTAL BENEFIT WITH EQUAL OR LOWER AGGREGATE COST, THERE IS A GOOD CHANCE THEY WILL TRY TO DO SO

CURRENT RESEARCH SUGGESTS FOUR PRINCIPLES FOR EVALUATING POSSIBLE METRICS FOR COMPARING HETEROGENEOUS MITIGATION EFFORT

be fully possible a priori. In such cases, exchange or discount rates might need to be set through an iterative discovery process. Again, with linkage among cap-and-trade systems or between a cap-and-trade and carbon tax, such complexity would not be required. But among more divergent systems, as we will surely find in the range of INDCs submitted for inclusion in the Paris agreement, they might help enable transfers of mitigation units — or at least serving as heuristics in advancing capacity to do so.

There is a diverse "community" of jurisdictions, intergovernmental organisations, academic institutions, non-government organisations and private sector entities that are already assessing current climate-mitigation actions and those to be included in the Paris agreement. One example is Climate Transparency, a consortium of practitioners that are learning from each other and comparing notes on their approaches, methods, and assumptions — and making progress toward converging on a common conceptual framework and terminology. In the lead up to the Paris meeting, it is important that efforts such as this are encouraged, so that the new regime supports efforts to compare diverse, nationally-determined climate mitigation actions. This would enable cross-border carbon-market transactions that are required to both facilitate growing mitigation ambition and to catalyse finance for low-carbon investment.

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(1) As well as to address adaptation to climate change, climate finance, and other important dimensions of international climate policy. (2) Joseph E. Aldy and William A. Pizer, "Alternative Metrics for Comparing Domestic Climate Change Mitigation Efforts and the Emerging International Climate Policy Architecture," forthcoming in Review of Environmental Economics and Policy (2015). See also Joseph E. Aldy, "The Crucial Role of Policy Surveillance in International Climate Policy," Climatic Change 126 (3-4), p. 279–92. (3) As well as potentially reducing volatility in the price(s) of traded units. (4) The most significant current example of a purely bottom-up linkage of cap-and-trade systems is that between the US state of California and Canadian province of Québec. These two sub-national jurisdictions worked for several years to ensure that their system designs were sufficiently harmonised. The EU Emissions Trading System and the Regional Greenhouse Gas Initiative (northeastern US) are also, in fact, networks of linked cap-and-trade systems. (5) Gilbert E. Metcalf, and David Weisbach, "Linking Policies When Tastes Differ: Global Climate Policy in a Heterogeneous World," Discussion Paper 2010-38, Harvard Project on International Climate Agreements, July 2010; Daniel Bodansky, et al., "Facilitating Linkage of Heterogeneous Regional, National, and Sub-National Climate Policies through a Future International Agreement," Discussion Paper, Harvard Project on Climate Agreements, November 2014. (6) Aldy and Pizer (2015). (7) There have also been certain serious issues with regard to environmental integrity in the context of the Kyoto Protocol's International Emissions Trading system. These issues were unique to the Protocol, the importance of which is now greatly diminished, and the underlying circumstances — an emissions trading system embedded in a "top-down" international climate agreement — are unlikely to be replicated in the foreseeable future. (8) Michael Lazarus, et al., "Options for Restricted Linking: reporting on work-in-progress," presentation at research workshop, "Comparison and Linkage of Mitigation Efforts in a New Paris Regime," Harvard University, May 8, 2015.

Harvard Project on Climate Agreements

WORLD BANK GROUP Climate Change

FROM A TINY RIPPLE

The carbon market as we know it grew from several, separate initiatives around the world – which the 1997 Kyoto Protocol helped coalesce, and inspired further efforts. In an extract from IETA's forthcoming oral history, Katie Kouchakji looks at what was built with just a small amount of policy direction

For many observers, the carbon market truly began to take off in 2005, with the entry into force of the Kyoto Protocol and the start of the EU Emissions Trading System (ETS). In reality, work on market mechanisms to tackle rising GHG emissions had been ongoing since the late 1980s and really took hold after the Kyoto Protocol was agreed in 1997 – despite the rules for its flexible mechanisms not being agreed until 2001.

"The process to negotiate market mechanisms started with the mandate from COP 1 in Berlin," recalls Frank Joshua, who helped set up the flexible mechanisms when he was at the UN Conference on Trade and Development, referring to the first Conference of the Parties to the UNFCCC in 1995.

"The US had, at that point, signalled they were interested in discussing flexible mechanisms … leading up to the Kyoto conference in 1997, were a series of proposals, including one from Brazil on something called the Clean Development Fund that, at some point, became the Clean Development Mechanism [CDM]."

The road between the Kyoto Protocol being agreed and the rules for its flexible mechanisms being finalised in Marrakech in 2001 was long, as a result of lingering ill feeling after the end of the negotiations in Japan, says Joshua – which had overrun by two days.

"It was mainly the provisions on emissions trading [that held up the Kyoto talks], which had been objected to by many delegations," says Joshua. "The US insisted that they must be in and, at one point, the US delegation had threatened to walk out."

He adds: "The meeting eventually got around to fixing the question of emissions trading by deleting the paragraph on emissions trading and reinserting a paragraph at the back of the document, which is now Article 17 … which authorised emissions trading."

Dirk Forrister, now president of IETA, was negotiating for the US in 1997 in his capacity as Chairman of the White House Climate Change Task Force under President Clinton.

"The biggest challenge was trying to get global agreement on the use of markets," he says. "It was such a new thing – we had done it in the US on acid rain trading, but it was not a tool that had been used in a lot of other places, and it was one of the last things to be negotiated. It really went down to the wire."

GROWTH OF THE CDM

"The Kyoto Protocol was the first international piece of law that tried to articulate an idea of carbon rights and the trading of these carbon rights, and creating a market," says Martijn Wilder, head of Baker & McKenzie's global climate change practice, which was started following the Kyoto agreement. "Our vision was that the Kyoto Protocol, the CDM and international emissions trading really set a framework for really interactive private sector engagement in climate change."

The first CDM projects were quick off the mark, building off of previous experiences with government initiatives to reduce emissions. EcoSecurities was one such firm that translated its experiences into this emerging market and, by 2005, it had built up the largest private sector portfolio of CDM investments.

"Over time, we started recognising that the next stage of the market was going to emerge – there was going to be a real market, as opposed to companies trying to figure out a project," says Marc Stuart, one of the co-founders of EcoSecurities, of the early years.

"THE KYOTO PROTOCOL AND INTERNATIONAL EMISSIONS TRADING SET A FRAMEWORK FOR REALLY INTERACTIVE PRIVATE SECTOR ENGAGEMENT IN CLIMATE CHANGE"

– MARTIJN WILDER

"IT WAS LIKE A JUMP INTO THE UNKNOWN"

– CHRISTINE FAURE-FEDIGAN

Stuart and his business partner, Pedro Moura Costa, built the first certification system for third-party verification firm SGS in 1997, and it was this that prompted the establishment of EcoSecurities. The first project that they used this new system for was to certify the national GHG reductions of Costa Rica – before emissions accounting became standard under the Kyoto Protocol.

This work led Stuart and Moura Costa to other projects with governments and public sector institutions, before they looked to acquire their own carbon assets – often at a discount. But it paid off, and Moura Costa notes that by the time the Kyoto Protocol entered into force, the firm had the largest private sector portfolio.

"We got involved in something like 700 projects, developed and registered about 450, and about 54 technologies," he says, with the pair moving away from their initial projects in forestry as these projects were largely shut out of the Kyoto Protocol.

CARBON FUNDS: STIMULATING THE MARKET

The World Bank was also a significant player in the early years, with Ken Newcombe heading up its carbon finance unit. Its Prototype Carbon Fund (PCF) aimed to stimulate the market and show what could be done – in a similar fashion to how its current Pilot Auction Facility is showing a new model of finance for CDM projects. However, Newcombe says the greatest challenge was the fact that he worked for the Bank.

"It was both an opportunity and very difficult – some people call it being an 'intrapreneur', being an entrepreneur on the inside of a big institution," he says. "It was like making love in the time of cholera – it was, at the same time, really exciting and dangerous because you had a major proposal for change which was poorly understood and, in some quarters, unwelcome."

Newcombe says the road to the PCF began at the Rio Earth Summit in 1992, and culminated eight years later with the Fund's first close in April 2000, having raised $135 million (which rose to $180 million in later fundraising rounds) from both private sector firms and sovereigns. One of these investors included Gaz de France (GDF), now known as Engie.

Christine Faure-Fedigan, who is now the firm's director of corporate climate policy, recalls that, in 2000, it was a bit of a gamble to invest in the PCF as the firm was not yet then subject to carbon emission regulations.

"Carbon markets didn't exist, crediting projects didn't exist, we didn't know if we were going to have obligations, we didn't know anything about regulations," she says. "It was like a jump into the unknown." What swayed the decision was a sense by the board that, as GDF transformed from a gas supply company into a power generator, it would be subject to constraints in the future.

The PCF was an opportunity to "get us a better understanding of how putting a price on carbon would give us opportunities to develop new services and new products for our big consumers", says Faure-Fedigan. "Also we knew that there was going to be the possibility to use those credits against our possible future obligations."

Private sector funds followed suit, most notably Natsource's Greenhouse Gas Credit Aggregation Pool which, in 2005, raised €455 million ($498 million) at its first close – the largest in a private sector fund at the time.

"The hardest part was to get it launched," remembers Jack Cogen, then president of Natsource. "When the carbon markets first began… we had very little capital, and it was very hard for large industries to take us very seriously. We had to convince them that our intellectual property and staff was more than sufficient to make up for the capital and they should give us the money – which ultimately they did. We ended up raising about $1.2 billion at our height."

PREPARING FOR LIFE AFTER PARIS

Despite the difficulties of recent years and the near-collapse of the CDM, the private sector is keenly watching Paris for any ripple of policy that could spawn the next wave of market activity. As the past has shown, it doesn't take much to spark the innovations that the future needs – and this time, there are solid examples to draw from and build on.

"A lot of the early lessons that were learnt will be brought across," says Baker & McKenzie's Wilder – including on market

"IT WAS LIKE MAKING LOVE IN THE TIME OF CHOLERA – EXCITING AND DANGEROUS AT THE SAME TIME"

– KEN NEWCOMBE

linkage, CDM evolution, use of offsets and market design. "We've got a very solid base to work off."

"I think we'll build on the base of experience and exciting tools and existing markets," says Forrister. "We're seeing carbon markets take grounding in a lot of new places, and I think that's very healthy."

But, he adds, "It's frustrating to see the erosion of the market because the policy side, frankly, hasn't kept up with the business side … it will surprise you how creative and engaged the business community can be behind such a programme.

"We need to be taking the issue much more seriously and using this tool to its full potential. Right now, it feels like we're still revving the engines and getting ready to do something dramatic with it, but we haven't let it show its full colours yet."

Katie Kouchakji *is a freelance journalist who has covered the carbon market and climate policy since 2005. Formerly editor of Carbon Finance until 2013, Katie has also worked at Argus Media. She has worked as IETA's communications advisor since 2014 and is preparing an oral history of the carbon market for IETA, to be released in 2016. Katie has a degree in English Language and Linguistics from Durham University.*

(left) Participants on a site visit in Chile to one of the PCF's projects (right) Tombstone marking the total amount raised by Natsource's Greenhouse Gas Credit Aggregation Pool in 2005 – the world's largest private sector manager of carbon emissions assets at the time.

IETA
CLIMATE CHALLENGES
MARKET SOLUTIONS


THE FIRST WAVE

LESSONS FROM THE FIRST WAVE
MEMO TO POLICY-MAKERS

The first wave of carbon markets provided several lessons that programmes have since taken – and the early pioneers continue to learn from their experiences as time goes by. With a fresh wave of carbon markets under development, and the potential for the Paris agreement to inspire more, these early lessons are increasingly important.

The important thing is that all of these developments came from a tiny ripple of climate policy, and built up into the first wave of climate action. The greatest lesson? It doesn't take much to get innovators innovating, and to start making permanent disruptions to the world's emissions levels.

IT MAKES SENSE FOR CLIMATE POLICIES TO BE BUSINESS-FRIENDLY

The first kid on the block was the EU, with its emissions trading system (ETS). After much debate and in face of business opposition to a carbon tax, the EU embraced emissions trading as its leaders realised that it was the lowest-cost way to meet its Kyoto Protocol targets – as explained by Peter Vis, who was instrumental in its development.

REFORMS TO MARKET SYSTEMS SHOULD FOCUS ON IMPROVING THE OVERALL FUNCTIONING

Although not without its faults, the EU ETS has continually been improved since it began in 2005 as lessons have been learned, with the more substantial changes coming in recent years. With the final piece of structural reform in place, the Market Stability Reserve, the EU is now looking at its 2030 target and how the ETS will help get the region there. But throughout it all, it is important to bear in mind that reforms should be made because they make sense and improve the functioning of the system – and not because of the mistaken impression that a low price means the system has failed, as Ingo Ramming explains.

ENSURE THERE IS RELIABLE EMISSIONS DATA BEFORE STARTING ANY MARKET MECHANISM, AND THAT THE SYSTEM USES ROBUST ACCOUNTING STANDARDS – WHICH ALREADY EXIST

One of the most valuable lessons from the EU ETS is that there must be reliable emissions data to ensure environmental integrity of any market mechanism. Standards to measure, report and verify (MRV) emissions are key to giving confidence in the mechanism, and can help track progress. Madlen King looks at lessons from around the world when developing MRV approaches – and finds that there is no need to start from scratch with the Paris agreement.

THE CLEAN DEVELOPMENT MECHANISM (CDM) HAS MUCH TO OFFER A FUTURE AGREEMENT AND MARKET MECHANISM – BUT THERE MUST BE DEMAND TO SUSTAIN IT

Much of the institutional principles of the CDM will remain relevant beyond Paris: MRV, governance, transparency, price discovery, and so on. This holds true even if the CDM itself is dropped in favour of something new or is retooled. But none of this will matter if there is no demand, which is one of the greatest challenges it is currently facing, as Karl Upston-Hooper reports.

INTENSITY-BASED TARGETS WILL ONLY BE EFFECTIVE IF THE REDUCTION REQUIREMENT IS AGGRESSIVE

Over in Canada, North America's first carbon pricing programme is undergoing a revamp. One of the first courses of action for the newly-elected New Democratic Party government in Alberta was an increase in target and fee in the province's Specified Gas Emitters Regulation. Further changes are afoot, including the possibility of moving to an absolute cap, instead of the current intensity-based one, which can allow emissions to keep growing unless the reduction requirement is aggressive enough, explains John Goetz.

DON'T UNDERESTIMATE THE CONTRIBUTION FROM THE VOLUNTARY CARBON MARKET

It's not just compliance markets that have been making waves: over the course of 10 years, the voluntary carbon market has reduced an additional 1 billion tonnes of emissions. Often a testing ground for new ideas and projects, Jonathan Shopley says it is ready to scale up and do more, quicker than before – particularly as post 2020 pledges so far are not going to get us to 2°C.

TRY TO PROVIDE CLARITY SO BUSINESS CAN PREPARE

In the meantime, there are also firms using what is called a shadow carbon "price", in anticipation of future regulations. In a case study, Angus Gillespie from Shell explains how the firm applies what it calls a project screening value investments – and how the outcomes from Paris could affect this.

HOW EMISSIONS TRADING WON IN EUROPE

The world's oldest and largest carbon market was established in the EU more than 10 years ago – despite initial reservations about trading by the bloc's policy-makers. Peter Vis explains how the tide was turned

GHG emissions trading came about in Europe first, despite the initial reluctance of the EU towards employing the Kyoto Protocol's "flexibility mechanisms". Why was that so?

The first reason was that emissions trading was not a tax. Europe had been wrestling with the idea of a carbon/energy tax since it took such a legal proposal to the Rio Earth Summit in 1992. Economists usually argue that a CO2 tax is more efficient, being able to cover large swathes of the economy, and more certain with regard to the costs. Revenues would be raised that could be used for good purpose by national governments…

The reason it failed was primarily institutional: the EU's Treaty of Rome required then, as it requires still today, the unanimous agreement of all Member States on taxation issues. Several Member States could not agree to constrain their fiscal sovereignty by introducing such taxes at the European level when they already had such a freedom to act at the national level if they wanted to.

European businesses, as represented by BusinessEurope (called UNICE at the time), were also fiercely opposed to such a tax. They worried for their competitiveness, maintaining that it was certain to increase their costs, and sceptical that any of the revenues raised from industry would be recycled back to them.

When emissions trading was first floated as a possibility in 1998, its major virtue was that it was not a tax. Revenues might be generated if allowances were auctioned, but it was difficult to claim that emissions trading was a tax if allowances were allocated for free. The trading of allowances meant that money was "recycled" within business sectors. Emissions trading, therefore, avoided being typecast as a tax, although some tried to argue it was.

The importance of this was that the legal basis for emissions trading was the environmental Article of the EU Treaty, given that the primary purpose was to limit GHG emissions. Institutionally, the environmental legal base was of "co-decision", with the European Parliament and the Council deciding together, and the Council taking its position on the basis of a qualified majority of Member States. Crucially, this avoided the need for unanimity. That basic fact changed the dynamics completely, so that one or two Member States could not block the way forward.

There was, however, a second crucial element that helped the introduction of emissions trading. Businesses had welcomed insertion of the "flexibility mechanisms", such as emissions trading, into the Kyoto Protocol. In particular, Article 17 read that: "The Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3." Businesses were, however, less enthusiastic about the proviso that followed: "Any such trading shall be supplemental to domestic actions…"

It was not initially envisaged that emissions trading would be by operators; it was widely thought that emissions trading would be between Parties to the Protocol, which is to say between governments. When the European Commission first raised the possibility of emissions trading at company level, it was hard for business to argue that they welcomed the flexibility of emissions trading between governments but not between businesses. Businesses, after all,

IF SOMETHING WAS TO BE DONE ABOUT CLIMATE CHANGE, IT MADE GOOD ECONOMIC SENSE TO DO THIS IN A "BUSINESS-FRIENDLY" WAY

were the major emitters that governments would have to regulate, and they were also the ones who made investment decisions, so the logic that they should be covered by such an instrument was strong.

In the run up to, and subsequent to, the Kyoto Protocol being agreed in 1997, there were thought to be two ways of fulfilling the targets: by "domestic actions" or by the "flexibility mechanisms". The two were portrayed as alternatives. The more environmentally ambitious governments and green NGOs lined up behind domestic actions, which were generally thought to be such things as command-and-control regulations or taxes, and more liberal governments and businesses lined up behind the flexibility mechanisms.

This "supplementarity" provision had been included at the insistence of the EU, among others. As soon as the European negotiators returned from Kyoto, it became a priority to try and define exactly what this word "supplemental" meant. EU expert groups were convened to elaborate a definition. Many hours of my time were lost discussing how to define supplementarity, which eventually earned the shorthand name of a "concrete ceiling" (reflecting EU Council Conclusions text)[1].

When eventually agreed in May 1999, the EU went out to sell its definition to others, such as the United States. I recall accompanying my Commissioner, Ritt Bjerregaard, to visit Under Secretary of State for Global Affairs, Frank Loy, in Washington, to try and convince him. We managed to do no such thing, however. Third countries could not understand why we wanted to define supplementarity restrictively, when common sense suggested that it was anything "less than half" of a Party's effort to fulfil its target. The European definition was horribly complicated, but it amounted to a small percentage of the effort of Parties, and was never accepted by Parties as a whole.

This extended debate lasted a couple of years and took up a disproportionate amount of my time, just when there was much to do in developing the European Commission's concept of emissions trading. Although few could understand it, what mattered was that in the context of the debate on supplementarity, emissions trading was seen as a "good thing" by the business community, whereas domestic actions were seen as difficult, more costly and constraining. Perception is everything, and the debate unintentionally framed the way businesses viewed emissions trading: they saw that many environmental NGOs were against it, and that economically liberal countries such as the United States were for it, and concluded for themselves that it was not such a bad thing.

Minds were shaped by this debate, so that when the European Commission proposed

EMISSIONS TRADING AVOIDED BEING TYPECAST AS A TAX, ALTHOUGH SOME TRIED TO ARGUE IT WAS

emissions trading for operators, trusting business know-how would be able to respond more flexibly and cost-efficiently, it was too late for the business community to change its mind and say that emissions trading was bad… They had spent years lobbying for it to be used more rather than less. And, of course, many businesses saw that if something was to be done about climate change, it made good economic sense to do this in a "business-friendly" way.

In retrospect, the definition of supplementarity and the "concrete ceiling" made little impact – except in shaping minds. The EU's emissions trading system (ETS) was considered a domestic policy and measure within the bloc. The EU unilaterally constrained the use of the "flexibility mechanisms" for its Member States, although not very severely, and the debate about supplementarity moved on as it became clear that the EU Member States did not need much use of international emissions trading and offsets to meet their Kyoto targets. The use of offset credits from the Clean Development Mechanism (CDM) was capped for operators under the EU ETS, but that was partly in recognition that CDM credits do not actually reduce global emissions, but transfer emissions "rights" from one part of the world to another, in exchange for a financial transfer flowing from the purchaser of the credits to the vendor.

So, to summarise, emissions trading happened in Europe more easily because of the extended debate over supplementarity. The polarisation between emissions trading and other "flexibility mechanisms" of the Kyoto Protocol, on the one hand, and "domestic actions", on the other, made business more willing to embrace emissions trading as we know it today.

Finally, and crucially, emissions trading gave reassurance to both governments and businesses that what had been promised in Kyoto could be delivered cost-efficiently, minimising any burden on European industry. All this proved to be true, and, with ups and downs, emissions trading has stayed the course through its first decade, with every chance of continuing to deliver for the next 10 years and more.

*This article was written by **Peter Vis** while he was the EU Visiting Fellow at St. Antony's College, Oxford University, for the academic year 2014-15. Prior to that he was Head of Cabinet to Connie Hedegaard, European Commissioner for Climate Action (2010-14). An official of the European Commission since 1990, he worked extensively on developing and implementing the EU's emissions trading system from 1998-2005.*

(1) For the EU's proposal on defining a "concrete ceiling" see Council Conclusions on the Environment (paragraph 3) as agreed by the Agriculture Council of 17 May 1999: http://europa.eu/rapid/press-release_PRES-99-149_en.htm?locale=en

THE EU ETS @ 10: SLOGAN OR CORNERSTONE OF THE EU'S CLIMATE POLICY[1]

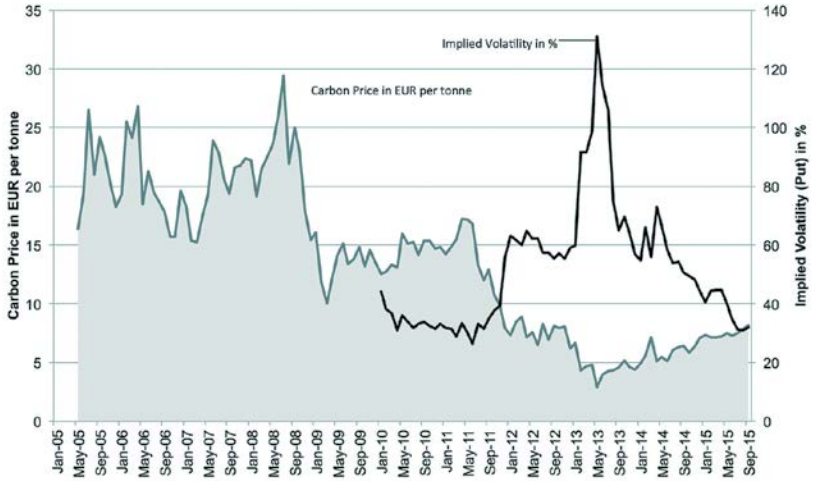
The European carbon market has been a volatile ride since the start of the EU ETS in 2005, with oversupply, recession and structural challenges to overcome. As it turns 10, Ingo Ramming reviews its first decade and debates if the EU ETS is finally fit for the future

With the start of the new millennium, carbon markets and emissions trading was the new buzz phrase which excited not only the financial community but also politicians, environmentalists and NGOs. The first trades were executed in 2003 and the start of the EU Emissions Trading System (ETS) in 2005 created a surprising feel good atmosphere and the impression that this was about more than just trading. More important, carbon pricing became a reality and moved from environmental circles into boardrooms.

Times were different. The global economy was flourishing, the Euro was strong and the EU was in expansion-mode. It was pre-financial crisis, with a strong belief in markets and deregulation. It was inspired by the challenges of transforming our energy system and preventing global warming.

However, once the economic crisis hit and the 2009 UN climate talks in Copenhagen resulted in a minimum consensus, it became increasingly difficult for policy-makers to balance often mutually conflicting goals or, as political scientist Roger Pielke Jr's phrases it in his 'iron law': "When policies focused on economic growth confront policies focused on emissions reductions, it is economic growth that will win out every time."

This is best illustrated by the development of European carbon prices. Allowance prices fell from a high of more than €30 ($32.56) per tonne of CO2e to €2.80 in 2013 on the back of a significant structural surplus of roughly 2 billion allowances – equivalent to one year of allocation. At the time of writing in October, prices for European carbon units were around €8.30.



WITH THE EU ETS, CARBON PRICING BECAME A REALITY AND MOVED FROM ENVIRONMENTAL CIRCLES INTO BOARDROOMS

"It's the economy, stupid", and the inflow of international offsets: these were the usual explanations for the surplus, but overlapping and conflicting policies had a significant impact, too. Furthermore, lost trust in Europe, European policies and Europe's inability to reform the EU ETS undermined the confidence of market participants. Discussions on aviation and the EU ETS were barely constructive and when negotiations on backloading, a quick fix to tackle the surplus, turned into a neverending story, many participants switched off, frustrated that any attempt to live and learn and improve a young market were delayed.

Since then a lot has changed, and policy-makers in key European member states, the European Commission and the European Parliament stepped up and pushed for reforms. The no drama-approval process of the Market Stability Reserve (MSR) helped to regain trust in the EU ETS and the longevity of the system. Carbon prices have recovered and implied volatilities of EUA options[2] fell significantly, indicating increased confidence.
Still, it is too early to declare "mission accomplished" and there are significant challenges ahead to reestablish the EU ETS as the leading policy instrument for the EU's future climate change response.

The MSR will ensure a better market functioning. It will rectify the lack of supply flexibility in the EU ETS and improve price discovery. However, the MSR will only start in 2019. Auctioning volumes will increase until then and will impact the supply and demand balance.

Another important factor that will drive supply and demand are developments in

the power sector. The power sector is going through a fundamental transformation on the back of the increase in renewable energy and deteriorating power economics. Improved energy efficiency will reduce power demand. Innovation in storage and demand-side management will change the structure. Trading around actual solar and wind production will become more important to power traders than long term strategic hedging. This will have a significant impact on the behaviour of utilities, hedging strategies, the so-called "natural demand" – and ultimately the price of carbon.

This makes long term carbon price forecasts very challenging. Historically, carbon price forecasts had a bias to the upside as growth assumptions were too positive and innovation was underestimated. Therefore, policy-makers should not focus on price and create the atmosphere that a high price means a successful EU ETS and low prices symbolise failure. Rather, reforms should be made because they make sense, make the EU ETS fit for purpose and fulfill its role as the central pillar of the EU climate change policy.

The EU ETS is the instrument of choice of EU regulators and businesses to reduce GHG emissions. It guarantees that the environmental objective (the cap) is met or not exceeded. It ensures the most cost-effective abatement options are developed as the instrument does not pick and choose technologies. It is technology neutral and lets the market decide which options are developed first. Furthermore, it is a European-wide system that minimises intra-EU competitiveness distortions that national policies cause.

The discussions on the revision of the EU ETS, the 2030 Framework and the Energy Union will define the future development of the European energy and climate policy. A successful outcome will ensure the achievement of the environmental objectives without harming economic development. Furthermore, to remain the EU's central pillar for reducing GHG emissions cost-effectively, it is important to ensure efficient regulation and avoid European or national policies that overlap or conflict with the objective of the EU ETS.[3]

POLICY-MAKERS SHOULD NOT CREATE AN ATMOSPHERE THAT A HIGH PRICE MEANS A SUCCESSFUL EU ETS AND LOW PRICES SYMBOLISE FAILURE

Ingo Ramming *is a Managing Director at Commerzbank and Co-Head of Commodity Solutions. He is also a member of the supervisory board of Deutsche Börse Commodities GmbH and co-chairs IETA's EU ETS working group. He was previously responsible for interest rate and hybrid structuring and greenhouse gas emissions at Dresdner Kleinwort, and worked in commodity structuring and fuels & assets at ENRON. Until 2013, he was an Executive Director and member of the board of Carbon Trade & Finance, a joint venture between Gazprombank and Dresdner Kleinwort/Commerzbank.*

(1) Views expressed in this article are those of the author and do not necessarily reflect the opinion of Commerzbank or IETA. (2) Implied volatility is one of the most important concepts for options traders and reflects expected price fluctuations over a given period. High volatilities reflect the expectations of big changes and vice versa. (3) For more details see IETA: Overlapping Policies with the EU ETS, July 2015

COMMERZBANK

THE DEVIL IS IN THE DETAIL

Madlen King writes on the whys and the wherefores of MRV

One cannot read about carbon markets without coming across numerous acronyms. One which appears more often than most is MRV. But what does it mean and why does it matter?

The three letters belie the complexity and contentiousness involved in their meaning: the monitoring (or measuring), reporting and verification of climate change actions. MRV provides the means for countries to have confidence to cooperate in setting ambitious targets for action, and establishes the rules by which all must adhere to ensure consistent, comparable and accurate submissions. Most importantly, it provides trust.

You will come across MRV in relation to organisational carbon reports; emission reduction and removal enhancement projects; and actions taken by nations to mitigate emissions. This includes their reporting through national inventories and communications, and more recently to climate finance, adaptation, capacity building and technology transfer.

What does MRV mean? The 'monitoring' or 'measuring' component refers to a wide variety of methods by which actions, emissions or reductions can be quantified. And these methods have varying degrees of complexity; of effort required; and therefore of uncertainty. From the simplest calculation approaches, such as those applying an estimation of the emissions based on the amount of fuel consumed or industrial activity and the carbon content of that fuel or intensity of the processes, to the more complex such as direct measurement within flue gases, the 'M' covers a great deal of effort to quantify and aggregate.

The 'reporting' component refers to the means by which the data and information that has been monitored is then reported; the method of reporting – whether through online systems or more simpler submissions and whether or not defined reporting formats are used; the content – whether it is simply the top level numbers and facts, or much of the underlying raw data and calculations; to whom it is reported – the UN, national regulators or publicly; and at what frequency – perhaps annually such as in an emissions trading system (ETS) and the national communications of parties for example.

Finally, the 'verification' component refers to how the emissions and supporting information that have been monitored and reported are independently assured. For the national communications of developed countries participating in the Kyoto Protocol, this is by an international expert review process, but for national market systems this can be by national regulators or expert independent third party verifiers. The depth and breadth of scrutiny involved in that process is described by the level of assurance and the materiality applied.

What is all the fuss about? Well, if you were reviewing the performance of a business you may look at the previous years' accounts. You would want those accounts to have been prepared in a standard way that ensures their completeness, you would want to be able to read those accounts in a way that is sufficiently transparent to be understandable, and is consistent and comparable with those of other businesses, and finally you would want to be assured that those accounts have been independently confirmed to be a true, fair and accurate representation. In essence, you would want to have trust in what was reported.

GHG emissions and actions to mitigate, adapt, finance and capacity build are no different, whether it is comparing national actions and inventories, organisational reports for regulatory compliance purposes, or project emissions reductions. Their completeness, transparency, comparability and accuracy through well-defined MRV are essential to have confidence in the results, and to build trust and cooperation from the outset.

Robust MRV provides confidence for the users of these systems – whether they be national governments, the boards of organisations, or all stakeholders – that all parties are pulling together, are being held to the same standards and requirements, and that the information that is being reported can be trusted and relied upon. At the top level, this is critical for international negotiations on climate agreements and targets, to ensure that the parties can and do move forward together with common aims and responsibilities. This also helps ensure that targeted actions are sufficient to meet the global objective of limiting global warming to 2°C.

MRV is by no means a new phenomenon. Since the start of the UK ETS in 2002 and followed by the EU ETS in 2005, organisations captured by these systems have been familiar with the requirements of an annual MRV cycle for their obligated emissions. Since 2001, the first year that GHG emission reduction projects could be registered under the Clean Development Mechanism (CDM), project developers have been used to MRV processes required both before and after project implementation.

However, MRV is a more recent development on the international stage. Since the inception of international action on climate change with the UNFCCC and the Kyoto Protocol, which established

MRV PROVIDES CONFIDENCE, RULES AND, MOST IMPORTANTLY, TRUST

the concept of national communications and national inventory reports, the MRV of parties' progress has been an important building block for agreements and action on mitigation. However it wasn't until the Bali Action Plan in 2007 that the term MRV was first used in this forum – and not until 2010, in Cancun, when a more detailed package of rules and guidelines were defined.

From the international perspective, there is therefore still much work to be done. Parties were invited to develop Intended Nationally Determined Contributions (INDCs) and submit them in the first quarter of 2015. While these are still trickling in, these should provide the necessary information to facilitate the clarity, transparency and understanding of the intended actions. However, the components of the more detailed future MRV systems in relation to the 2015 agreement still require definition in the upcoming negotiations at the end of the year in Paris and beyond.

What is needed is a means to be able to track progress toward the global objective of limiting global warming to below 2°C, by quantifying emissions reductions of individual actions, attributing them to individual nations in a consistent manner that avoids double counting, and to be able to tally those actions against the ambition gap. This would allow us to understand if actions are sufficient, or if further collaboration is needed to close the gap.

What is also needed is that the lessons from the experiences of MRV at a smaller national and regional scale under ETSs are learned from at the international level. These lessons have already taught us much, but not least is the importance of: testing and continually improving the MRV systems as time and experience progresses; the need for flexibility of approach to apply to different levels of process and experience; establishing an accurate baseline to ensure that targets are sufficiently ambitious and that emission reductions are truly being achieved; clear reporting formats and guidance to ensure that monitoring and reporting practices are consistently applied; and a robust independent and consistent verification process to assure the accuracy and completeness of the monitoring and reporting.

But these lessons are so far limited to the MRV of GHG emissions mitigation. The MRV systems required for the future must be designed to cover all commitments that we hope will be embodied in the Paris Agreement relating not just to mitigation but also to finance, adaptation, capacity building, and technology transfer and cooperation – subject to how these are all defined. If the "what" that the MRV is addressing is not detailed appropriately, then the system will not function effectively

THE MRV OF PARTIES' PROGRESS HAS BEEN AN IMPORTANT BUILDING BLOCK FOR AGREEMENTS AND ACTION ON MITIGATION

Without a robust MRV architecture in place, we risk further stalemate where parties have no confidence in the intentions, actions and achievements of each other. The many elements of MRV are essential for all parties to provide trust to commit to what are challenging contributions; trust that all are tested by common responsibilities; and trust that the reported results are a true and accurate account.

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CERTITUDE

THE MONTAGUES, THE CAPULETS AND THE CDM

What's in a name? That which the Kyoto Protocol calls the CDM would smell as sweet in the Paris agreement, writes Karl Upston-Hooper

Since its inception in 1997, in the form of Article 12 of the Kyoto Protocol, the story of the Clean Development Mechanism (CDM) has played out on the global stage, has involved a cast of thousands and has seen more highs and lows than a Shakespearean tragedy. Initial concerns about registration delays, the linking of the International Transaction Log with the EU's registry and categorisation of certified emission reductions (CERs) gave way to an explosion of participants and interest, double-digit prices and new carbon funds – all supported by a vibrant climate ecosystem of service providers.

Given the promise of the opening acts, the decline in the use of the CDM over the last few years has been surprising to many. However, the lessons learned and experience gained should endure: many tools, processes and approaches developed under the CDM can be used as a basis for facilitating investment into emissions reducing projects in a post-Paris world.

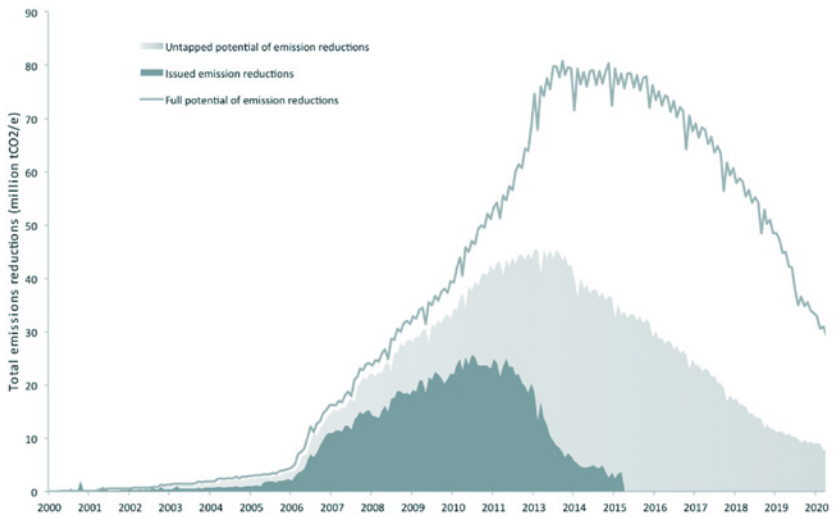
The passion that this innovative mechanism generated should be recalled. The CDM, through the use of price discovery by the market, enabled private investment into emission reduction projects on a scale that dwarfed existing public finance measures. By the end of the first Kyoto commitment period in 2012, 7,338 projects had been registered, a plethora of methodologies developed, more than $100 billion had been invested in emission reduction projects[1], technologies transferred, institutional capacity built in 110 developing countries and, perhaps most importantly, a emission reduction pipeline of 950 million tonnes of CO_2e per annum created.

Like many of Shakespeare's plays, the CDM has always meant different things to different people. For some it was aspirational, a tool to help developing countries skip to a low-carbon pathway. For others, it has always been about cost efficiency, the ability to discover the lowest cost abatement opportunities, maximising the bang for the buck and encouraging ambition in those with historic responsibilities. For many practitioners, the CDM was also an institution, a forum for developing, testing and contesting the nuts and bolts of project design and measurement, reporting and verification (MRV) – and accordingly has evolved into a global language that forms the basis of other policy tools such as Japan's Joint Crediting Mechanism (JCM) or the Gold Standard. Regardless of which side of the debate about issues like additionality or appeals you were on, a Montague or a Capulet, all would agree that the Paris Agreement must address the role of market mechanisms, and by implication the future of the CDM.

Just as Baz Luhrmann placed Romeo + Juliet in the MTV generation of Verona Beach, the modern context for the Paris negotiations is a world away from the Brazilian proposal for a Clean Development Fund that originally lead to the creation of the CDM. There are now many other carbon market travellers on the Road to Paris: the emissions trading systems of the EU, California and Québec, the Regional Greenhouse Gas Initiative, New Zealand, Korea, China, Kazakhstan; the innovative market systems in Mexico, Thailand and South Africa; the JCM; nascent programmes in Russia, Alberta and Chile, plus China's planned national ETS from 2017; and strong carbon taxes in much of Scandinavia. However, given the uncertain role that markets will play, based on the Intended Nationally Determined Contributions (INDCs) published to date, and the state of the negotiating text of the Ad Hoc Working Group on the Durban Platform (ADP), the Rime of the Ancient Mariner comes to mind: "Water, water, everywhere, but not a drop to drink".

Most observers are confident that, by the early hours of 12 December, there will be a Paris Agreement – but the $100 billion question is what role will markets be proscribed within this bottom-up world of nationally determined contributions (NDCs). Will meat finally be put on the bones of the discussions of future market mechanisms, or will the Brazilian proposal for CDM-plus be the new agenda item for the 2016 negotiations? Conceptually, delegates will have three (overlapping) options:

a. Continuing the use of carbon markets, although not necessarily in the form of the CDM, as a mechanism for achieving commitments/contributions made in Paris;
b. Relegating carbon markets to an implementation tool for climate finance initiatives; and/or
c. Acknowledge and encourage carbon pricing as a domestic instrument, albeit with international co-operation if possible.



Source: UNFCCC

As with the Montagues and the Capulets, these discussions occur in an environment lacking in trust and torn by disagreement over historic responsibilities and current realities. The CDM has some lessons in, if not overcoming, then navigating around these historic differences. Through standardising approaches to emissions monitoring and verification, providing clear process and procedures which can be used as a basis to disburse investment, and stimulating a network of co-operation and engagement between private sector actors, with government assistance, to put cleaner infrastructure on the ground. Although the CDM will not be the centrepiece of Paris Agreement, much of its institutional principles remain relevant. Price discovery through a market mechanism is efficient when properly regulated. There needs to be environmental integrity so that "a tonne is a tonne is a tonne", as UNFCCC Executive Secretary Christiana Figueres – a former member of the CDM Executive Board – has taught us. Subsidiarity is common sense and good governance, but needs to take place within the confines of an international agreement. Trading works best where there is a common currency, previously the CER, but perhaps now a new International Compliance Unit.

Prior to the Paris Agreement becoming effective in 2020, the CDM can provide a platform for nations to continue to support emissions reduction projects and much of the institutional infrastructure, from host country authorities to parts of the UNFCCC secretariat, can be used to assist in operationalising INDCs. Already, the World Bank's Pilot Auction Facility and the purchase programmes of the Swedish Energy Agency, the Nordic Environmental Finance Corporation and others are aiming to support the ecosystem that has evolved around the CDM. Although these measures provide some level of respite for disillusioned market participants and give confidence that a market mechanisms will persist, they would need to be scaled significantly to restore the confidence of the private sector: that is, investors need to see more demand for the end result (CER or another unit) before coming back. The Green Climate Fund implementing a results-based financing initiative, built around the CDM, would be one such mechanism to achieve a degree of scale.

During the course of the two weeks of negotiations in Paris, there will be more hostages, duels and victims (loss and damage, REDD+, response measures, CDM reforms, the Framework for Various Approaches, New Market Mechanism, IP rights for technology, voting rights, to name but a few candidates) than Shakespeare managed in Romeo and Juliet – and perhaps the CDM itself is one of them. If this is the case, then hopefully the lessons, principles, capacity and relationships that built the CDM are also not lost and find a place in the Paris Agreement, otherwise we are left with Juliet's immortal words: *Parting is such sweet sorrow that I'll say good night until tonight becomes tomorrow.*

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(1) According to the CDM Executive Board's 2014 status report, at least $138 billion – "probably significantly more" – had been invested in the CDM over the nine years from 2005-14.

GO WEST

Will Alberta lead again with its new climate change programme, asks John Goetz

Alberta's GHG emissions have been the subject of increasing scrutiny and criticism. The province accounts for the lion's share of Canada's emissions, emitting 267 million tonnes of CO2 equivalent (CO2e) in 2013, roughly 37% of Canada's total emissions.[1] Although Canada contributes less than 2% of global emissions[2], growing emissions from Alberta's oil sands has garnered significant attention from environmental groups and governments. Even with lower oil prices, oil sands production is still expected to increase by 800,000 barrels per day (bpd) by 2020, down from the previous forecast of 1.2 million bpd.[3] Several oil pipeline projects to ship Alberta oil to the US and coastal ports are being delayed, in large part due to the emissions profile of oil sands crude.

Alberta's GHG emissions profile is unique in Canada and elsewhere. Almost half of its emissions come from 100 large industrial facilities – a significant concentration of emissions from a relatively small group of sources. Alberta has limited hydro resources and an abundance of coal and natural gas. It has relied on inexpensive coal-fired generation (approximately 52%) and more recently natural gas (38%) for most of its electricity. The GHG emissions from these two fossil fuel sources are significant (45 million tonnes annually) and comprise about 17% of the province's emissions. Perhaps most significantly, Alberta is one of the world's largest oil and gas producers, and exports roughly 75% of its oil and 50% of its natural gas. Although only a quarter of its oil production is consumed domestically, extraction and processing generates 46% of its emissions. As Canada's largest emitter with growing emissions, its climate policies merit serious attention.

It is not widely known that Alberta was the first jurisdiction in North America to enact GHG regulations with the introduction in 2007 of a scheme that requires large emitters (more than 100,000 tonnes CO2e per year) to reduce their emissions intensity (measured per unit of production) by 12% from a historical baseline. The intensity approach was favoured over absolute reductions because it allowed the oil sands industry to continue growing and providing economic benefits as long as its emissions intensity decreased. Continued growth in oil sands production was expected to result in increased overall emissions until 2020, but then begin declining as technologies like carbon capture and sequestration were introduced to curb or offset these emissions.

Although new technologies and improved practices have reportedly resulted in a 20% intensity reduction,4 overall emissions continued to rise. A new provincial government, elected in spring 2015, has committed to a leadership role in developing a more effective climate strategy. So far, it has increased the stringency of the existing regulation (see box) and formed an advisory panel to recommend a comprehensive set of measures to further reduce GHG emissions.

The amended regulation effectively puts a ceiling on the market price of offsets and EPCs, which typically trade at a 5-15% discount from the fund credit price. The C$15 (US$11.39) ceiling has thus far been insufficient to generate the needed stimulus for renewable energy projects, new technology deployment and offset projects generally; only projects with extremely low implementation costs have been viable.

The government would like to change this and has set out a vision to support new technology adoption, renewable energy deployment and efficiency/conservation.

In its discussion document, the province's government has committed to exploring a wide array of policy approaches to reduce GHG emissions. In addition to the amendments to the existing regulations, it could augment or replace its current programme with policies including other carbon pricing approaches, such as a carbon tax similar to British Columbia or a cap-and-trade system similar to Québec and California. Other approaches like renewable portfolio standards, fuel standards, sector emission limits, emission performance standards and technology standards will also be considered, along with other incentive-based approaches such as feed-in-tariffs, tax credits, subsidies, government backed loan guarantees, power purchase agreements and efficiency and consumption reduction incentives.

Whatever it chooses, Alberta is exploring linking with other jurisdictions. This will be challenging if it opts for a more stringent version of its existing intensity-based programme, but not impossible. If it changes course and moves to a cap-and-trade system, linkage with California, Québec and Ontario would be likely. Many think it may be easier and more efficient for Alberta to continue making its current intensity-based programme more stringent rather than replacing it with an entirely new one. Regulated emitters are accustomed to the existing programme and intensity-based tools can reduce total emissions if the reduction requirements are aggressive enough.

ALBERTA'S SPECIFIED GAS EMITTERS REGULATION

In advance of its new climate action plan, Alberta's existing SGER has been amended significantly, increasing both the carbon price and the reduction requirements.

Prior to the amendment taking effect in 2016, large regulated emitters must reduce their emissions intensity by 12%. There are four compliance mechanisms for meeting this target:

1. Reducing emissions at the facility,
2. Purchasing verified offsets,
3. Purchasing technology fund credits (allowances) from the government (currently priced at C$15/tonne),
4. Purchasing or using emission performance credits (EPCs), or any combination of the above. EPCs are given to facilities that exceed their reduction targets in a given year and can be sold or used in later years.

In 2016, reductions increase from 12% to 15% and to 20% in 2017. The price of technology fund credits increase from C$15 to C$20 in 2016 and to C$30 in 2017.

Regulated emitters are still allowed to satisfy 100% of their compliance requirements using technology fund credits.

Alberta could continue to phase in more stringent reduction requirements and broaden the application of the regulation to cover more facilities and emissions, in line with jurisdictions like California, Québec and Ontario, albeit with diminishing returns. It can escalate the price of technology fund credits over time, but perhaps more significantly could also limit the percentage of fund credits that emitters can use to comply. Advocates of this approach say it would generate more actual reductions (rather than just paying into a fund) and stimulate deployment of emission reduction projects by removing the price ceiling on offsets and EPCs. The combination of increasing reduction requirements and limiting the ability to use fund credits would mean more real reductions will be required, increasing the demand for offsets and EPCs and establishing a new market-based price. This could result in the first true market price for carbon to date, but the impact of removing the price ceiling on offsets and EPCs would have to be closely assessed to ensure it would not result in unintendedly high compliance costs.

It is interesting to note the impact the amended regulations are already having, even though they are not effective until 2016. Prices offered on offsets for 2015 delivery have increased significantly, as have prices for 2016 delivery. This price increase may stimulate an increase in projects coming to the market.

Regardless of what is agreed at the Paris climate talks, governments within and outside Canada have already moved to take real steps toward climate change goals. Québec recently announced a 2030 reduction target of 37.5% below 1990 levels. Ontario is bringing in a new cap-and-trade programme in 2017 to link with California and Québec, targeting 37% below 1990 levels by 2030. In its Intended Nationally Determined Contribution (INDC), Canada is aiming for a cut of 30% below 2005 levels by 2030 and is relying on provincial programmes to achieve it. With its newly elected Liberal government, Canada is expected to increase its commitment to address climate change and either introduce a new programme or support the provinces' more aggressive emission reduction programmes.

The responsibility for nearly 40% of Canada's INDC will fall on Alberta. There is a great deal of momentum in Canada and around the world. Alberta's new government, led by Premier Rachel Notley, appears to want to join the party by announcing an impressive target and a programme for achieving it in time for Paris. It has to do this in the context of an economy that has suffered a major blow from falling oil prices and massive industry layoffs. This is no easy feat – but is a unique opportunity to revamp North America's oldest carbon pricing programme.

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(1) Climate Leadership Discussion Document, Government of Alberta, page 10 (2) Canada's INDC Submission to the UNFCCC (3) IHS Report: Oil Sands Will Continue to be a Leading Source of Global Oil Supply Despite Lower Oil Prices, Other Headwinds (4) Climate Leadership Discussion Document, Government of Alberta, page 9

DENTONS

WHAT ROLE FOR THE VOLUNTARY CARBON MARKET AFTER PARIS?

Jonathan Shopley examines the evolution of the voluntary carbon market – and anticipates a critical role in a post-Paris world

The IPCC's First Assessment Report in 1990 provided the scientific impulse for a global climate agreement and led to the Kyoto Protocol. This helped lay the foundations for a global carbon market that has waxed and waned along with political will and ambition. It also stimulated a small, environmentally-committed section of civil society and business to take early action by offsetting their unavoidable greenhouse gas emissions.

Over the past 10 years, voluntary action has grown slowly and steadily, delivering $4.5 billion in carbon finance for 1 billion tonnes of CO2e emissions reductions from a broad range of climate mitigation projects worldwide.[1] It is unlikely that aggregate ambitions of initial Intended Nationally Determined Contributions will deliver the emissions reductions required to limit the global average temperature increase to 2°C. Voluntary action that goes beyond regulatory requirements can close that gap – as has been shown in the past decade.

In fact, offset-inclusive carbon management may need to do some heavy lifting, and is well placed to do so for five notable reasons:

1. Enables corporates to price carbon into their capital allocation plans.
2. Directs carbon finance to parts of the global economy where it is most needed and most effective in delivering reductions and co-benefits.
3. Innovates and pioneers approaches that accelerate impact, and leverage private sector capital.
4. Provides the potential to link the disparate national and sub-national programs that are the likely outcome post-Paris.
5. Delivers tangible value to businesses using offset-inclusive carbon management strategies.

After three distinct stages of development, the voluntary carbon market (VCM) has demonstrated its capacity to complement policy and regulation, and is poised to make a critically important contribution to the climate change fight after the Paris negotiations.

PIONEERING EXUBERANCE

Hot on the heels of the 1997 Kyoto Protocol, hundreds of enterprises from Australasia across Europe and throughout North America offered offsetting solutions, and hundreds more developed low-carbon projects to supply compensating reductions. In the absence of independent third-party standards, most developed their own methodologies to calculate, verify, transact, and retire reductions. There was a mixed press on this 'Wild West' era: attention to quality and impact was eclipsed by a pioneering exuberance for jump-starting carbon sequestration and reduction projects around the world. The seeds were sown and took root, as early adopter celebrities, consumers, corporates and government agencies used offsets as an effective way to action their sustainability commitments and engage environmentally conscious audiences.

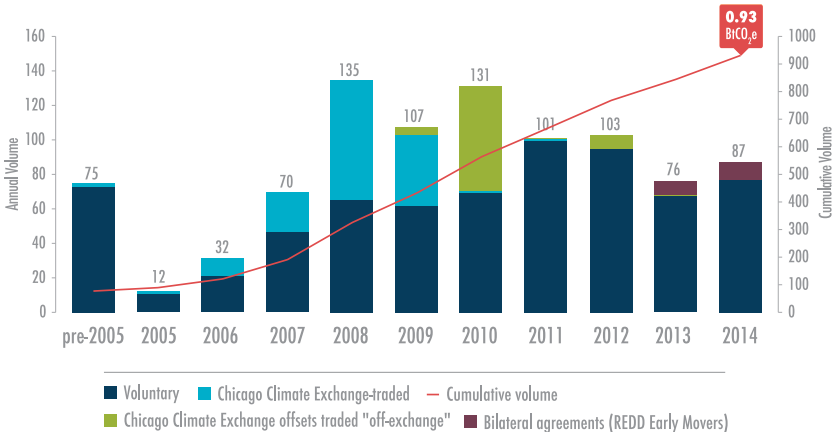
DELIVERING WITH INTEGRITY

The second era saw the quality and integrity of the VCM underpinned as third-party offset standards adopted and adapted the Clean Development Mechanism's (CDM) additionality tests. The Voluntary Carbon Standard (later renamed the Verified Carbon Standard, or VCS), referenced the comprehensive additionality approaches and combined them with validation and verification processes that reduced the transaction costs for voluntary carbon projects. Its agriculture, forestry and other land use (AFOLU) methodologies, launched in 2007, brought valuable innovation to a class of reductions poorly covered by the CDM, and a buffering solution for the permanence issues that undermined early stage enthusiasm for forestry projects.

In 2012, VCS launched a framework to account and credit reduced emissions from deforestation and forest degradation (REDD) projects implemented at national or sub-national scale. This provided the basis on which early REDD projects have secured funding in the VCM, and through which REDD approaches can be included in compliance regimes following a Paris agreement.

The NGO-backed Gold Standard pioneered a structured consideration of sustainable development aspects in CDM and voluntary carbon projects. While its original objective to strengthen the CDM's delivery of sustainable development outcomes has been frustrated by the reduced role of the CDM, it has made invaluable contributions by enabling small-scale projects and projects in least-developed economies to access carbon finance.

American Carbon Registry (ACR) and Climate Action Reserve (CAR) have led with standards for domestic carbon projects in the US. They developed cost-efficient offset methodologies, such as ozone depleting gas destruction and methane capture, to serve both voluntary and emerging sub-national compliance carbon markets in North America. Their work will be useful post-Paris, when there will be more opportunities to deploy domestic offsetting



Source: Ecosystem Marketplace

in both developed and developing nations. Then to round out investments in quality assurance, in 2007 a group of carbon offset service-providers established the International Carbon Reduction and Offset Alliance (ICROA, now part of IETA) to promote voluntary action as a valuable complement to compliance and regulation. Members' compliance to a Code of Best Practice is audited by a third-party annually. This self-regulatory initiative brought an overarching approach to quality assurance for buyers of offset-inclusive carbon management services, as it defines accepted practices for measuring, reducing and offsetting emissions, and communicating climate actions accurately.

SCALING IMPACT

With the integrity of the VCM on a more secure footing, the last five years has seen carbon finance expand to a wide range of project types that enable reductions in carbon emissions efficiently and rapidly, and also deliver a variety of other important sustainable development outcomes. Imperial College research[2] commissioned by ICROA in 2014 found that one tonne of carbon dioxide reduced brought an additional $664 in benefits to the communities where these projects are based, such as poverty alleviation and infrastructure development. This evidence of wider sustainability benefits in business supply-chains is shifting offset-inclusive carbon management from the corporate responsibility side-lines to the heart of corporate strategies to future-proof against risks from climate change and climate regulation. Tracking this trend, the Carbon Disclosure Project (CDP) found that 14% of respondents to its annual survey, or 265 companies, offset 50 million tonnes in 2014 – of which, 16.5 million tonnes was voluntarily purchased.

Voluntary offset adherents include Danone, General Motors, Microsoft and Marks & Spencer. Microsoft's 'Carbon Fee' programme places an internal price on carbon across its business units. The accumulated revenue is used to fund internal emission reduction projects, source renewable energy and to purchase a portfolio of carbon offsets. It reported in 2014 that, after three years, the programme was saving the company $10 million a year in addition to reducing annual emissions by 7.5 million tonnes CO2e. It also procured 10 million MW hours of renewable energy over the three years and found that community projects within its offset portfolio had delivered a positive impact for an estimated 3.2 million people.

AFTER PARIS ...

UNFCCC executive secretary Christiana Figueres managed expectations for Paris at the Lima negotiations by making the point that carbon neutrality, the cornerstone of voluntary carbon offsetting, is in fact what policy and regulation will have to deliver by the end of the century – if not sooner. She stressed that the vast majority of businesses, individuals or nations wishing to make absolute reductions to their emissions now will have to rely on quality offsetting.

The VCM challenge is set. It has the potential, the encouragement and momentum to move from niche player delivering 1 billion tonnes every 10 years to a respected component of national and sub-national initiatives making that impact annually, and delivering on sustainable development.

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(1) Ecosystem Marketplace, AHEAD OF THE CURVE: State of the Voluntary Carbon Markets, 2015. (2) ICROA & Imperial College, Unlocking the hidden value of carbon offsetting, 2014.

CASE STUDY: SHELL'S CO2 PROJECT SCREENING VALUE

Angus Gillespie explains how firms can screen investment options for future carbon regulations

Shell has long recognised the challenge of addressing climate change and has used an internal value for CO_2 in investment decisions for about 15 years, in recognition of the need for government action to address the externality cost of CO_2 emissions. Over that time, our approach has evolved and developed to find the most impactful means of ensuring current and future costs of CO_2 are adequately included in project economics.

The approach in Shell applies a uniform project screening value (PSV) of $40/tonne of CO_2e to the total greenhouse gas emissions of all investments. That real term value applies to all projects of all sizes and types in all regions of the world. The simplicity of Shell's CO_2 PSV based model helps its application. The unambiguous rules on CO_2 valuation are known and respected by economists and managers across the company.

Various forms of CO_2 valuation have been used by Shell over the years. An internal cap-and-trade system was tried, as were CO_2 values differentiated by regions and time periods, as many companies use today. Shell's general experience was that complexity created challenges with internal compliance with the process, either through innocent confusion or "creative gaming" by some to minimise project costs. The simple and uniform use of a $40/tonne CO_2 PSV is difficult to avoid.

Shell's CO_2 PSV is not a price forecast, but rather is a risk management tool that encourages CO_2 mitigation investments in preparation for when regulation would make those investments commercially compelling. From a CO_2 management perspective, the best points for influencing projects' mitigation choices are its development and refurbishment stages.

IF MATERIAL EVIDENCE EMERGES FROM THE PARIS TALKS OF EXPANDING CO2 REGULATION AMBITIONS, THAT WOULD PROMPT A REASSESSMENT OF THE SCREENING VALUE SHELL USES

Both need investment appraisals. The mandatory inclusion of a value on CO_2 in appraisals focuses management attention on limiting emissions – and so the corresponding relative cost of that item on the investment economics. That, in turn, improves the investment's robustness to future CO_2 regulation.

The benefits of having an internal CO_2 investment value exceed the internalisation of a significant future operating cost associated with CO_2 emissions. The CO_2 PSV helps "price-in" mitigation measures that cost less than $40/tonne, so bringing forward when those options prove economic. Project managers' natural sensitivity to CO_2 costs raises their levels of inquisitiveness and search for innovative, economic (now or later) CO_2 management opportunities and options.

In turn, that opens new opportunities to educate asset teams on CO_2 management. Quantification of the regulatory CO_2 risk exposure allows summation and reporting by country, asset class, business, etc., all of which enhances understanding. Related to that, quantification creates the ability to identify the "tall poppies" or the few assets that account for the majority of CO_2 exposure. That encourages our focus on the CO_2 management efforts at the points of maximum leverage.

The appropriate level of Shell's CO_2 PSV is reviewed on an annual basis, which needs a reassessment of expected trends in global CO_2 costs. For Shell, we have defined six regions that together account for over 90% of our future CO_2 exposure. Separate regional CO_2 cost projections to 2050 are developed. Those are then normalised to accommodate Shell's learned preference for a flat, all-encompassing CO_2 value.

While the outlook for global CO_2 costs has varied over the past five years, since Shell first made its CO_2 value public, our CO_2 PSV has remained constant at $40/tonne. The constancy has helped reinforce understanding inside Shell. To some extent, accuracy and its associated complexity has been sacrificed for effective application and compliance. Still, if material evidence emerges from the Paris talks of intensifying and expanding CO_2 regulation ambitions, that would prompt a reassessment of Shell's CO_2 PSV.

Applying a value on CO_2 emissions is not Shell's only basis of CO_2 management. It is one of a suite of complementary systems and processes. In that context, and as a response to a regular line of questioning when presented externally, it is useful to explain what Shell's CO_2 PSV is not and what it does not cover.

The PSV is applied to Shell's direct and indirect (Scopes 1 and 2) emissions but not to those associated with our products' final use (Scope 3), which can be covered

by other CO_2 risk management processes. Although it is derived from our views on future CO_2 regulation, the PSV is not a Shell CO_2 price or cost forecast. Because of its application at the point of investment, the CO_2 PSV does not apply to the economics of operating assets, other than through its influence on investment for maintenance and repairs. The CO_2 management trends that are not addressed by the CO_2 PSV are served by alternative processes.

Shell has found the CO_2 PSV to be a useful CO_2 management tool but as one of a family of systems, each suited to its own specific points of influence. Our approach puts special emphasis on the projects with the largest CO_2 emissions profile – our so-called "carbon critical projects". As well as using the $40/tonne PSV, carbon critical projects test their sensitivity to higher and lower CO_2 cost assumptions.
If these projects' economics prove especially sensitive to CO_2 cost assumptions, there are occasions when the standard CO_2 PSV is replaced by a bespoke (and centrally approved) projection of CO_2 costs for both the asset and its products. The various benefits of quantified CO_2 risk are then maintained while the relative accuracy of this approach exceeds that of the uniform $40/tonne PSV. Because of the effort needed for such derogation from using the CO_2 PSV, this approach is used for only a handful of carbon critical projects in any year.

There should come a point in future when Shell's use of a CO_2 PSV becomes redundant. That is likely to be when CO_2 regulation matures to the point that asset and project managers use actual projections of CO_2 costs for their own asset and product locations in their investment appraisals.

It is worth answering another question regularly posed when Shell's use of a CO_2 PSV is discussed externally: what advice would Shell offer to other companies planning to introduce their own CO_2 valuation methodology?

In terms of impact, our experience shows that process simplicity and, if possible, uniformity of valuing CO_2 provides real benefits. Paradoxically, companies' early attempts at valuing CO_2 are often ambitious with differentiated time bands, regions and project types. Such (understandable) quests for accuracy can create downsides in compliance.

The other piece of advice is to complement internalisation of a CO_2 value with other CO_2 management systems.

THERE SHOULD COME A POINT IN FUTURE WHEN SHELL'S USE OF A CO2 PSV BECOMES REDUNDANT

Valuation of CO_2 on its own will not drive sufficient actions to encourage robustness against future risks and uncertainties associated with CO_2 regulation. Still, if an organisation has to make a definitive first move, putting an explicit investment value on CO_2 is a very good place to begin, just as Shell did in 2000.

Angus Gillespie *is VP CO2 based in The Netherlands. His is a centralised team that oversees Shell's overall CO2 emissions and accompanying financial exposure with a cross-business, global basis. Angus was previously responsible for strategy development in Future Fuels & CO2, where Shell's biofuels growth plans were generated, and before that for the Shell Renewables business. Prior to switching to the "green side of the business", Angus worked in a variety of commercial roles in Shell's upstream businesses in Aberdeen, The Hague and Houston*


RIDING THE WAVE

LESSONS FROM RIDING THE WAVE
MEMO TO POLICY-MAKERS

On the heels of the first wave of action and markets, others soon followed – including the first compliance carbon markets in the US. Some of these initiatives were able to learn lessons of the early movers, such as the importance of accurate data acquisition and reporting, centralised infrastructure, market oversight and avoiding windfall profits. However, other regions have not entirely followed suit while remaining subject to political whims, prompting challenges for business planning and operations.

Nonetheless, these programmes rode the wave of climate policy through economic and political turmoil, and are still standing – and have lessons for the climate policy world after Paris.

REGULAR PROGRAMME REVIEWS ARE IMPORTANT
When it started, the Regional Greenhouse Gas Initiative (RGGI) was – like the EU ETS – plagued by an oversupply of allowances as the fuel mix in the power sector in the states covered had changed since the programme had initially been conceived. A comprehensive and transparent programme review in 2012 led to a tighter cap, among other changes which were smoothly implemented, and RGGI's next programme review launches in 2016. Katie Dykes writes that RGGI's evolution has underscored the practical benefits of regular reviews.

A MARKET-BASED APPROACH CAN REACT QUICKLY TO CHANGING CIRCUMSTANCES
The inherent flexibility of a market-based mechanism means it can react to situations in a way that a regulatory approach or series of complementary policies simply cannot. How, where and when technology breakthroughs will happen is unpredictable, so it's best to enable the market to do what the market does best: channel capital and resources to the right technology under the right circumstances to achieve policy goals at least-cost, says Dorothy Rothrock.

COMMON STANDARDS ARE IMPORTANT TO ENSURE INTEGRITY
One of the most important lessons from the Kyoto Protocol's Joint Implementation mechanism is that any project-based mechanism needs to have common standards, irrespective of where the project is based. Otherwise, there is the risk of damaging the credibility of the whole mechanism – and investors need to trust the integrity of the programme if it is going to be successful, warn Hanna-Mari Ahonen and Kari Hämekoski.

INITIATIVES TO PROTECT FORESTS NEED SUPPORT POLICIES AT BOTH DOMESTIC AND INTERNATIONAL LEVELS
There is no doubt that an international mechanism to support reducing emissions from deforestation and degradation (REDD) is needed to drive much-needed finance and demand for the outcomes, says Robert O'Sullivan – but this needs to be underpinned by robust and transparent domestic regulations combined with incentives to preserve forests.

POLICY INSTABILITY IS ONE OF THE – IF NOT THE – BIGGEST CHALLENGE TO BUSINESS
Constantly changing policy track according to the political whims of the day, as seen in Australia over the past decade, is less than conducive to long-term planning by business, writes Cameron Reid. And while there may be opportunities, if the policy itself still isn't clear, these could go untapped.

CLEARLY-DEFINED, TRANSPARENT RULES ARE CRITICAL
When designing any new policy, the lesson from Korea is to ensure transparency in the process, argue Sungwoo Kim and Hyoungchan Kim. This includes being clear about how future emissions projects are derived and ensuring that stakeholders are involved in the process as they will be shouldering the effort.

EMPOWER SUB-NATIONAL LEADERSHIP AND ENGAGEMENT
Ontario's Minister of Environment and Climate Change, Glen Murray, makes the case for sub-national involvement at all levels of climate policy formation, noting that sub-national governments are dealing with both energy and climate policies – including infrastructure and energy planning – as well as the realities of climate change. He also notes that using a market-based approach means it is no longer a choice between growing an economy or cutting emissions.

LINKING CARBON MARKETS BRINGS ECONOMIC BENEFITS
Widening the pool of a carbon market through linking brings greater liquidity, says Dominik Englert, which is better for price discovery. It also allows for more emissions reduction opportunities to be exploited. Following the California-Québec linkage, the proposed link between the EU ETS and Switzerland is learning that technical compatibility is an important consideration.

THE REGIONAL GREENHOUSE GAS INITIATIVE IN 2015 – AND BEYOND

Katie Dykes evaluates the progress made by the first US cap-and-trade system targeting CO2 emissions since its launch in 2009 and what lies in its future

The year 2015 has been an exciting one for climate change policy. As participating states in the Regional Greenhouse Gas Initiative (RGGI), we recently marked the seven-year anniversary of our first-ever auction, and our established track record of success is growing by the day. As of the time of writing, we've had 29 successful quarterly auctions of CO_2 allowances

We've learned many invaluable lessons in the process, and shared our experiences with others working to set up their own programmes. In 2012, we were pleased to congratulate California on the launch of their own carbon trading initiative, and later to watch Québec join in and now Ontario prepare to participate.

Throughout this time, the RGGI states have remained committed to continuous programme improvement. Our 2012 programme review set a variety of improvements in motion, most notably a 45% reduction in the RGGI cap. The new cap was implemented in 2014, and almost two years out, we can see it was a smooth transition. The experience has underscored the great benefits of regular programme review; inevitably, conditions change over time, new research is published by experts, and new feedback emerges from stakeholders. The past year has also seen the release of several new independent studies and reports reinforcing RGGI's success. An independent study from the Analysis Group in 2012 quantified the economic benefits of RGGI's first three years. Recently, the Analysis Group issued a new report covering the period from 2012 to 2014, which finds that the second three-year period generated $1.3 billion in net economic benefit, and 14,200 jobs.[1]

Like the 2012 report, this report found that benefits were created in each of the nine RGGI states.

Another new report quantified the considerable health benefits of the RGGI states' move to cleaner fuels, finding that the transition has saved hundreds of lives, prevented thousands of asthma attacks, and reduced medical impacts and expenses by billions of dollars.[2] A third report separately found RGGI to be a significant driver in the carbon pollution emissions decline experienced in the region.[3] More evidence comes in all the time to the effect that RGGI is driving pollution reductions, delivering consumer benefits, and advancing the prosperity of the region as a whole.

Of course the biggest climate policy development of 2015, at least as it relates to RGGI, is the US Clean Power Plan (CPP). The CPP is a landmark achievement for US climate policy, imposing the first national carbon emission standards on power plants. A proposed rule was released in the summer of 2014, accompanied by an extensive national stakeholder outreach process which the Environmental Protection Agency (EPA) described as "unprecedented"; more than four million comments were submitted.[4]

Now that the rule is final, the RGGI states are pleased that the rule continues to support multi-state mass-based programmes as a cost-effective route to achieving emissions reduction goals, and has maintained the great flexibility provided to the states. Meanwhile, EPA summaries suggest that the rule will actually increase nationwide emissions reductions, a measure which the RGGI states supported in our comments to EPA on the proposed rule.

Many initial analyses of the final rule noted that the changes to the CPP building block methodology encourage more states across the nation to pursue cost-effective renewable energy options. Our earlier comments to EPA reinforced the importance of equitable renewable energy targets, and our own track record shows our commitment to renewables, with a 63% increase in non-hydro renewables between 2005 and 2013.[5]

Several RGGI states are pioneering innovative methods to finance and develop clean energy. Connecticut has implemented the nation's first Green Bank and, in the wake of its success, New York followed suit this year. In 2014 alone, the Connecticut Green Bank deployed nearly $20 million and approved an additional $5 million for projects, enabling the deployment of 3.5MW of clean energy and preventing the emission of more than 61,000 tons of CO_2.[6] The New York

RGGI IS DRIVING POLLUTION REDUCTIONS, DELIVERING CONSUMER BENEFITS, AND ADVANCING THE PROSPERITY OF THE REGION AS A WHOLE

Green Bank is aiming for $1 billion in capitalisation, and early estimates suggest this could produce as much as $8 billion of additional private sector investment in clean energy projects over the next 10 years.[7]

Another important development noted in many initial analyses of the final CPP rule is a shift towards greater recognition of the accomplishments of early actors in reducing emissions, combined with greater requirements of those that have not yet taken advantage of cost-effective emissions reductions. This is also in line with the RGGI states' comments.

Though our states' goals remain among the most ambitious in the country, we're well-placed to meet them thanks to RGGI and the complementary programmes we already have in place. It's too early to say whether any technical changes will be needed to RGGI itself, but we'll be able to discuss and address that topic in the course of our upcoming 2016 programme review process. Likewise, it's too early to say whether RGGI might grow or expand, but we have the groundwork in place to plan for that possibility.

Looking ahead, we know that climate action will only increase in importance. The past year saw the issuance of the first US Quadrennial Energy Review, which found that severe weather is the leading cause of power disruptions, costing the US economy from $18 billion to $33 billion a year.[8] Like other RGGI states, Connecticut is already struggling with impacts from severe storms and sea level rise. This provides even more motivation to cut our emissions, and reinvest RGGI proceeds in measures such as energy efficiency that will improve grid reliability and reduce consumer costs.

The national pledges made so far leading up to Paris show that many leaders think the same. The RGGI states account for more than 15% of US GDP,[9] and the Congressional Research Service found that our total emissions from energy consumption are comparable to those of France.[10] Our states' achievements have global significance, both in terms of our actual reduction in carbon pollution and in setting an example and sharing our experiences for the benefit of others.

To nations preparing to assemble in Paris, our message is this: our experience shows that reducing harmful carbon pollution can go hand in hand in hand with economic prosperity, grid reliability, consumer benefits, and job creation. We've shown this both in our clearly observable track record, and in a variety of independent studies, reports, and analyses. After seven years of success, we're pleased to continue to share the benefits of our experience with the world.

THOUGH OUR STATES' GOALS REMAIN AMONG THE MOST AMBITIOUS IN THE COUNTRY, WE'RE WELL-PLACED TO MEET THEM

Katie Dykes *is Chairwoman of the RGGI Board of Directors and Deputy Commissioner for Energy at the Connecticut Department of Energy and Environmental Protection (CT DEEP). Katie provides leadership at a defining moment in the agency's history as DEEP moves forward to achieve the goals of Connecticut's energy agenda by bringing cheaper, cleaner, and more reliable energy to the state.*

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RGGI Inc.

CALIFORNIA: CLIMATE CHANGE LEADERSHIP WORTH FOLLOWING

Dorothy Rothrock writes about California's leadership on climate change, the challenges that lie ahead, and how a broad carbon market is the most cost-effective way to reach new emission reduction goals

California took another big step to demonstrate leadership in the effort to impact global climate change in 2015. Feeling confident that emission reduction targets for 2020 will be readily achieved, state leaders began the process of developing policies to reach ambitious new 2030 and 2050 goals (40% and 80% below 1990 levels, respectively). They are looking to the upcoming climate change gathering in Paris to highlight our success so far and encourage other countries to take up this challenge. The important work, however, will be when they come home and face the daunting challenge of imposing rules to reduce emissions far faster and greater than current regulations will accomplish by 2020.

One of the most important objectives of the California programme is to provide leadership to encourage others to follow with similarly ambitious policy. As has been acknowledged by Governor Brown, if others do not follow, all is for naught when it comes to addressing climate change. Therefore, it is worthwhile to examine the challenges and opportunities as California strives to achieve success as a global climate leader.

THE DIFFICULTY OF THE TASK

Reaching targets beyond 2020 will require a fundamental transformation in the way California produces and uses energy, with significant uncertainty as to the availability and cost of the technology necessary to allow for that transformation. Governor Brown has said that the post-2020 programme will be "far more stringent" and "far more difficult" than the current programme.

According to the state's Scoping Plan Update, achieving post-2020 emission reduction targets "will require that the pace of GHG emission reductions in California accelerate significantly. Emissions from 2020 to 2050 will need to decline several times faster than the rate needed to reach the 2020 emissions limit."[1] Even for the most well-designed programme, the challenge will be daunting.

THE SUCCESS TO DATE OF THE CURRENT PROGRAMME

The relative ease with which the current goal appears to be being met could provide policy-makers false assurance that the next steps will also be easy.

The increased challenge in meeting the 2050 goal lies not only in the relative difference in the scale and pace of the reductions, but also because of some transitory events which are contributing to the ability to meet the current goal. These include:

1. the deep recession, which has been perhaps the single largest contributor to emission reductions to date,
2. the court ordered freeze of the Low Carbon Fuel Standard, which delayed impacts from much more challenging compliance targets, and
3. the precipitous drop in crude oil (and gasoline) prices – that occurred concurrent with the inclusion of fuels in the cap and trade programme.

RELYING ON COMPLEMENTARY POLICIES

Ultimately, California policy-makers may be forced to choose between either meeting new challenging targets by letting markets decide the technology path, or steering the programme over the finish line by picking and choosing which emissions are reduced, how and when. Unfortunately, state policy-makers appear to have chosen the latter path for now. We don't believe policy-makers are equipped to design a series of "complementary measures" that will successfully determine the precise timing and "recipe" of emission reductions needed to meet this century-scale challenge. How, where and when innovation occurs is simply too difficult to predict.

A market-based approach, such as an improved and expanded version of the state's cap-and-trade system, is the policy alternative that provides the assurance of meeting a specific emissions reduction target while delivering this outcome at the lowest cost. A market-based approach can react quickly to evolving technologies and new approaches in a way that a regulatory approach or series of complementary policies simply cannot.

As California looks toward the meeting its longer term goals, it's more important than ever that the focus be on the most efficient and cost-effective approaches. A market-based approach would drive down emissions while minimising costs to the economy. Continuing the current path which relies heavily on complementary policies greatly increases the potential for the state's efforts to be both expensive and unsuccessful.

USING CLIMATE POLICY TO ADDRESS MULTIPLE OBJECTIVES

Many of the activities undertaken to achieve the 2020 target may result in various environmental co-benefits. It is important to acknowledge, measure and document these co-benefits, and where possible and consistent with the most cost effective GHG reduction solution, seek to maximise them. However, the state should not let a goal to achieve co-benefits drive the design of GHG reduction policies.

The current programme focuses too heavily on benefits and objectives unrelated to GHG reduction, and achieving these co-benefits is the aim of many of the more costly, and ineffective elements. To be successful in achieving its primary objective, the programme should reduce GHG emissions at lowest cost and not be designed to create desirable, though secondary, benefits. This is especially true when co-benefits can be achieved with separate, targeted policies.

DEMONSTRATE THAT WIDER CONSENSUS IS POSSIBLE

If regulations are imposed through heavy-handed political pressure rather than fact-based analysis, the policies may not be sustainable for a transformative long-term challenge like climate change. Moreover, jurisdictions we want to recruit to join the cause will likely not have the same progressive electorate or single party control of state government as California. These other jurisdictions will demand credible economic analysis to build consensus and to demonstrate that policies can reduce emissions at a reasonable cost.

California could bring along the regulated communities in other jurisdictions to obtain acceptance, if not support, for these policies through a robust process of stakeholder involvement and outreach. Rather than a "decide–announce-defend" approach, California's leadership in persuasion and compromise could overcome resistance and clear the path for broad participation in GHG reduction efforts.

RECOGNISE THE VALUE OF ALL EMISSION REDUCTIONS

To increase the potential for global climate change impacts, California must successfully encourage action by others. But California policy-makers have not consistently adopted positions that promote such action. On one hand, policy-makers acknowledge the global nature of the problem and the need for others to act. On the other hand, policy-makers seem intent on valuing only in-state emission reductions and minimising the role of out-of-state emission reductions in its cap-and-trade programme. The state must decide whether it is internationalist or isolationist when it comes to climate change.

A MARKET-BASED APPROACH WOULD DRIVE DOWN EMISSIONS WHILE MINIMISING COSTS TO THE ECONOMY

THE IMPORTANT WORK WILL BE WHEN THEY COME HOME FROM PARIS

One way the state could encourage and recognise such action (while at the same time reducing the cost of its programmes on its consumers and industry) is by expanding its use of offsets – both quantitatively and geographically. Recent actions to consider international sector-based offsets as early as the third compliance period is a positive signal. As Berkeley economist Severin Borenstein has said: "It's time to make our Global Warming Solutions Act about global solutions".[2]

The path we take in the next version of California climate policy will be closely watched around the world. CMTA hopes that state regulators embrace the policy approaches that will most likely result in effective leadership to reduce global GHG emissions.

Dorothy Rothrock *has been President of CMTA, the only state-wide organisation solely dedicated to advocating on behalf of the state's manufacturing and technology companies, since 2014. She had been an energy lobbyist and the Association's VP of Government Affairs since 2000. She regularly speaks to policy-makers, media and civic groups about the importance of manufacturing investment and job creation, and how well-designed laws and regulations can promote environmental protection, public health and economic prosperity.*

CALIFORNIA MANUFACTURERS & TECHNOLOGY ASSOCIATION

(1) Proposed First Update to the Climate Change Scoping Plan: Building on the Framework, February, 2014. Page 37 and Figure 6, page 38. (2) Severin Bornstein, Blog post 4/7/14, Energy Economics Exchange, University of California at Berkeley, Haas School of Business

SAFEGUARDS AND INCENTIVES FOR CROSS-BORDER MITIGATION: LESSONS FROM JI

As we move to a climate agreement that sees every nation taking action, Hanna-Mari Ahonen and Kari Hämekoski look at what lessons can be taken from experience with Joint Implementation

The Kyoto Protocol's Joint Implementation (JI) is an international tool for harnessing private sector resources to voluntarily identify and realise mitigation potential in countries with emission caps beyond what is required by national law or incentivised by host country policies. Conceptually, JI offers a blueprint for two key functions relevant for any robust climate policy framework: quantification of the emission reductions achieved by specific mitigation efforts, and provisions for sharing the emission reductions between the host country and other participants in contexts where overall emissions are capped.

Practical experience with JI provides valuable lessons about the versatility and diversity of this flexibility mechanism, challenges associated with multiple inconsistent standards, the importance of trust in the quality of emission reductions, and models for avoiding double-counting of mitigation outcomes even in complex cases with overlapping climate policies and mechanisms.

Effective climate action requires cross-border cooperation between countries, between different sectors within a country, and between governments and the private sector. Current and future climate action consists of various types of mitigation targets, policies and measures at international, national, regional, installation and sectoral levels, creating a fragmented landscape of mitigation incentives. Within an economy-wide emissions cap, some mitigation action may be required by regulation, certain emissions restricted by caps, and further mitigation potential may or may not be incentivised by domestic policies and measures.

JI PROJECTS BY HOST COUNTRY

Host country	projects
Ukraine	321
Russia	182
Czech Republic	59
Poland	40
Bulgaria	38
Romania	21
Lithuania	20
France	17
Estonia	14
Germany	13
Hungary	13
OTHERS*	23

*Belgium, Finland, Greece, Spain, Sweden, New Zealand, Slovakia, Latvia. Source: UNEP DTU JI Pipeline, October 2015

EFFECTIVE CLIMATE ACTION REQUIRES COOPERATION BETWEEN COUNTRIES, BETWEEN DIFFERENT SECTORS, AND BETWEEN GOVERNMENTS AND THE PRIVATE SECTOR

LESSON 1:

JI IS A VERSATILE MITIGATION TOOL THAT, DEPENDING ON THE CONTEXT, CAN BE USED TO SUBSTITUTE, COMPLEMENT OR SERVE AS DOMESTIC MITIGATION POLICY.

JI introduces a carbon price, which acts as a mechanism for discovering and realising least cost mitigation potentials within a covered sector (or country). The incentive is the possibility to count the mitigation outcome – the Emission Reduction Unit (ERU) – towards the investor's compliance. Such cross-boundary flexibility can enhance cost-effectiveness by unleashing joint low-cost mitigation potential instead of implementing more costly mitigation potential on one side of the border, while leaving cheaper options untapped on the other.

JI was originally designed as an international mechanism between two countries with caps, but host countries have used it creatively as a domestic cross-sectoral mitigation tool, for example allowing unregulated sectors to supply emission reductions for capped sectors under an emissions trading system (ETS), as illustrated by the EU and Switzerland in their submissions to the UNFCCC[1].

It is up to the policy-maker to determine the role and scope of JI in the overall policy mix, taking into account interactions between different policies and measures. For landfill gas capture, JI was the sole incentive in Russia and Ukraine, whereas in some EU accession countries, such as Lithuania, JI served as a transitionary tool to incentivise early action ahead of regulation that mandated landfill gas capture, thus rendering the activity ineligible under JI once the regulation came into force. Denmark, Spain and Switzerland have experimented with domestic mitigation support schemes modelled on JI, whereby the government or regulated installations pay for domestic emission reductions quantified in accordance with domestic JI-like standards.

LESSON 2:

JI CAN HARNESS PRIVATE SECTOR RESOURCES TO VOLUNTARILY IDENTIFY AND REALISE MITIGATION POTENTIAL BEYOND THE PACE AND LEVELS ACHIEVED BY DOMESTIC POLICIES AND MEASURES.

The private sector needs clear and predictable rules, stable and transparent processes and a sufficient price for emission reductions to incentivise investments in mitigation. Even where the scope for JI is limited to small niches of unregulated

emissions, JI can be a valuable private sector-driven tool for discovering mitigation potential and costs, identifying and bridging of policy gaps and promoting innovation and transition to new policies.

For example, in the case of nitric acid plants, JI realised untapped low-cost potential to reduce nitrous oxide emissions. Several countries used JI to incentivise voluntary early mitigation beyond the levels required by environmental permits ahead of the sector's incorporation into the EU ETS. Some set stringent benchmarks for crediting, thereby retaining part of the mitigation benefit as a contribution towards the national target, while allowing further emission reductions to be sold to finance the mitigation investment.

LESSON 3:

COUNTRY-SPECIFIC STANDARDS CAN CREATE FRAGMENTATION AND MISTRUST IN JI, THEREBY UNDERMINING THE CREDIBILITY OF THE ENTIRE MECHANISM.

Originally, the quality of JI projects and ERUs was assessed either under the host country-specific Track 1 or the UN-supervised Track 2. A recent study[2] questions the environmental integrity of a large share of JI projects and issued ERUs, suggesting that the share of issued ERUs with questionable quality varies significantly for the four countries analysed: from over 80% in Ukraine and Russia to 0% in Poland and Germany. Ukraine and Russia have surplus emission quotas under the Kyoto Protocol, which may weaken incentives to control the quality of the issued ERUs compared with countries with targets that require deviation from business-as-usual emissions which have strong incentives to ensure that ERUs are only issued against real emission reductions that are reflected in their GHG inventory.

Mistrust towards the quality of ERUs from some countries has spilled over to entire JI market, undermining the market for environmentally robust JI activities. The ongoing JI reform is developing a single-track approach with international oversight to ensure common minimum standards across all activities, enhancing the credibility and consistent application of the mechanism independent of the ambition level of host country targets.

LESSON 4:

TRANSPARENT PROCEDURES AND ACCOUNTING ARE NECESSARY – BUT ARE NOT NECESSARILY SUFFICIENT FOR ENSURING CREDIBILITY.

Current JI rules do not ensure transparency – but they do ensure that the ambition embedded in the collective Kyoto target is maintained through the conversion of ERUs from the national emission quota. Transparent information on standards and their application is crucial for assessing environmental quality, and robust tracking and accounting are essential for ensuring that emission reductions are not double-counted towards compliance. However, transparency and accounting alone cannot guarantee that the units issued and used for compliance meet minimum standards and represent real mitigation.

LESSON 5:

TRUST IN THE QUALITY OF THE MECHANISM IS ESSENTIAL FOR ITS FUNCTIONING, AND CALLS FOR INTERNATIONAL COORDINATION AND OVERSIGHT.

This trust comes from striking a balance between international oversight and national implementation. This requires robust international minimum standards for eligibility, baselines and quantification of emission reductions; appropriate national application of such standards to fully reflect relevant host country policies, circumstances and priorities; and independent verification and effective enforcement to ensure that standards have been met and appropriately applied.

TRUST IN THE QUALITY OF THE MECHANISM IS ESSENTIAL FOR ITS FUNCTIONING

International procedures for approving methodologies and accrediting auditors can promote consistency and minimum quality across activities. The ongoing JI reform process is considering all these elements, with the aim of transforming a decade of lessons into a blueprint for an environmentally robust tool to incentivise and quantify real cooperative mitigation outcomes.

Hanna-Mari Ahonen *joined the Swedish Energy Agency in 2013 and is engaged in the Swedish Programme for International Climate Change Mitigation and UN climate negotiations, specialising in international flexibility mechanisms. Since 2003, she has worked on pioneering carbon market initiatives at the Finnish Ministry of the Environment, the Finnish Environment Institute, GreenStream Network and the Nordic Environment Finance Corporation. She holds a M.Sc. in Environmental Economics.*

Kari Hämekoski *joined the Nordic Environment Finance Corporation in February 2010 to manage various climate and carbon finance activities. He has been working on JI since 1999, for Pöyry, the Finnish Government and the World Bank. He holds a M.Sc. in Environmental Science.*

(1) Kollmuss, A., Schneider L. and Zhezherin, V. 2015. Has Joint Implementation reduced GHG emissions? Lessons learned for the design of carbon market mechanisms. Stockholm Environment Institute, Working Paper 2015-07.

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EXPANDING REDD+ FINANCE

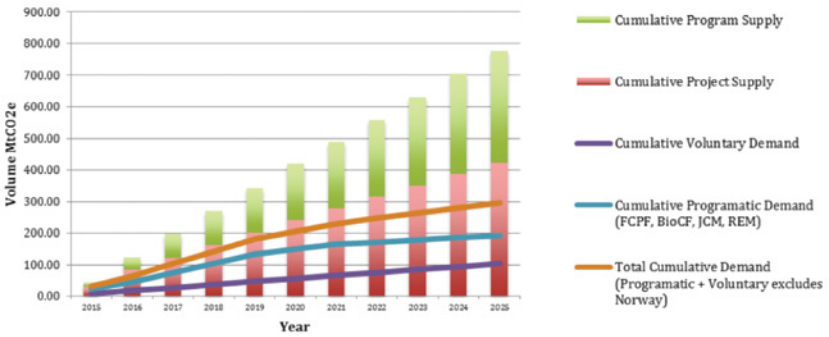
A combination of approaches is needed to finance REDD+ and sustainable land use. Developing countries must demonstrate political commitment to create and enforce sound policy and reform broken ones. This must be met by flexible sources of international finance and market mechanisms that mitigates economic costs and engages the private sector, writes Robert Sullivan

The climate crisis cannot be addressed without changing how we use forests and other lands. Emissions from forests and land use accounted for approximately one-third of anthropogenic CO_2 emissions from 1750-2011.[1] In addition to storing and releasing carbon, forests also harbour significant terrestrial biodiversity, help control flooding[2], and play an important role in people's livelihoods.[3] Forest dependent communities must benefit from efforts to protect and restore forests. But addressing the root causes of forest loss – demands for fuel, agricultural land, commodities and wood products – and the circumstances that promote unsustainable use, such as poor governance, is not simple.

A number of different approaches have been taken to financing forest conservation and restoration over the years. Early experiments in carbon finance in the 1990s demonstrated that carbon credit markets can effectively engage private sector emitters and investors to finance forest conservation projects. These early experiments have been refined and tested again and again over the last 20+ years and proven to be a potentially viable source of finance – albeit not without some controversy and limitations.

Emissions trading markets, however, fall short of financing REDD+ on their own due to insufficient demand for credits. Recent analysis of potential supply and demand for REDD+ credits from 2015-25 shows that supply from existing REDD+ projects and programmes far exceeds current demand (918 million tCO_2e of supply versus 207-739 million tCO_2e of potential demand over the same period).[4]

FIGURE 1: POTENTIAL SUPPLY AND DEMAND FOR REDD+ CREDITS 2015 – 2025 BASED ON EXISTING (STATUS QUO) ESTIMATES OF SUPPLY AND DEMAND[5]



This imbalance continues when supply and demand estimates are increased to take into account potential new sources of supply and demand, such as domestic regulations in a number of developed and developing countries. The feasible supply of emission reductions from deforestation has been estimated to be 1.8 billion tCO_2e per year at a cost of less than $20 per tCO_2e, with significantly higher estimates of theoretical supply (4.3 billion tCO_2e per year).[6] However the maximum amount of market driven demand is calculated to be only 18% of this estimated annual feasible supply.[7]

What is needed to advance REDD+ – along with a more comprehensive suite of low emission land use activities such as climate smart agriculture and restoration of degraded lands – is a combination of policy approaches to better manage and incentivise sustainable land use. Key to this is better governance and regulation of land use, including controls on clearing and unwinding of agricultural and other subsidies that drive deforestation and land degradation.

Cultivating forest conservation over other uses can be politically challenging if it is seen to threaten economic development. There are a number of policy options to create new incentives that engage the private sector and catalyse private finance for sustainable land use,[8] along with a wide range of existing financial tools and resources to support government action.[9] Domestic policy options include adding climate impacts and mitigation or offset requirements into environmental impact assessments, along with carbon taxes and domestic emission trading systems in more advanced developing countries where these tools are already becoming more common.[10]

A number of developing countries are exploring the simpler environmental impact assessment type approach. For example, Gabon passed a new law on Sustainable

Development in 2014 that allows "negative impacts" to be offset using tradable sustainable development credits, which can include "carbon, biodiversity, eco-system services and community capital credits". Malawi is also currently evaluating its options for attracting domestic and international finance to support REDD+, including new domestic policy. Moving any of these policy options forward requires strong political will and long term commitment by developing country governments. Someone also needs to cover the cost.

Developing country governments should not bear the cost of mitigation alone. This is particularly important in least developed countries where economic development is a priority. The private sector needs to be engaged, but passing costs onto the domestic private sectorcan affect development and competitiveness. Flexible sources of international support are needed from industrialised countries and multilateral funds to help encourage political leadership and mitigate the costs of domestic action. This is particularly true in least-developed countries.

WHAT IS NEEDED TO FINANCE REDD+ IS A COMBINATION OF POLICY APPROACHES TO BETTER MANAGE AND INCENTIVISE SUSTAINABLE LAND USE

What does this mean for UNFCCC negotiators struggling to refine the scope and content of a new agreement?

First, a new agreement should allow diverse approaches to financing REDD+ and low-emission development for land use. This should include domestic and international emissions trading for countries that choose to pursue it, coupled with strong market demand signals from industrialised countries. Developing countries that show the political commitment to low-emission development must be given adequate financial support to build a suite of policies to help make this a reality and mitigate the costs to their economy.

Second, any financial or accounting approaches should be transparent and consistent wherever possible – not only to facilitate emissions trading markets, but also to understand relative contributions from all parties irrespective of the approach taken.

All of this and more can and hopefully will be achieved in Paris. But this is just a start. As we move beyond Paris and our memories of Parisian culinary and architectural landmarks fade, we should not forget the words of the French intellectual landmark Jean-Paul Sartre who said "Commitment is an act, not a word."

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(1) IPCC. (2014). "Climate Change 2014: Mitigation of climate change. IPCC Working Group III Contribution to AR5. Chapter 11 - Agriculture, Forestry and Other Land Use (AFOLU)." Retrieved from http://report.mitigation2014.org/report/ipcc_wg3_ar5_chapter11.pdf (2) Lambrechts C. et al (eds) (2009) "Vital Forest Graphics", UNEP, FAO, UNFF (3) Chao S., (2012) "Forest Peoples; Numbers across the world" Forest Peoples Program (4) Linacre, N.; O'Sullivan R.; Ross, D.; and L. Durschinger. (2015). "REDD+ Supply and Demand 2015-2025", United Stated Agency for International Development Forest Carbon, Markets and Communities Program, Washington, D.C., USA. (5) Ibid. (6) Coren, M.; Streck, C.; and Myers Madeira. M. (2011). "Estimated supply of RED credits 2011-2035". Climate Policy, 11:6, 1272-1288 (7) Linacre, N.; O'Sullivan R.; Ross, D.; and L. Durschinger. (2015). "REDD+ Supply and Demand 2015-2025", United Stated Agency for International Development Forest Carbon, Markets and Communities Program, Washington, D.C., USA. (8) Linacre, N.; O'Sullivan R.; Rocha M., Greenhalgh S., and D. Ross. (2015). "Supporting REDD+ in Developing Countries: A Review of Policy Options", United Stated Agency for International Development Forest Carbon, Markets and Communities Program: Washington, D.C., USA. (9) For a thorough review see Streck. C., Murray, B., Aquino, A., Durschinger, L., Estrada, M., Parker C., and Zeleke, A (2015) "Financing Land Use Mitigation: A Practical Guide for Decision-Makers" Prepared with support from cooperative agreement # S-LMAQM-13-CA-1128 with U.S. Department of State. (10) Linacre, N.; O'Sullivan R.; Rocha M., Greenhalgh S., and D. Ross. (2015). "Supporting REDD+ in Developing Countries: A Review of Policy Options", United Stated Agency for International Development Forest Carbon, Markets and Communities Program: Washington, D.C., USA.

THE BUSINESS OF DIRECT ACTION

Cameron Reid sets out where the business opportunities lie in Australia's Direct Action plan to reduce emissions

While variations on the phrase "sometimes the only thing you can change is your attitude" is generally the realm of self-help gurus, social media psychology and resilience coaches, it is also an apt summary of climate policy within the Australian context.

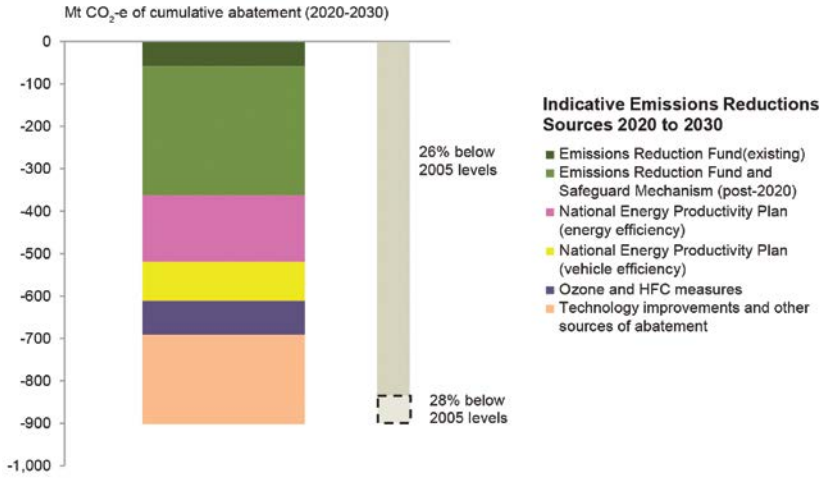
The recent high profile changes in Australian politics have not resulted in substantive changes to climate change policy. Yet, whether it be the change in leadership, cautious optimism in the lead up to the Paris climate talks or simply the onset of the southern spring, there is a tangible change in mood that can only be described as more optimistic and upbeat when referring to Australian climate and carbon policy. It is telling that responsibility for the environment and foreign affairs portfolios', pivotal areas in the lead up to the Paris conference, are two of only a handful that remained unchanged in the ministerial reshuffle in the wake of the leadership change.

Response to the Australian Intended Nationally Determined Contribution, a 26-28% reduction on 2005 emissions by 2030

MUCH OF THE HEAVY LIFTING NEEDS TO BE DONE BY TWO CORE MECHANISMS THAT EFFECTIVELY CONSTITUTE THE DIRECT ACTION PLAN

has generated a (generally) healthy debate domestically about emission reduction targets and levels, what constitutes Australia's fair share and the economic opportunities, and risks and impacts that may flow from various outcomes. This debate will continue and intensify as Paris nears, running a real (albeit reduced) risk of politicisation. However, this necessary – but potentially distracting – debate is now less likely to overshadow the underlying task of reducing emission levels significantly over the coming years.

Government publications highlighting the path or policy mix currently designed to achieve the reduction target show the relative contributions of key programmes and policies. As you would expect, the government has necessarily sought to balance the desire for detail against the need to consult, refine and alter policy details and proportions in line with information as it comes to hand.



Indicative emission reduction sources 2020-30. Source: Department of the Environment, Australia's 2030 Emissions Reduction Target

What we do know is that much of the heavy lifting needs to be done by two core mechanisms that effectively constitute the government's Direct Action plan (there are other initiatives, complementary to the reduction task, but of less materiality).

These two programmes, the Emission Reduction Fund (the ERF) and the Safeguard Mechanism, play two distinct roles. The first is a closed bid reverse auction process, designed to facilitate and enable emissions reduction across the economy by providing companies the opportunity to bid abatement into a periodic auction process. Critically the price the government pays per tonne of abatement achieved is "as bid", designed to ensure the cheapest form of abatement, thus driving competitive pressure for firms to put in the cheapest but commercially viable price per tonne of CO_2 abated. Successful bids then in effect contract with the government for the delivery of the abatement and are paid on delivery, ensuring Australian taxpayers only pay for delivered abatement and through the design of the auction at the lowest price.

The second, the Safeguard Mechanism, in contrast, sets a baseline for the larger emitting facilities (those with annual emissions above 100,000 tCO_2e) and provides for the constraint of emissions below their determined baseline. It is important to note that, at the time of writing in early October, the mechanism rules had just been released and were in the process of being legislated. Legislation has been available for public comment and the final legislation, while not guaranteed, appears likely.

An important element of the mechanism is to treat the electricity generation sector

initially as a single entity, defining a "sectoral baseline" (an aggregation of five distinct grid systems across the country). This sectoral baseline is the first gateway or level of compliance, only if this sectoral baseline is breached will the emission levels of an individual generator (known as a facility) be subject to assessment and potential restriction. This aspect of the policy will be fertile ground for discussion into the future.

Electricity generation accounts for a third of Australia's emissions. When you consider characteristics such as an emission intensive fleet of coal fired generators that are long in the tooth (approximately 75% of the fleet is beyond their technical design life[1]), a chronic oversupply of generation (that contributes to subdued wholesale prices), barriers to exit for existing plants, no explicit pricing on CO_2 emissions and resultant challenging conditions for investment in large scale renewables, you arrive at the very real conclusion that further policy developments to address this may be required. Whether well considered regulation has a role to play or the Safeguard Mechanism could be the appropriate conduit for such change is a very live discussion point in Australian policy.

At present, it is the ERF that provides the most realistic opportunity for the emission reduction sector. According to government documentation, the ERF and Safeguard Mechanism combined will contribute approximately 350 million tCO_2e to the cumulative emission reduction task.[2] Other key areas include energy and vehicle efficiency, technology improvements and other abatement mechanisms projected to make up the balance.

THE ONLY WAY FOR EMISSION REDUCTION OPPORTUNITIES TO GO IS UP

Viewed through what we know, current policy indicates the Safeguard Mechanism will not, in the foreseeable future, be designed to curtail emissions from large emitting facilities, but rather ensure they do not grow materially. One must therefore assume much of this abatement will be derived from the ERF.

This is where it is timely to return to the more positive and upbeat perspective. There are a number of sectors and experts who have expressed a lack of confidence in the ability of the ERF to deliver the reductions required. But, from a future perspective, if we assume this is correct then the current situation constitutes the minimum or floor on the opportunity for carbon abatement. Put another way, the only way for emission reduction opportunities to go is up. From the perspective of those whose business benefits from, or is designed to facilitate emission reduction opportunities, the opportunities are there at present and will only increase. This is cause for optimism into the future.

The next few months will be crucial for the sector. The finalisation of the Safeguard Mechanism will provide the guiding parameters for large emitters, giving more certainty as to the level and extent of plans required to manage their footprint, and further clarity on any opportunity for the monetisation of abatement opportunities, which lends itself to business development and further commercialisation. It will also assist in providing an environment within which secondary and trading markets for abatement have a better chance to develop and mature.

Critically, in early November 2015, the government will hold the second of the ERF's periodic auctions. The first auction, in March 2015, procured a projected 47 million tCO_2e of emissions reductions at a reported average price of A$14.85 (US$10.69). This demonstrated that there exists the supply, demand and appetite for abatement, and that the price per tonne (assuming it remains within the range of the first auction) is at a level that should enable projects to make a viable business case.

While the positive attitude referred to is both encouraging and refreshing, it cannot be allowed to mask the challenges at hand. Over the last decade, climate policy in Australia has been erratic, politicised and less than conducive to long-term planning. The emerging shoots of bipartisan agreement (to the extent possible) on the need to act, an increasing consensus on the challenge at hand (if not the mechanism to meet it) and very public statements of support for action by both civil society and corporate Australia only serve to reinforce the rationale for positivity.

Cameron Reid *is Manager, Carbon & Renewable Policy at AGL. He is responsible for influencing, understanding and communicating the impact (short and long term) of climate change, carbon policy and renewable energy policy on AGL operations. Most recently, Cameron was heavily involved in the development of AGL's revised Greenhouse Gas Policy and public commitments which saw the organisation commit to decarbonisation of its generation fleet by 2050.*

(1) Nelson, T., Reid, C. and McNeill, J. (2014), "Energy-only markets and renewable energy targets – complementary policy or policy collision?" (2) Australia's 2030 Emissions Reduction Target, via the Department of Environment website

BUILDING A KOREAN ETS FOR THE FUTURE

At the start of 2015, the world's second-largest national emissions trading system began in South Korea. Sungwoo Kim and Hyoungchan Kim evaluate its performance so far and the outlook for the post-2020 Korean carbon market

The Korea Emissions Trading Scheme (KETS) began at the start of 2015, with the aim of achieving the government's 2020 reduction target of a 30% cut compared with business as usual, in a cost effective manner. In terms of emissions covered, the KETS is the second largest market after the EU ETS, and it is expected to play a leading role in spreading emissions trading to developing and emerging countries.

The 525 covered entities consist of private companies and public organisations with emissions greater than or equal to 125,000 tCO_2e at the entity level, or greater than or equal to 25,000 tCO_2e at an installation level. In total, 66% of national GHG emissions are captured by the programme.

The first two compliance periods both span three years (2015-17 and 2018-20), expanding to five years from Phase III (2021-25). Emitters are obliged to submit allowances corresponding to their emissions by the end of June of the subsequent calendar year, with penalties for noncompliance, set at around three times the average trading price of the compliance year by the Ministry of Environment, up to a maximum of KRW 100,000 (approximately $90) per tCO_2e.

PHASE I SO FAR…

The total allowances issued for Phase I represent 1,687 million t CO2e. Of these, 95% has been allocated, and the remaining 5% is reserved for unexpected new installations and capacity expansions, for early action, and for market stabilisation measures.

The total volume of allowance traded in the KETS's first nine months amounts to a reported 181,380 tonnes. By comparison, in the past, approximately 780,000 tonnes of offset credits during the same period, focusing on reduction results via Clean Development Mechanism (CDM) projects, were traded with a total trade value of $8 million. It has been reported that, as of October 2015, 19 transactions have happened in the market so far. Even though the system is still at its preliminary stage so it is too early to judge its effectiveness, for an active and smoothly operating market system, it is worth taking note of the concerns below.

Two main factors appear to be limiting further active trading: the unlimited banking of allowances, and the dominance of a relatively small number of players in the market - 50 companies account for 80% of allocations. It is also difficult for many covered entities to access CDM credits which had been expected to be used to cover much of the shortfall - participation in 70% of domestic CDM projects was limited to a handful of covered entities.

The carbon price therefore seems to reflect the intent of the government that allowance prices should remain around KRW10,000 for market stability, rather than the economics of abatement, and this may result in weakening the incentive for emission reductions for participating entities.

Given that most participants are expected it have a shortfall of allowances, lack of liquidity in the market is a more immediate concern than price volatility, especially given the limited range of realistic abatement options, at least in the short term. This led many players to stockpile offsets before the launch of the KETS and carry the costs of these forward on their balance sheets against future shortages of emission allowances.

LESSONS LEARNT

As recommended by the IPCC, most developing countries set emissions reduction targets against business-as-usual (BAU) projections. Our experiences with the KETS demonstrate the importance of considering uncertainty in setting a cap with BAU projections.

Unlike developed countries, it is critical to disclose information on how future emission scenarios are determined, and whether the involvement of stakeholders is guaranteed in the processes of cap setting, to ensure emissions reductions and economic growth are achieved.

The market mechanism should function properly: it should send a price signal based on market activity so that emitters can establish cost-effective reduction strategies. When the number of participants in the market is limited, and a few entities hold a significant number of allowances, it is fundamental to consider how to increase the liquidity of emission trading. A possible solution is to offer an opportunity for other players to participate in the market, and

THE KETS DEMONSTRATES THE IMPORTANCE OF CONSIDERING UNCERTAINTY IN SETTING A CAP WITH BUSINESS-AS-USUAL PROJECTIONS

encourage the trade of derivative products facilitating the market but not interfering with market stability.

TO PARIS – AND BEYOND

The Korean government submitted its Intended Nationally Determined Contribution for the Paris agreement to the UNFCCC at the end of June. It essentially states that the country's voluntary commitment is to reduce GHG emissions by 37%, compared to BAU projections, by 2030. Of the required reductions, 11.3% will be met with international credits, and the reduction target for the industrial sector will not exceed 12%. When the national emissions reduction target is set via the conclusion of the UNFCCC 21st Conference of the Parties (COP 21) in Paris, the government will provide a detailed implementation plan, including the annual reduction targets for each sectors.

IT IS CRITICAL TO DISCLOSE INFORMATION ON HOW FUTURE EMISSION SCENARIOS ARE DETERMINED

Some experts have highlighted that the 2030 domestic reduction target (26%, after deducting the international carbon credits from the total reduction target), is lower than the existing target for 2020 (30%), and moreover, the reduction target for the industrial sector eases from 18.5% to 12%. This is mainly because the changes could allow KETS entities to expect an adjustment of the reduction target for 2020 and, most importantly, additional allocation during Phase I. It may lead to an increase of market uncertainty, and consequently, make the entities to delay their own decision makings for further investment to mitigate their carbon emissions during the first compliance period. Thus, it is highly recommended to minimise market uncertainty by finalising the mitigation roadmap 2030 as early as possible.

Sungwoo Kim *is the Regional Head of Climate Change & Sustainability in KPMG Asia Pacific, with over 16 years of professional experience. He has been advising public and private decision-makers since 2008 on issues related to carbon pricing, climate finance, and corporate social responsibility. He is a member of World Bank External Advisory Group for sustainable development.*

Hyoungchan Kim *is a Director in KPMG Korea, and has over 10 years of professional experience in climate change and sustainability practices. He advises Korea Government on development and implementation of ETS, and private sector clients on its low carbon strategy and carbon market engagement.*

A CALL TO ACTION

Glen Murray, Ontario's Minister of the Environment and Climate Change, writes about the growing sub-national momentum for cap and trade across North America – and how Ontario plans to play its part

At the Climate Summit of the Americas in July 2015, a clear and definite message was heard – the most significant progress in the fight against climate change is happening at the sub-national level.

Why is this? Sub-nationals – municipal, provincial, state and regional governments – have authority over important aspects of climate and energy policy, like energy regulation, public planning and public investment. In fact, according to The Climate Group, 75% of all public expenditure on environmental protection is made by sub-national governments.

Climate impacts also tend to be amplified at the local level, so sub-nationals are more motivated and best placed to address local impacts.

WE'RE SEEING PROOF THAT GOOD ENVIRONMENTAL POLICY IS GOOD ECONOMIC POLICY

As The Climate Group has said, these governments face the realities of climate change on a practical level. Their reaction is grounded in the need to protect communities, support businesses, diversify economies and create jobs.

The good news is that sub-nationals are showing that we don't have to choose between promoting economic growth and fighting climate change. At the Summit, Governor Jerry Brown told us how California is bringing down emissions while growing the economy. California's most recent statistics show that the economy produced approximately 6.6% fewer GHG emissions for every dollar of GDP, and GDP increased by more than 2% – breaking the link between emissions and economic growth.

Similarly, Felipe Calderón – former President of Mexico and Chair of the Global Commission on the Economy and Climate – told us that in 2014, for the first time in 40 years, global GDP grew by 3% while GHG emissions stayed flat.

And in the US, the Regional Greenhouse Gas Initiative (RGGI) is spurring innovation in the clean energy economy and creating green jobs in the nine RGGI states.

In other words, we're seeing proof that good environmental policy is good economic policy. And sub-nationals are taking the lead by making strong commitments to continue to reduce greenhouse gas emissions.

Ontario is part of California's Under 2 Memorandum of Understanding – known as the Under 2 MOU – which supports the principle of limiting global warming to 2°C to protect the planet from irreparable damage.

As of August 2015, 18 states and provinces had signed the Under 2 MOU. This represents a population of 130 million and more than $5.3 trillion in gross domestic product. Combined, these signatories represent the third-largest economy in the world.

We are hopeful that even more jurisdictions will join us by signing the Under 2 MOU in the lead up to the Paris climate talks in December 2015.

In addition, there is also the Compact of States and Regions, an agreement that 20 international partners signed in 2014, which commits signatories to publicly report on GHG emissions every year.

And to show the growing Pan-American consensus on the urgency of fighting climate change, representatives from 22 provinces, states and regions joined Ontario to sign the first-ever Pan-American action statement on climate change at the Climate

Summit of the Americas. It includes commitments to support carbon pricing, ensure public reporting, take action in key sectors and meet existing greenhouse gas reduction agreements.

The province of Ontario also joined the Western Climate Initiative in 2008, where we are building a framework to engage in carbon trading with the state of California and the province of Québec.

And in April 2015, we announced that Ontario would join Québec in its efforts to fight climate change by adopting a cap-and-trade system for GHG emissions. We believe that carbon pricing, including cap and trade, is an investment in the future – one of the steps we need to take for the next generation.

Cap and trade will help Ontario reach its mid-term target to reduce emissions to 37% below 1990 levels by 2030. This target puts us on a path to meet our 2050 target of 80% below 1990 levels.

Cap and trade will set an overall limit on the amount of GHG pollution that can be emitted from most sources in Ontario – but it will do so much more. It will reward innovative companies who are embracing the new green economy and creating more opportunities for investment.

At the Ministry of the Environment and Climate Change, we are hard at work with our ministry partners determining how the proceeds from cap and trade should be used. But we do know the money raised will be reinvested into projects that reduce GHG pollution, such as public transit, renewable energy, energy conservation and building retrofits.

Cap and trade will also encourage companies to find new ways to reduce their carbon footprint – and entrepreneurs and start-ups will be in demand to sell clean technology services.

Cap and trade is just one part of the Climate Change Strategy and five-year action plan that Ontario is releasing in 2015.

The strategy will look forward to 2050, guide our long-term approach to climate change and outline a path towards our province's transformation to a low-carbon, resilient economy. It will also help align economic signals, incentives and investment with climate change objectives, and support innovation in clean technology.

We have conducted public and stakeholder consultations with municipalities, industries, environmental groups and First Nations and Métis communities on climate change. More than 1,500 people have attended in-person consultations and we have received more than 300 ideas and 420 comments online.

The message is clear. Ontarians want immediate action on climate change and they want a price on carbon to encourage investment in a better future, including public transit and cleaner technology.

And we can't wait any longer.

By 2050, the average annual temperature in Ontario will increase by 2.5°C to 3.7°C. Our Far North winters are forecast to be around 7°C warmer in 2050, and around 4°C warmer in the south. Our Great Lakes are under threat from droughts and warmer waters.

We are also experiencing more frequent incidences of extreme weather. The

CARBON PRICING, INCLUDING CAP AND TRADE, IS AN INVESTMENT IN THE FUTURE

Insurance Bureau of Canada reports that, in recent years, water and wind damage caused by severe weather has replaced fire as the top concern.

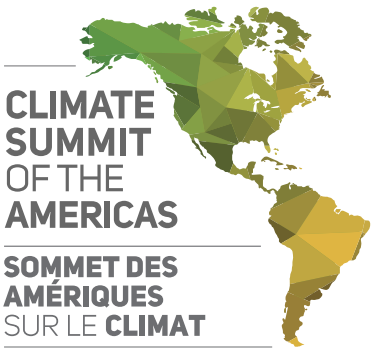
For example, in 2013 alone an ice storm in southern Ontario and eastern Canada resulted in C$200 million (US$151.9 million) in insured losses, and a flood in the city of Toronto became the most expensive natural disaster in Ontario's history. Two of the Great Lakes – Huron and Michigan – also hit the lowest water levels ever recorded.

The costs associated with climate change are adding up. It far outweighs the costs of taking action and investing in climate resilient solutions.

For the good of our present society and for tomorrow's generations, sub-national jurisdictions must continue to lead the way in the fight against climate change.

Together we are stronger and we must continue to find new ways to work together for a future where our environment is respected, protected and sustainable.

Glen Murray *is the Ontario Minister of the Environment and Climate Change. He was first elected to the Ontario legislature in 2010 and re-elected in 2011 and 2014. He has had a lifetime of activism in urban planning, sustainable development and community health, and served as mayor of the City of Winnipeg, Manitoba from 1998 to 2004.*



CASE STUDY: LINKING THE SWISS AND EU ETS

Dominik Englert writes about why "adding" 6 million tCO_2 to 2 billion tCO_2 is harder than it seems

What a shock in May 2014: €33.50 ($37) for a single tonne of CO_2?[1] Suddenly, Switzerland's emissions trading system (CH ETS) had become the most expensive worldwide. Even if the price for Swiss emission allowances (CHU) has considerably decreased since then – it is currently about €11/CHU – this soar in price fuelled calls for a link between the CH ETS and the EU ETS.

The idea of linking the Swiss ETS with its EU counterpart emerged in 2008 and represented the first attempt to connect two independent trading systems. While the CH ETS covers only 55 companies emitting a combined 6 million tCO_2 per year, the EU ETS covers about 12,000 installations and caps around 2 billion tCO_2 annually.[2] This striking difference in scale has direct implications on the respective expectations of a link.

SWITZERLAND'S ECONOMIC GAINS FROM A LARGER CO2 MARKET

Switzerland's strong interest in a linkage is mainly driven by economic motivations. Due to its small size, the CH ETS suffers from major deficiencies. First, public trading of CHUs is non-existent and transactions of Swiss emissions allowances only take place over-the-counter. At the time of writing in September 2015, the official exchange had not registered a single trade since its inception in 2011.[3]

Second, as Swiss companies usually apply modern and efficient technologies already, they often feel deprived of low-cost emission reduction opportunities. Third, the CHU price has always ranged significantly above the price for an EU emissions allowance (EUA) – as much as five times higher – which leads to a significant competitive disadvantage.

Consequently, Switzerland expects that linking will bring a more liquid market, greater flexibility in exploiting emissions reduction potential and a level playing field for national companies and their European competitors.

THE EU'S POLITICAL MOTIVATION FOR A LINKING

In return, the economic impacts on the EU ETS would be negligible. Once linked, the CHU price would instantly adapt to the EUA price level. Therefore, the EU's motivation for a linking is more coloured by political considerations.

In the global political arena, the linking represents an important symbolic act. After the successful example of California and Québec, linking two more independent trading systems with each other would show again that a bottom-up approach in global carbon pricing is feasible and should hopefully invite others to follow suit.

Additionally, the linking would allow the EU to eliminate a blind spot in European carbon legislation with regard to aviation: currently, CO_2 emissions from the aviation sector are not capped by any specific legislative measure in Switzerland. The prospective linking would imply that Swiss airports would no longer serve as a safe haven for intra-European flights.

CHANGES AND COMPROMISES FOR FULL COMPATIBILITY

Having started as a voluntary programme in 2008, participation in the Swiss system was introduced as an alternative for national companies paying a mandatory CO_2 levy of €22/tCO_2.[4] From the outset, this system differed considerably from the EU's. The free allocation was based on a company's emissions reduction potential from both a technical and an economic point of view. Additionally, firms could temporarily use removal units from carbon sink projects. Finally, the penalty regime, where the CO_2 levy plus tax had to be paid retroactively in case of non-compliance, served as a *de facto* price cap.[5]

As a consequence, Swiss policy-makers had to remove these potential barriers to linking through a complete revision of the CO_2 Act in 2011. First of all, the ETS became mandatory for large emitters from 2013 to 2020. Furthermore, free allocation was subsequently based on the same efficiency benchmarks as in the EU and the use of international offsets was harmonised with the EU's practice. Finally, the new penalty mechanism requires Swiss companies to pay a penalty of €114.50/tCO_2 and hand in the missing emissions allowances at a later point of time.

A POTHOLED ROAD TO A FINAL AGREEMENT

So why is it that, despite the enhanced compatibility, a link has not been

THE LINKING ASPIRATIONS BETWEEN THE CH ETS AND THE EU ETS SHOW THAT TECHNICAL COMPATIBILITY MUST BE CONSIDERED

established yet? In March 2015, the seventh round of high-level negotiations that formally started in 2011 was completed and both parties confirmed that a final agreement was in close reach. Only minor technicalities like the regulatory and commercial modalities of auctioning CHUs in a non-discriminatory way remain. But, as is often the case, the major obstacle is more political than technical.

From the very beginning, the consideration of aviation in a linked market has been controversial. Many Swiss stakeholders opposed the idea of including aviation into the CH ETS and, with constant changes to the stop-the-clock proposal over the years, the EU has not necessarily facilitated a common position either.

The entire negotiation process has also been suffering from a general political crisis between Switzerland and the EU since February 2014, when the Swiss people voted in a referendum for the reintroduction of immigration quotas in Switzerland. As a consequence, the EU – for which freedom of movement represents one of its core achievements – temporarily suspended all negotiations on any bilateral agreements. Even if the talks have been resumed in the meantime, this sword of Damocles remains.

LESSONS LEARNED

Given the small size of the Swiss ETS and Switzerland's membership in the European Economic Area for more than 20 years, a fast and efficient conclusion of any linking negotiations was expected. Yet, the past five years have proven this idea overoptimistic.

The linking aspirations between the CH ETS and the EU ETS show that technical compatibility must be considered as a necessary condition. However, it clearly does not represent a sufficient condition *per se*. While technical issues can usually be resolved over time, keeping constant rational sobriety in the talks represents a big challenge for any linking projects worldwide.

Even if the respective gains are self-evident for both sides, the promoters of linking should always try to focus on the project itself, keep it separate from any possible proxy conflicts and avoid that the linking becomes a political playground. Admittedly, this is difficult in a CO_2 market that is highly political by definition. Nevertheless, it is recommended to limit any political discussions to the actual cause. This would considerably help the carbon pricing mechanism of international emissions trading to unfold its full potential by following a simple, but convincing logic: the bigger, the better.

With a background in economics and international relations, ***Dominik Englert*** *has worked since 2011 for First Climate, an internationally renowned consultancy based in Zurich and Frankfurt. Within this context, he has provided advisory services on CO_2 markets, carbon policy and climate finance for public organisations and industrial companies on a global scale. In November 2015, he starts a new position at the World Bank in Washington DC, dealing with climate risk and disaster management.*

(1) Swiss Emissions Trading Registry (14.09.2015). Auctions. (2) Swiss Federal Office for the Environment (24.04.2015). Linking the Swiss and EU emissions trading schemes. (3) OTC-X (4) The CO2 levy was raised to €49/tCO2 in 2014 and it will further increase to €77/tCO2 in 2016. (5) Carbon Market Watch (May 2015). Towards a global carbon market – Prospect for linking the EU ETS to other carbon markets.

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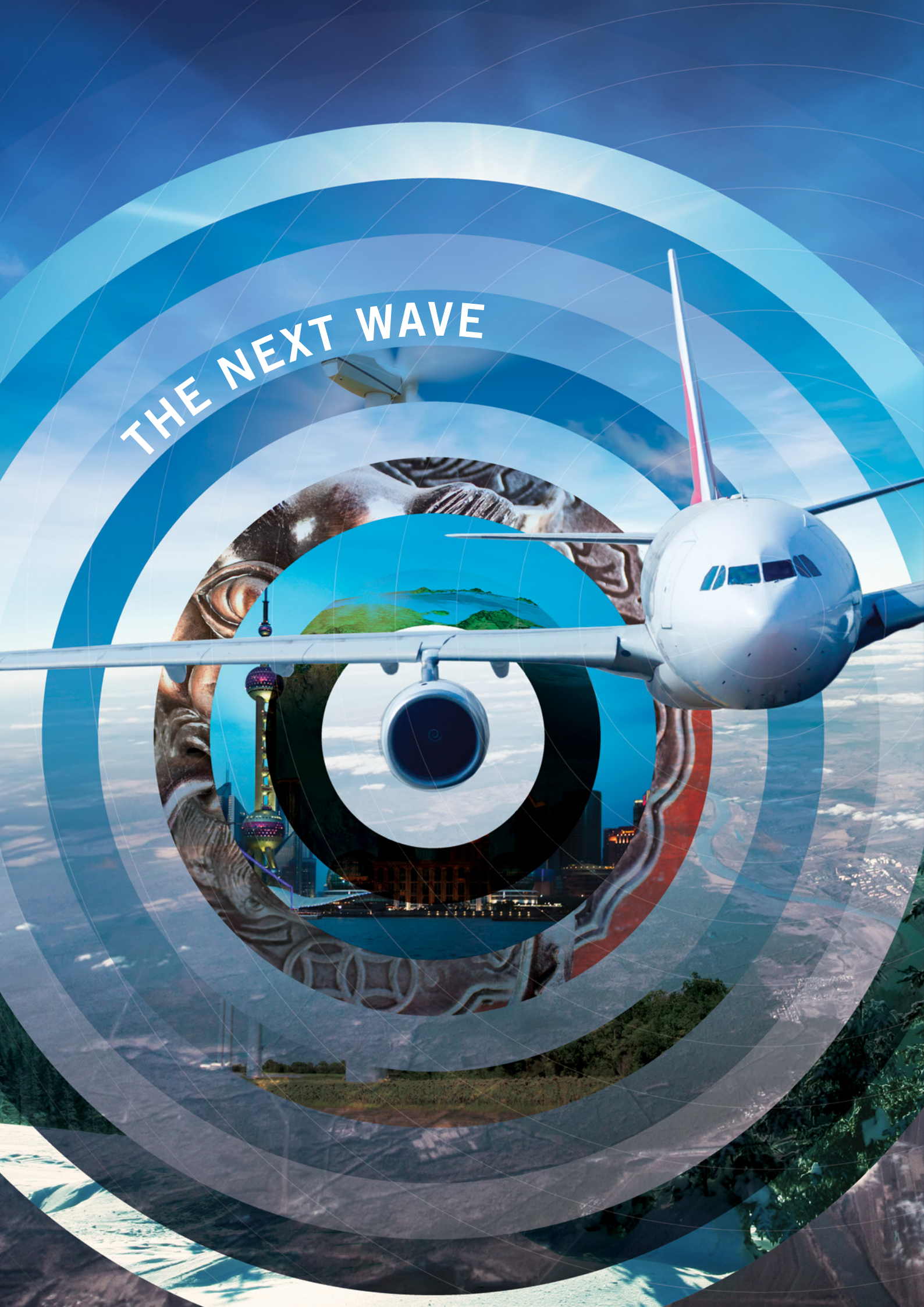

THE NEXT WAVE

LESSONS FOR THE NEXT WAVE
MEMO TO POLICY-MAKERS

Even without an international climate change framework, more and more emissions trading systems are emerging. From national plans – such as in China, and other countries participating in the World Bank's Partnership for Market Readiness (PMR) – to sectoral plans (aviation), decision-makers realise that market-based approaches are the ideal solution for the environmental goals they are trying to achieve.

These efforts will take shape in the months and years after Paris, but make no mistake: this next wave is going to be even more disruptive to the atmosphere than what's come before. The Paris agreement is a chance to leverage these initiatives – and spur others to action.

A GLOBAL FRAMEWORK THAT ENCOURAGES MARKETS AND FACILITATES LINKAGE IS KEY FOR CONFIDENCE

Ultimately, the response to the climate challenge is a revolution in energy, industry and transport. The best way to drive this change is by putting a price on carbon. The Paris agreement is a chance to encourage this at a global level – and establishing a framework to enable linkage will boost confidence, argue David Hone and Jonathan Grant. Linkage can bring a myriad of benefits – as shown by Steven Rose and Richard Richells' modelling of a handful of proposed emission reduction plans for Paris.

REGULAR REVIEWS COULD LEAD TO INCREASED AMBITION

Be wary of allowance surpluses: these may bring a false sense of reassurance that leaves companies unprepared to respond to any strengthening of climate policy, warn Marcus Ferdinand and Emil Dimantchev. If periodic reviews of contributions are part of the Paris agreement, this could strengthen the role of carbon markets, which in turn means reducing emissions further and faster.

PUBLIC AND PRIVATE COOPERATION IS IMPORTANT IF EMERGING CARBON MARKETS ARE TO BE POLITICALLY AND OPERATIONALLY VIABLE

When designing new markets, governments should consult with business on plans – this can help build support for the system and also to aid companies in preparing for future regulations. Good examples are the PMR and IETA's Business Partnership for Market Readiness, which are working together to build the next generation of carbon markets, as outlined by Adrien de Bassompierre and Dan Barry, while Tom Kerr writes about how public and private organisations are uniting under the Carbon Pricing Leadership Coalition. Meanwhile, Richard Chatterton notes that investors would be wise to pay attention to the proposals for Paris as a hint of the direction for future policies.

MARKETS CAN PROVIDE INCENTIVES FOR FINANCE FLOWS

When faced with a price on carbon, emissions go down, and investments change course. As demonstrated by the Clean Development Mechanism (CDM), incentives can help channel investment flows to projects which aid sustainable development, says Gernot Wagner. Individual investments, if organised at a large enough scale, make the difference – like in the CDM.

PROJECT-BASED MECHANISMS CAN LEAD TO FURTHER ACTION

As well as providing emission reduction units, project-based approaches can yield benefits for years to come. As host to the largest share of projects under the CDM, China's renewable energy sector and a low-carbon workforce has been built up. The country has taken that experience and knowledge transfer and developed its seven pilot trading systems – which will transition to a national ETS from 2017, writes Jeff Swartz. However, initiatives should also be able to adapt to local circumstances if they are to work, warns Geoff Sinclair, highlighting how the CDM has largely bypassed Africa.

LAY SOLID FOUNDATIONS FOR MARKET MECHANISMS

This includes legal foundations to underpin the programme, as well as gather reliable emissions data using robust emissions measuring, reporting and verifying standards. This can be done through voluntary programmes that later transition to a compliance market – as is happening in Taiwan, as explained by Hui-Chen Chien, Robert Shih and Wen-Cheng Hu.

SECTOR SPECIFIC EFFORTS CAN LEAD TO TECHNOLOGICAL ADVANCEMENTS

Climate negotiations specific to aviation have resulted in advancements in aircraft efficiency and biofuels, and fostered discussions on emissions reduction solutions focused on technology. This sets a good example for other industry-specific action either within or parallel to the UNFCCC process, say Megan Flynn and Alec Kibblewhite.

ATTENTION À PARIS

The UN climate negotiations can seem disconnected from the real world, but investors and businesses would be wise to pay attention this time, says Richard Chatterton

It is easy to write of the UN climate talks as a failure. The negotiations have been going on for over two decades, yet global emissions keep on rising and countries are as divided as ever on how the burden of emission reductions should be shared. But for anyone with a vested interest in the energy sector, to ignore where things might go from here would be a mistake: the outcome from Paris is likely to help shape many of the risk and opportunities that will dominate the global energy sector over the next decade.

IMPACT OF FALLING RENEWABLE COSTS

We expect that the cost of renewables, in particular roof-top solar PV, will continue to fall and that over 10-15 years solar and wind will become largely competitive with conventional power plants, without the need for government subsidies (Figure 1). Based purely on falling costs and the dynamics of competitiveness, we expect $250-350 billion/year will be invested in renewables over the next 25 years – around half of which in Asia – as solar and wind dominate capacity additions around the world (Figure 2).

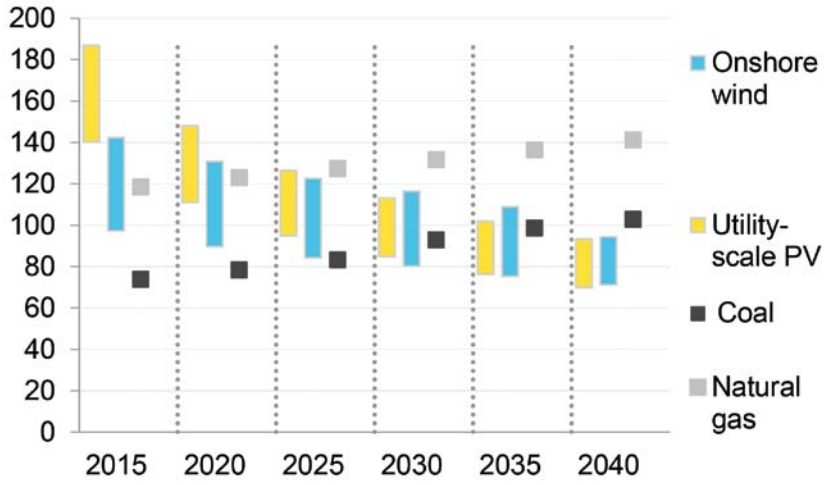
This huge shift towards clean energy will transform the global electricity system, with renewables' share of the generation mix doubling from around a quarter today to almost 50% in 2040. This is excluding the impact of government intervention that has not yet been implemented, so any regulatory action favouring renewables would provide further upside to the outlook.

BUT STILL MISSING 2°C

If the science is correct, global GHG emissions will need to more than halve over the next 35 years and fall to zero before the end of the century. Our analysis suggest that power sector CO2 emissions will peak around 2030 and then remain stable at close to 15 billion tonnes of CO2 equivalent per year – a level of emissions that is inconsistent with a 2°C trajectory. PwC's Low Carbon Economy Index meanwhile says that, at current decarbonisation rates (1.3% per year in 2014, compared to a rate of 6.3% required to meet the 2°C goal), we will have used the world's carbon budget by 2036.

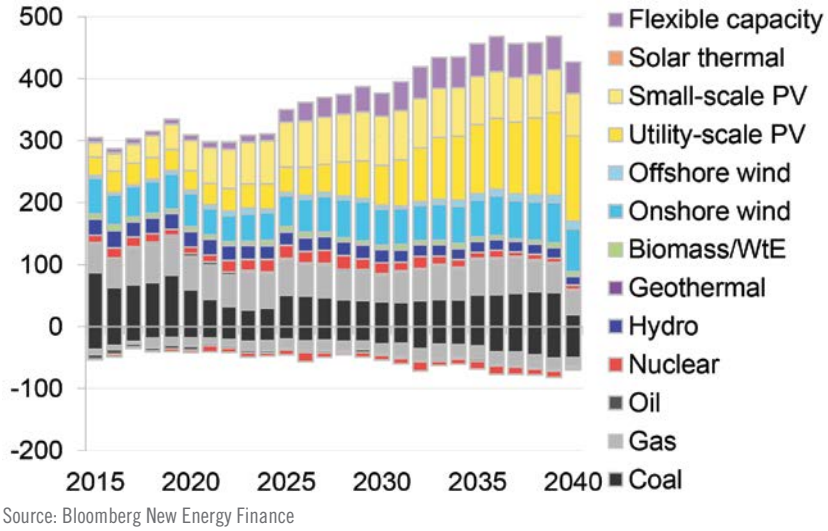
So what could policy-makers do to push the world closer to a 2°C pathway? To date, the UNFCCC targets have been woefully inadequate, with the US and China avoiding targets altogether and only the EU and a handful of smaller developed countries with targets extending to 2020 under the Kyoto Protocol.

FIGURE 1: LEVELISED COST OF ENERGY ($/MWH)



Source: Bloomberg New Energy Finance

FIGURE 2: CAPACITY ADDITIONS AND RETIREMENTS (GW/YEAR)



Source: Bloomberg New Energy Finance

The Paris talks are based on a fresh round of target setting, with each country setting its own 'Intended Nationally Determined Contribution', or INDC. The idea is that if countries define their own targets, they are more likely to support the eventual agreement they helped to shape. The negotiations can then focus on facilitating domestic action and, using the INDCs as a baseline, placing pressure on countries to ratchet up their ambition.

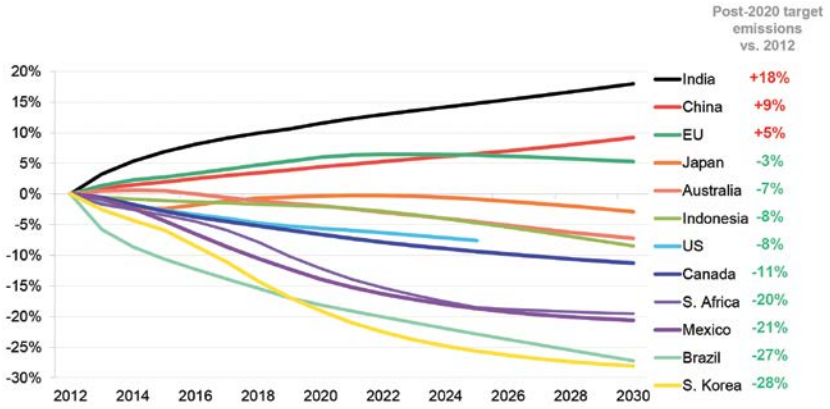
Nearly every country has submitted its INDC ahead of the Paris meeting, so we are able to judge the minimum level of climate action that each country plans to take. It is no surprise that, on aggregate, the targets are still far from sufficient to put the world on a 2°C pathway. In fact, they equate to a decarbonisation rate of 3% per annum, roughly half the level required, and a climate change scenario of 3-3.5°C. However, the INDCs do provide some important signals about the varying trajectories of policy intervention in different countries.

OPPORTUNITIES AND RISKS

We have analysed the INDCs for major countries and compared the emissions trajectory implicit in each target to our own BAU forecasts. The difference between countries is stark (see Figure 3). India for instance is likely to exceed its target by a considerable margin, whereas South Korea and Brazil need to curb their cumulative emissions by more than a quarter over the next 15 years to meet the targets in their INDCs.

This provides an important signal about the likely level of policy intervention going forward. If you are an energy intensive business in South Korea, Brazil, Mexico or South Africa, it is likely to become more expensive to emit CO2 over the coming years. However, if you are a clean energy developer, you're likely to benefit from increased regulatory support. If you are in China or India, on the other hand, the outcome from Paris is unlikely to have much of an impact on the regulatory risk outlook.

FIGURE 3: CUMULATIVE EMISSIONS IMPLIED BY INDC COMPARED WITH BAU EMISSIONS (2012-30)



Source: Bloomberg New Energy Finance

COAL AND GAS ARE LIKELY TO SUFFER

BNEF has a very bullish view on the outlook for renewables compared with many other research houses, but the flip side of our optimism for wind and solar is a very negative view of the outlook for coal and gas in the power sector.

As with our renewables projections, this outlook excludes the impact of government intervention that has not yet been implemented, so any incremental policy action will cause the fossil fuel demand outlook to deteriorate further.

Threats to fossil fuel demand may come from a number of different channels, such as reform of fossil fuel subsidies, implementation of carbon pricing or outright caps and bans on consumption, particularly for coal in urban areas. Several INDCs explicitly take aim at fossil fuels: India pledged to reform its subsidies for diesel, kerosene and cooking gas; and China states that it will "control total coal consumption", without giving further details. It is likely that the debate within the UNFCCC forum will increasingly turn towards fossil fuel consumption as well as emission reduction targets, which will be ominous for the fossil fuel industry.

THE START OF SOMETHING NEW

Paris is the start of a new era of global climate policy, but it is likely to open up more questions than provide answers. Yes, we have the INDCs and can take a view on the level of investment needed to achieve them, but uncertainty will remain around a number of issues, including how countries may be able to cooperate or trade with one another, how much north-south financial and technological assistance will be delivered, and how targets will be reviewed over the next 10-15 years. It will take time for the UNFCCC to come up with answers these questions – the only precedent we have is that it took almost eight years to ratify the Kyoto Protocol – but the Paris agreement will be the foundation for the future policy framework. Investors and businesses would be wise to pay attention.

Richard Chatterton *is Head of Global Carbon Markets Research at Bloomberg New Energy Finance. BNEF provides unique analysis, tools and data for decision makers driving change in the energy system.*

Bloomberg NEW ENERGY FINANCE

VALUE OF INTERNATIONAL EMISSIONS TRADING PARTNERSHIPS

Bottom-up linking is now seen as a necessary stepping stone to more global emissions trading markets. But how might the early movers fare? In this article, Richard Richels and Steven Rose explore the possible value of a partnership between the US, the EU and China

Achieving stringent long-run climate objectives may be expensive, with rapidly rising marginal costs.[1] Policy design will thus be important, and measures that will reduce mitigation costs require serious consideration. The goal of international emissions permit trade in today's bottom-up policy environment is to reduce the costs for trading partners of meeting their national commitments. We recognise, however, that cost-effectiveness is but one of many considerations when designing climate policy.

This paper discusses the potential of one such possible partnership that engages three major emitters: China, the EU and the US. We use the MERGE Model (a **m**odel for **e**valuating **r**egional and **g**lobal **e**ffects of GHG reduction policies)[2] to examine the benefits from such a partnership. MERGE is an intertemporal computable general equilibrium model that optimises the discounted utility of regional consumption. Thus, both present and expected future net returns are considered in investment decisions.

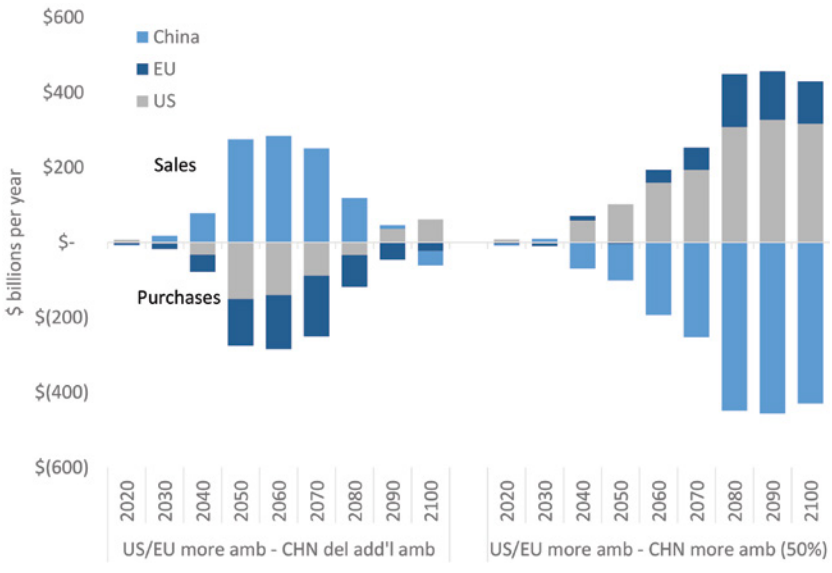
Given the long-lived nature of energy producing and energy using capital stock (eg, power plants, transportation, buildings), analysing near-term decisions requires a long-term perspective. In general, near-term investment decisions are best analysed in the context of potential long-term policy and markets. The model can also be easily configured with regard to the number of regions to be examined. Hence, it lends itself to the evaluation of a broad range of potential partnerships and how they might be melded into a more comprehensive system.

For the present analysis, we consider the period 2020 to 2100. We assume that each region pursues its respective near-term Intended Nationally Determined Contribution (INDC) pledge through 2025/2030, and ambition to 2050 if expressed. For the EU, we assume that its economy-wide GHGs are reduced 40% below its 1990 levels by 2030. Subsequently, it reduces emissions by 80% below 1990 levels by 2050. For the US, we assume its economy-wide GHGs are reduced by 28% below their 2005 levels by 2025. Subsequently, the US reduces emissions by 80% below 2005 levels by 2050.

However, whereas China has pledged to peak its emissions by 2030, its post-2030 ambition remains uncertain, and is explored through sensitivity analysis (Table 1). Specifically, we examine each of the following two post-2030 pathways: 1) delayed additional ambition with emissions flat at 2030 levels until 2050, and 2) more ambitious mitigation immediately after the 2030 peak with the ambition of emissions reductions of 50% below 2030 levels in 2050. For the remainder of our policy horizon (post-2050 through 2100), we assume that each region continues to reduce emissions by 1.5% per year.

Figure 1 shows the estimated aggregate value of permit flows between the three regions. This represents the product of the permit volume and the permit price at each point in time. China's long-run ambition has

FIGURE 1: ANNUAL EMISSIONS PERMIT MARKET FINANCIAL FLOWS



important implications for permit volume, price, financial flows, and direction of trade. In Scenario I, China makes no additional commitments beyond their initial peaking pledge until 2050, while the EU and US pursue their respective 2050 objectives. In this scenario, China is selling permits into the emissions market and the other regions are buying, which allows the EU and US to follow more gradual domestic emissions reduction paths. Specifically, the EU and US cumulative reductions through 2050 are reduced by 25% and 15%, respectively, and through 2100 by 15% and 10%, respectively. In this scenario, annual trade volume reaches as high as 3.6 billion tCO_2 equivalent (CO_2e) per year with permit prices rising from roughly $40 to $190/$tCO_2e$.

If China adopts a tighter constraint on post-2030 emissions, the volume, prices and financial flows change, as do trading positions. Indeed, in Scenario II, China is buying emissions permits during most of the century, after modest sales early on. The increased ambition on the part of China produces higher permit prices (starting at about $40 and rising to $255/$tCO_2e$) with annual permit trade volume peaking at 1.9 billion tCO_2e during the period. Thus, the EU and US are accelerating domestic emissions reductions and receiving permit revenues, while China reduces its domestic rate of cumulative emissions reductions through 2050 and 2100 by 5%. The total discounted present value of the financial flows in the respective permit markets are $1.32 and $1.26 trillion.

THE GOAL OF INTERNATIONAL EMISSIONS PERMIT TRADE IN TODAY'S BOTTOM-UP POLICY ENVIRONMENT IS TO REDUCE THE COSTS FOR TRADING PARTNERS OF MEETING THEIR NATIONAL COMMITMENTS

TABLE 1: SCENARIO SPECIFICATION

		Post-INDC Pledge		
		Through 2050		Post-2050
Scenario	Implementation of INDC Pledge	EU and US	China	All regions
I	Pledges to 2025/2030	More ambitious*	Delayed additional ambition#	Reduce 1.5%/year from 2050
II	Pledges to 2025/2030	More ambitious*	More ambitious (50%)^	Reduce 1.5%/year from 2050

For permit trading, each region is assigned annual emissions caps. For the US and EU, the caps are their emissions targets with linear interpolation in between. For China, a 2030 cap is set equal to the peaking level we estimate when China pursues the more ambitious long-run policy unilaterally.
* EU and US 2050 policies are Kyoto GHGs 80% below 1990 and 2005 levels respectively.
# Kyoto GHGs ≤ 2030 level to 2050.
^ Kyoto GHGs 50% below 2030 cap in 2050.

Figure 2 shows the discounted gains in aggregate consumption associated with trade in emission permits. The gains in consumption represent reduced mitigation investments due to emissions permit purchases and revenues from permit sales. The figure shows a key result from our analysis: emissions trading could be beneficial to each region within the coalition, but that the distribution of benefits will vary from one scenario to another.

In the first scenario, all three regions benefit from trading, but with different permit trade positions and levels of activity due to differences in regional emissions abatement costs. In the second scenario, the partners again all benefit from trading, but regional permit market positions have flipped buyers and sellers due to China's more ambitious policy. Looking across the scenarios, we find more aggregate benefits from trading to the partnership as a whole when all partners have greater long-run reductions ambition, with the benefits of trade to China and the US increasing, and the benefits to the EU declining. China's increased ambition pushes China into higher domestic marginal abatement costs relative to their partners, making permit imports appealing, while lower relative marginal costs at this time in the US result in the US being best suited to increase abatement effort and export permits.

This analysis is useful not so much for the absolute value of the numbers but their relative values. We adhere to the maxim that the purpose of modelling is more insights than numbers. With this in mind, we believe that our ongoing analysis, only a part of which is discussed in this short note, provides useful insights.

First, we make the fundamental observation that there is the potential for mutually beneficial emissions trading partnerships. Second, the size of the emissions permit market and whether a country is a seller or buyer will depend upon the composition of the partnership, the individual emission reductions goals of the partners, and their relative marginal costs of emission reductions. Third, permit trade can be beneficial for the citizens in each country regardless of whether countries are permit buyers or sellers.

Fourth, permit trade can lead to transfers of wealth between buyers and sellers and have trade balance implications. Fifth, emissions pathways based on a goal of

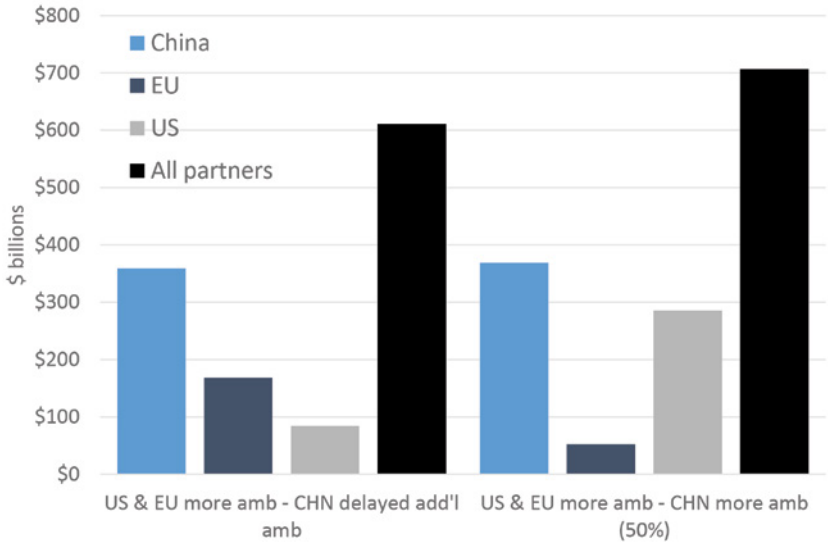
peaking emissions at some date in the future create a challenge for emissions trading. Caps will need to be negotiated and set to participate in trading, but the peaking level will be affected by a variety of factors, many of which are highly uncertain at the present time, such as economic growth, energy efficiency improvements, technology availability and choice, and future ambitions regarding emission reductions. Sixth, expanding the number of members will likely increase the size of benefits for the partnership as a whole, but it may also change the distribution of benefits among members. Hence, there may be a need for side payments, when consideration is given to such expansion.

This short article has only scratched the surface of what may be involved in creating an international market in emissions trading from the bottom-up. It suggests the need for research exploring the following: the potential for additional trading blocs and larger partnerships, the benefits of allowing for the banking of permits, the potential interaction between the availability of low-carbon emitting technologies and emission permit markets, and whether international emissions trading could serve to both increase the scale of the international effort and the receptiveness of countries to pledge verification, since it would likely be a prerequisite to participation in a trading regime.

THE GOALS OF THE PARTNERSHIP MAY NOT ONLY BE TO FOSTER COST-EFFECTIVENESS, BUT ALSO TO ENHANCE ECONOMIC EFFICIENCY

Finally, it is important to keep in mind the environmental objectives of the partnership when considering expansion. The goals of the partnership may not only be to foster cost-effectiveness, but also to enhance economic efficiency. That is, to achieve outcomes which minimise both the economic costs *and* environmental damage.

FIGURE 2: GAINS FROM TRADE IN EMISSIONS RIGHTS
(IN TERMS OF THE INCREASE IN THE VALUE OF AGGREGATE ECONOMIC CONSUMPTION DISCOUNTED TO 2100)



Richard Richels *serves as a consultant to EPRI on issues of cost-effectiveness and economic efficiency related to climate change policy. Previously, he served as a Senior Technical Executive for climate change research in EPRI's Environment Sector.*

Steven Rose *is a Senior Research Economist on climate and energy policy in the Energy and Environmental Analysis Research Group in EPRI's Environment Sector.*

(1) "Assessing Transformation Pathways" (Leon Clarke, Ke-jun Jiang, and others). In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer et al. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.G.J. Blanford, R. Mendelsohn, S.K. Rose, 2015. The Price of a Degree: Marginal Mitigation Costs of Limiting Long-Term Temperature Increase, submitted. (2) A. Manne, R. Richels, and R. Mendelsohn. "MERGE: A Model for Evaluating Regional and Global Effects of GHG Reduction Policies," Energy Policy, 23(1), January 1995.

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SPURRING CARBON PRICING THROUGH PUBLIC-PRIVATE DIALOGUE

Dan Barry and Pierre Guigon outline how the public and private sectors are working together to help get the next wave of carbon pricing systems off the ground

New carbon pricing systems are being developed and implemented around the world to help reduce GHG emissions and provide long-term signals to incentivise investment in clean energy and sustainable development. At present, about 40 national and over 20 sub-national jurisdictions – representing almost a quarter of global GHG emissions – are implementing explicit carbon pricing policies. Since 2012, the number of implemented or scheduled carbon pricing instruments has almost doubled, from 20 to 38. Although this momentum is encouraging, both governments and businesses face challenges that should not to be underestimated.

Many countries have expressed the need to strengthen technical capacity and knowledge, particularly in the area of economic modelling, to determine their low-carbon development pathways and identify effective and cost-efficient climate mitigation policies, including carbon pricing instruments. Capacity-building would allow them to better understand the potential implications of new policies on their countries' development objectives. Also, the development and implementation of carbon pricing instruments present technical challenges, which underlines the importance of establishing strong institutional and regulatory 'readiness' for carbon pricing.

Companies that are subject to new climate regulations in different jurisdictions face similar challenges. To ensure their ability to operate effectively in a carbon-constrained world, where GHG emissions are priced, corporate leaders in an increasing number of national and multi-national corporations are taking or considering action to monitor, report and verify GHG emissions, identify risks and opportunities related to new regulation, and build technical capacity early on.[1] Those companies that take early action, will become the corporate climate champions in the years to come.

For climate change policies to fully permeate a company, climate champions are needed at all levels, to inform on climate-related risks and opportunities, and to establish a credible and robust GHG emission reduction policy. Experience also shows that companies benefit from setting up structures to monitor, report and verify GHG emissions early on, as this helps establish an emissions baseline and identify both risks and opportunities in advance of climate policies being fully enacted.

Several methods of identifying risks and opportunities related to new regulation exist. For example, companies may find value in performing SWOT analysis to identify strengths, weaknesses, opportunities and threats related to their products under a carbon-constrained world, and to understand if their business model requires adjustments. Using an internal carbon price, or shadow price, can also help companies identify risks and opportunities, such as revealing the value of greater energy efficiency in project design or to ensure the economics of their investments are able to withstand potential policy scenarios in the future.

Finally, in order to build carbon pricing capacity early on, businesses can learn how to buy and trade carbon assets and minimise their exposure to market-related risks including price fluctuations and liquidity. To do so, some companies have created emissions trading simulations during the policy preparation phase, to test the implications of various policy design features, and share feedback on possible impacts on the market with policy-makers.

Well-designed and inclusive stakeholder consultations are critical to create an environment of predictability, consistency and flexibility, to allow companies to plan with

AT A GLANCE: PMR AND B-PMR

PMR
- Global partnership of 30+ countries
- Supports countries' readiness, piloting, and implementation of carbon pricing instruments
- Platform for collective innovation, discussions and dissemination
- 18 country programmes
- 13 donors contribute $127 million

B-PMR
- Global partnership of business, building on IETA's 150 leading companies active in carbon markets worldwide
- Supports companies' readiness through business-to-business engagement
- Forum for robust dialogue with local industry stakeholders
- Six missions in countries that are preparing emissions trading programmes

confidence. While policy-makers are often required to inform industry of new plans well in advance, early participation from companies can also help. For example, when governments design a policy, setting up reporting requirements in advance of mandatory regulations and starting with voluntary systems can help build emissions data inventories and companies to gain experience. For policy-makers, collaboration with businesses and key stakeholders can help, for example to improve understanding of the implications of and options to address the impacts on competitiveness of carbon pricing regulation, build consensus on policy design and reduce the risk of future discord.

PMR-BPMR PARTNERSHIP: THE ANSWER TO EFFECTIVE CARBON PRICING IMPLEMENTATION

The World Bank Group's Partnership for Market Readiness (PMR)[2] was created to help countries assess carbon pricing policy choices and prepare for future implementation of related instruments, by focusing on improving technical and institutional "readiness."

IETA's Business Partnership for Market Readiness (B-PMR) initiative was created in an effort to help corporate leaders understand the challenges and build "readiness" related to compliance with new carbon pricing regulation. To do so, the B-PMR has been conducting a number of in-country missions with the objective of raising the level of awareness and increasing the level of knowledge with regards to carbon pricing through industry-to-industry exchanges, focusing in particular on the practicalities of emissions markets.[3]

THOSE COMPANIES THAT TAKE EARLY ACTION WILL BECOME THE CORPORATE CLIMATE CHAMPIONS IN THE YEARS TO COME

In order for emerging carbon pricing systems to be politically and operationally viable, efforts by governments and business cannot take place in isolation. As a way to facilitate public-private interaction on carbon pricing and lessons learned, the PMR and B-PMR established a long-term and systematic collaboration.

Since 2013, a number of international workshops and meetings have been organised jointly to bring together policy-makers and representatives from the private sector around the world. In March 2015, for example, the PMR and B-PMR organised a workshop in London to discuss effective ways for the private sector to engage in the policy-making process. During this event, the dialogue focused on conditions needed for effective trading in carbon markets. As part of this workshop, policy-makers from PMR countries also visited various trading houses to experience first-hand how carbon markets operate, with an interactive demonstration from different trading desks.

In January 2015, the PMR and B-PMR will hold a joint workshop in Beijing, China, which will bring together international companies and China's leading state-owned enterprises (SOEs) to discuss best practices for industry engagement and readiness on emissions trading. International businesses will travel to China to meet with the country's leading companies, and national experts will share their lessons learned from participating in the EU ETS, California's cap-and-trade programme and Kyoto Protocol flexibility mechanisms. The objective of the workshop is to help Chinese SOEs prepare for their upcoming national ETS.

The participants will hold discussions on carbon pricing and emissions trading best practices, including on industry readiness, how to improve Chinese industry's understanding of the role and function of ETSs. The mission will also tackle knowledge transfer, to enhance the ability of Chinese industry to participate in China's ETS, as well as policy preparation, to assist the Chinese authorities to engage SOEs in technical stakeholder consultations on emissions trading.

As a number of PMR country programmes are now gearing up to implement new and innovative carbon pricing instruments, the PMR/B-PMR collaboration is becoming all the more relevant. The World Bank Group and IETA will continue to explore cooperation between these two initiatives to enhance support to government and businesses in preparing for carbon pricing.

Pierre Guigon *works in the Climate and Carbon Finance Unit at the World Bank. Since he joined the World Bank in 2013, Pierre has been focusing on providing technical assistance to developing countries in the area of climate policies – in particular with the PMR Programme. He previously worked in environmental finance for NYSE Euronext Group, and France's state-owned bank Caisse des Dépôts et Consignations.*

Dan Barry *is Head of Global Environmental Products (GEP) at BP. The GEP team manages exposure to environmental commodities worldwide for both the BP group and third-party customers. Previously Dan was Director of Clean Energy at Gazprom Marketing and Trading and currently serves as Vice-Chairman of IETAs B-PMR.*

(1) For more information, please see: Partnership for Market Readiness. 2015. Preparing for Carbon Pricing: Case Studies from Company Experience--Royal Dutch Shell, Rio Tinto, and Pacific Gas and Electric Company. World Bank, Washington, DC. (2) PMR Participants include: 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, the United States, California and Quebec. For more information about the PMR and its participants, please visit www.thepmr.org. (3) For more information about the B-PMR and its activities, please visit: www.ieta.org/b-pmr

B-PMR Business Partnership for Market Readiness
An IETA Initiative

pmr PARTNERSHIP FOR MARKET READINESS

CHINA: THE EMISSIONS TRADING TIDAL WAVE

To many, China's plans to start a national emissions trading system in 2017 seems fast, given the scale of the country's emissions. In reality, this new wave is the culmination of 10 years of activity, says Jeff Swartz

Carbon markets have been making waves in Europe, the US and elsewhere – and China is no exception. It will very likely become the carbon market 'tidal wave', considering the level of emissions that will be covered when its national emissions trading system (ETS) begins in 2017. China's experiences with emissions trading seem sudden and fast moving to carbon market professionals and the public at large. But, just as the EU ETS celebrates 10 years in 2015, China also celebrates 10 years of emissions trading.

CHINA'S CARBON MARKET IN NUMBERS

- 945,996,837: Amount of CERs issued to projects in China
- 3,763: number of CDM projects registered in China
- 47 million[1]: amount of carbon allowances traded in the seven ETS pilots, as of October 2015
- 25 million[2]: amount of CCERs issued as of October 2015
- 7: the number of pilot ETS programmes in operation
- 28%: Total amount of China's 2010 GDP currently covered an emissions cap
- 60-65%: China's carbon intensity reduction target, by 2030

CHINA'S FIRST WAVE

Seasoned UN negotiators and observers will remember one of China's negotiators during the Kyoto Protocol talks, Professor Zhong Shukong, as 'Dr. No.' China's negotiating position towards emissions trading in the Kyoto era was one of caution and insistence that developed countries take the lead through investments in the Clean Development Mechanism (CDM); . Zhong could see the benefits China would accrue.

Fast forward to 2005 and China took its first step on emissions trading when the Chinese government set up its 'Designated National Authority' to approve CDM projects under the authority of the National Development and Reform Commission (NDRC). At the same time, it established a department in the NDRC to exclusively focus on climate change.

This department began the process of reaching out to major Chinese companies and research institutes on the benefits and importance of the CDM. The NDRC's Climate Change team actively encouraged and directly requested China's leading think-tanks and energy companies to develop lists of projects that could be eligible for the CDM. Through this process, an entire industry of investors, engineers, entrepreneurs, consultants and project developers in China was born.

Over the past 10 years, these individuals have created a pipeline of more than 3,700 projects that collectively will reduce in excess of 600 million tonnes of GHG emissions by 2020. Clearly, Zhong was ahead of his time during the Kyoto negotiations for his support of the CDM; he not only helped establish thousands of jobs and an entire industry to emerge, but his foresight also helped China reduce more than 94 million tonnes of emissions 2005 to 2015.

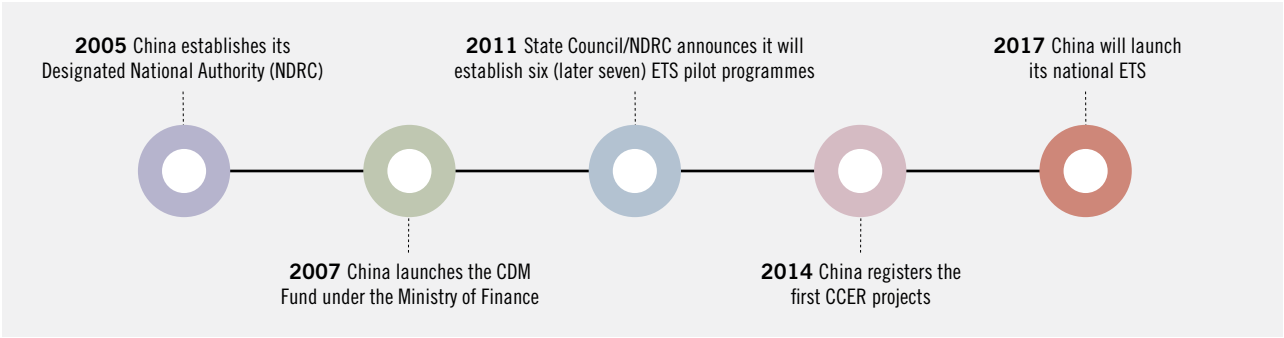
China's energy mix also changed for the better as a result of the CDM. Before 2005, China's renewable energy industry was in its infancy and the total share of renewables in China's overall energy mix only surpassed 15% by 2009.[3] Its early years of the CDM helped contribute to the establishment of the Chinese Renewable Energy Industry Association (CREIA) and the set-up of renewables divisions at China's 'five largest power companies.

The CDM also helped the government advance its understanding of the potential for renewable energy projects. China became a ripe opportunity for private sector investors interested in the CDM. As China's CDM pipeline grew, China took more ownership and even chaired the CDM Executive Board from 2012-13.

THE SECOND WAVE

In October 2011, the NDRC designated five cities[4] and two provinces to 'pilot' emissions trading from 2012 to 2015. The regions of Beijing, Guangdong, Shanghai, Tianjin, Shenzhen, Chongqing and Hubei accounted for about 18% of China's total population and 27% of its national GDP in 2010, and represent diverse regions of economic and geographic characteristics. Each pilot developed and implemented its own rules and standards for an ETS, in consultation with the NDRC's Climate Change Department

There are many differences between the ETS pilots due to the diversity of China's industrial development. For example,



Beijing has set an emissions threshold of 10,000 tonnes CO2 per year for obligatory participation, while Shanghai distinguishes the industrial sector and non-industrial sector enterprises with varying emissions thresholds. Allowance management and distribution has consistently been one of the most difficult elements of the pilot systems over the course of their implementation.

The local governments also entered into agreements with foreign environmental agencies to help understand how to properly implement an ETS. Agreements were signed between local governments in China and California, the UK, Norway, Germany, France, Québec and the European Commission. Moreover, China received $8 million from the World Bank's Partnership for Market Readiness in 2013 to study the feasibility of and make recommendations for establishing a national ETS under the 13th-Five-Year-Plan (2016-21).

In many respects, the ETS pilots in China have been a tremendous success. They have started the process of requiring companies in China to follow an annual rigorous monitoring, reporting, and verification (MRV) process. They have emboldened local governments and the NDRC in Beijing to have the confidence in emissions trading as a policy tool to reduce emissions. As a result of the experimentation with emissions trading at the municipal and city level, the NDRC will now embark on launching a national ETS from 2017.

THE TIDAL WAVE

In December 2014, the NDRC released the first rules on its website for a national carbon market. The rules are quite basic and give broad guidance on how the national carbon market will be governed. Since the initial release of the rules, the NDRC has had inter-ministerial negotiations and consultations with China's State Council (China's penultimate decision-making body) on the designs and plans for the national ETS.

As the rules indicate, China's national market looks poised to be a system whereby the provinces and regions issue allowances and adjust their respective emissions caps over time. The central government will be responsible for establishing and issuing regulations, as well as enforcing compliance. China's INDC for the Paris 2015 agreement includes a target for a 60-65% carbon intensity reduction by 2030. The national carbon market will be one policy tool for China to meet this target.

While the NDRC has updated its draft legislation since its first release in 2014, it has also told IETA that it aims for China's ETS to avoid three key mistakes it thinks were made in the EU ETS:

1. No overallocation of allowances.
2. Not introducing a tax and ETS at the same time, with the NDRC keen to introduce both simultaneously.
3. Not including indirect and direct emissions in the ETS; the NDRC wants to include both sources.

China's national ETS will include six sectors: power; petrochemicals and chemicals; iron and steel; cement; pulp and paper; and aviation. Any other sector will likely be subject to a carbon tax; however, this is still to be defined by the State Council. Other details, such as how allowance allocation will work and what amount of offsets operators in the national ETS can use are also still undefined. China will, however, allow for some form of foreign participation in its ETS, following positive experiences from the pilots where foreign companies can currently trade (Shenzhen, Shanghai, Guangdong, and Hubei).

China's carbon market will be the largest when it enters into force, and it will create an eastward pivot of activity on carbon pricing over time. While the details of its market still remain unclear, China's 10 years of policy evolution and experimentation with emissions trading have shown its government – and the world – that carbon markets are a positive and effective way to reduce emissions while maintaining economic growth.

Based in Brussels, ***Jeff Swartz*** *manages and directs international climate policy for IETA. He also leads IETA's Business Partnership for Market Readiness (B-PMR), which is helping to shape the next generation of carbon markets. Prior to joining IETA in 2011, Jeff spent four years in Beijing working on the CDM for the Nordic Environment Finance Corporation (NEFCO) and also at Evolution Markets.*

(1) Figure provided by Lim Jian Wei, ICIS China Carbon Analyst (2) Ibid (3) IEA, 'Integration of Renewables: Status and Challenges in China,' 2011. (4) In fact, the NDRC's original ruling was for four cities and two provinces. Shenzhen made a special case to the NDRC and was granted approval shortly after the original announcement.

IETA
CLIMATE CHALLENGES
MARKET SOLUTIONS

CLIMATE MARKETS AND AFRICA

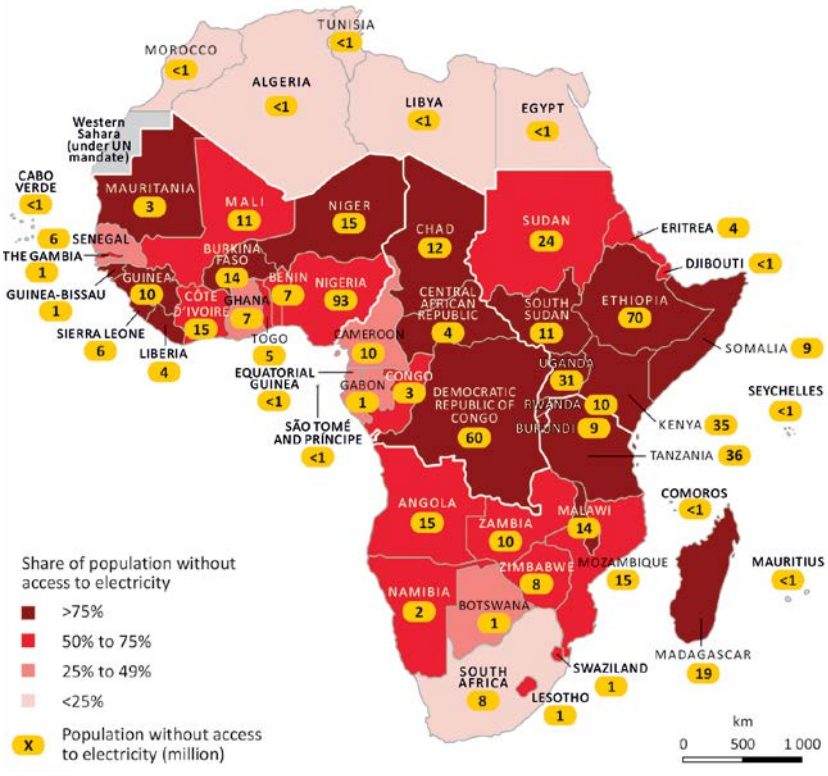
Geoff Sinclair considers the current role of climate policy and markets in Africa, the effectiveness of initiatives to date and what Paris can do to help

Successful economic development in many African nations relies on building appropriate infrastructure that is resource efficient. Climate policy and markets can help – but any initiative needs to consider the specific local challenges.

AFRICAN DEVELOPMENT CHALLENGES

Africa is the only continent where both the number of people without access to electricity and the number of people in extreme poverty are rising.

In many African countries, there has been a chronic failure to develop and maintain the energy infrastructure that is critical (alongside investment in education and health) to reverse this trend, and much of the existing infrastructure is costly and inefficient. This failure has not been due to a lack of latent demand, but due to other challenges including political complexity and instability, lack of creditworthy grid companies, weak government balance sheets, corruption, and lack of capacity in the public and private sectors. Project and infrastructure development in Africa requires a range of enabling conditions to be in place before it can truly take off. That said, many forms of climate-friendly infrastructure make sense in African countries even without the motivation of climate change mitigation: renewable energy, for example, is isolated from the cost, risk, currency exposure and logistical challenge of long-term fuel supply requirements. And with the dramatic reduction in costs, PV panels and wind turbines in particular, many projects are starting to stack up on unsubsidised economics. Many African households currently use a mix of fuels such as charcoal, kerosene and diesel when they can afford it – renewable energy solutions are already significantly cheaper and more reliable than these.



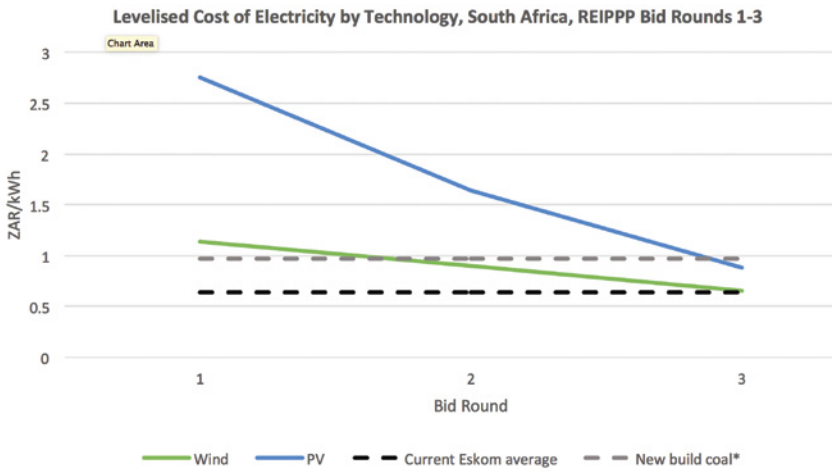
Source: International Energy Agency, Africa Energy Outlook 2014

MARKET APPROACHES TO STIMULATE GREEN DEVELOPMENT

"Spreadsheet" economics, however, does not mean that projects will happen. Each project has unique challenges, often requiring solutions (such as government or credit guarantees) that appear anathema to developed countries. Technological approaches also need to be adapted to local conditions: for example, given continued failure of centralised generation and transmission in many African countries, it is likely that smaller, decentralised solutions will be more successful.

THE CLEAN DEVELOPMENT MECHANISM

Until prices fell, the private sector viewed the Clean Development Mechanism (CDM) as a potential economic incentive to stimulate investment in green development. Most African countries, however, largely missed out, with the vast majority of investment going to Brazil, China and India. It it is clear that there were a number of reasons for this:



Notes: Price fully indexed, average ZAR/kWh base April 2011. Source: South Africa Department of Energy

- On the whole, CDM project activity was driven by economic development, rather than driving it;
- The general impediments to economic development in many African countries continued to exist; and
- The complexity and transaction costs of the CDM, particularly the measurement, reporting and verification of emissions, biased it towards large projects – whereas the greatest potential in Africa continues to be in smaller, distributed technologies. Programmatic CDM overcame this just as prices collapsed.

CLIMATE FINANCE

'Climate finance' is seen by many as a solution. There has been a rush of public funding available, to the point where public and quasi-public providers find themselves aggressively competing to finance a small pool of bankable projects. The problem is a need to get potential projects to the point where they become truly investable.

THE DEFINITION OF CLIMATE FINANCE APPEARS TO INCLUDE A NUMBER OF KEY COMPONENTS:

Grants and capacity building, which are a valuable source of support (and equity) for many developers, but have historically been restricted to a narrow range of external costs and have tended to be biased towards donors' political agendas;

Provision of loans and/or equity investment have traditionally been disbursed through multilateral and bilateral development banks, although donors are using an increasing number of innovative structures such as Green Africa Power. These provide up-front finance but are often restricted to projects that are large and/or already bankable. Most public funds of this nature require a minimum ratio of private to public funds.

Results-based finance *(RBF),* alternatively called pay-for-performance. Entering into a long term purchase of certified emission reductions (CERs) is one example, and the World Bank's Pilot Auction Facility is continuing innovation in this context, but other "results" such as certain social and health outcomes may also be purchased. Despite the name, RBF does not typically involve up-front finance, requiring investors to take the project development, implementation, financing and performance risk.

RBF initiatives are being developed with reference to local needs and conditions; the South African Renewable Energy Independent Power Provider Programme (REIPPP) is good example. The REIPPP consists of a series of tender rounds in which prospective developers compete based on the electricity tariff that their project would require, and has yielded remarkable results, including solar PV tariffs that are lower than those of competing thermal generation. The success of the REIPPP, however, also rests on government backing for the power offtake, a well-developed legal and regulatory framework and a grid capable of absorbing significant new (and intermittent) generation.

A number of African countries are now considering implementation of a similar mechanism, with Nigeria having recently tendered for related advice. Likewise, other initiatives such as Uganda's GET-FiT, a combination of subsidised renewable energy tariffs and standardised documentation, are planning geographical expansion.

PARIS AND BEYOND

It is easy to think of 'African' development in simplistic, top-down terms from a developed country perspective. Given the size and complexity of the continent, and the policy and development environment, initiatives to develop climate-friendly infrastructure can only be useful if they meet local priorities and intelligently apply a broad range of tools to have maximum impact. Helping developers to generate bankable projects is key.

Intended Nationally Determined Contributions (INDCs) reflect local priorities, thus can form the basis of a broad range of tailored engagements to assist development. In this scenario, African countries would direct their own development, while donor countries would work with them, applying a wide range of tools including guarantees, risk mitigation,

"SPREADSHEET" ECONOMICS DOES NOT MEAN THAT PROJECTS WILL HAPPEN

early stage project development assistance, grants, advice, loans, investments and RBF. This approach would also involve working with markets to facilitate projects.

A complex ecosystem of initiatives is already beginning to develop along these lines, and will continue to do so into 2016 – although there is possibility of donor competition and lack of coordination. As in financial markets more generally, however, the answer is in encouraging coordination, innovation and information disclosure. The Green Climate Fund may also play a significant role by providing both tools and people to apply them.

Paris can play an important catalytic role in aiding these developments:

- by stimulating the implementation, in a timely manner, of a well-considered set of INDCs that reflect local conditions and priorities (but nevertheless involve as much regional coordination as possible);
- by encouraging climate finance providers to support initiatives that work with local stakeholders and developers, using a broad range of tools with maximum flexibility and in a nuanced way to boost the number of bankable sustainable development projects and get them financed; and
- by explicitly acknowledging that African countries should be able to develop their own policies using the broadest range of tools and providing a means to link domestic tools to international mechanisms and standards, for example through tradeable instruments.

With the right framework of policies and financial support, the African continent can develop the infrastructure it needs to stimulate economic development that is consistent with the 2°C target and become an important contributor to global economic growth. The performance of individual countries in Africa will always vary, but Paris can play an important role in helping them to get there.

Geoff Sinclair *is Managing Director of Additional Energy, which specialises in renewable energy and innovative climate finance solutions for sub-Saharan Africa. He was previously head of climate finance at Standard Bank.*

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CHECK-UP: GREEN CLIMATE FUND

A year after its initial funding pledges and as it prepares to select its first projects, Katie Sullivan takes the pulse of the Green Climate Fund

Climate finance remains one of the hotter, sicklier of issues around today's UN climate negotiating table. Underpinning today's UN climate finance story is the 2009 promise by advanced economies to jointly-mobilise $100 billion per year by 2020 through a variety of public, multilateral, and private financial sources. If these sources, and their flows into climate mitigation and adaptation efforts, form the world's climate finance "nervous system", the Green Climate Fund (GCF) is positioned to become the system's primary organ. Given the high expectations, and even higher political pressures, surrounding the Fund, this brief **GCF CHECK-UP** gauges whether its current health and vital signs are in check for GCF's ambitious journey ahead…

TEST: GCF PLEDGE VS. CONTRIBUTION COUNT – PASS

The period from 2015 to 2018 represents GCF's initial capitalisation period, when the Fund welcomes pledges on a rolling basis from new public, private and philanthropic sources. After 60% of existing pledges are converted to contributions ("money in the bank"), the Fund launches a systematic resource replenishment cycle. As of October 2015, the GCF had raised $10.2 billion from 37 government pledges; of this amount, $5.8 billion has been announced and signed by contributors.[1]

TEST: GCF ACCREDITED ENTITY COUNT – PASS

Accredited Entities (AEs), including national, regional, international, public and private institutions, are responsible for channelling Fund resources to approved projects and programmes. Depending on its track-record and approved risk category, an AE can deliver a range of activities, such as: developing and submitting GCF funding proposals; overseeing project management and implementation; deploying financial instruments (grants, loans, equities, guarantees); and mobilising private capital. There are currently 20 approved AEs, with another nine expecting approval by GCF's November 2015 Board Meeting. Of GCF's current AEs: three are private sector entities (Acumen, AFC, and Deutsche Bank AG), and several others hold experience working with private sector (including ADB, CAF, EBRD, IDB, KfW, and the World Bank, among others.)

TEST: GCF NATIONAL DESIGNATED AUTHORITY COUNT – PASS

According to its Governing Instrument, the GCF must adopt a "country-driven approach" with strong coordination at the national level. For every developing country seeking to access GCF resources, there exists a National Designated Authority (NDA). Representing the interface between the Fund and countries, these NDAs (or Focal Points) communicate strategic climate finance and development priorities while liaising with the Fund, relevant AEs and other stakeholders. NDAs are also responsible for: project nomination letters for direct access to GCF funds; no-objection letters for projects and programmes; and approval of GCF readiness support. As of 7 October 2015, 136 NDAs and Focal Points have been identified by the Fund.

TEST: GCF PUBLIC INFO & ACCESS STATUS – PASS

As a sign that the GCF's officially "Open for Business", the Secretariat launched an updated website. The new and improved site contains "strong visual cues" and faster avenues to access GCF information, news, and stakeholder opportunities. Site navigation is structured around its core business areas: Funding Information ("Ventures"); Accreditation; Country Readiness Support; Private Sector Facility; News and Resources ("Contributions"); and Governance/Board Information ("Boardroom"). Additional phases of the website redesign, capturing other areas of the Fund's work, will be rolled-out by early-2016.

TEST: GCF PROJECT COUNT – NEEDS ATTENTION

Since July 2015, the GCF has received 37 formal project and programme funding

CLIMATE FINANCE REMAINS ONE OF THE HOTTER, SICKLIER OF ISSUES AROUND TODAY'S UN CLIMATE NEGOTIATING TABLE

THIS BRIEF GCF CHECK-UP GAUGES WHETHER ITS CURRENT HEALTH AND VITAL SIGNS ARE IN CHECK FOR GCF'S AMBITIOUS JOURNEY AHEAD

proposals from public and private entities. After review by GCF's Technical Advisory Panel and Secretariat, only eight of the 37 proposals were selected for GCF Board approval in November 2015.[2] Financing decisions on these first initiatives should send a positive signal to the international community (including those heading to Paris) that not only is the Fund fully operational, but developing countries are starting to access the fund to support national climate priorities.

TEST: GCF PROJECT BREAKDOWN – NEEDS ATTENTION

In total, the inaugural eight project proposals only request $168 million in funding through three available (and GCF-approved) financial instruments: $128 million in grants; $20 million in guarantees; and $20 million in equity support. Of the requested funding sought: over 80% is geared towards mitigation and adaptation in Least Developed Countries, Small Island Developing States (SIDS), and African States; two-thirds is intended to support adaptation; and 75% will be channelled in the form of grants. The projects, submitted by AEs at national, international and regional levels, cover various regions and funding themes (eg, land-use, energy efficiency, renewables, and water access).

Katie Sullivan *is IETA's Director of North America and Climate Finance. She leads efforts to inform climate change policy and market design with government and non-government partners across North America. She also manages IETA's growing international work on innovative instruments and mechanisms, capable of leveraging private capital into climate mitigation and resilience activities.*

(1) GCF website; status of pledges, 18 October 2015 (2) GCF's 11th Board Meeting takes place in Livingstone, Zambia, 2–5 November 2015. A key item on the agenda includes the Board's review and approval of the Fund's first set of funding proposals.

CARBON MARKETS AND CLIMATE FINANCE

Gernot Wagner discusses how carbon markets and climate finance are linked

Climate finance is lots of things to lots of people. For some, it's the $100 billion "Copenhagen commitment". For others, it's Citi's latest sustainable finance pledge of $100 billion.[1] It's Bill Gates's $1 billion clean energy investment. It's public and private monies; mitigation and adaptation; loans, bonds, equity stakes, high-risk ventures, Kyoto-style allowances, offset credits, and private and public grants. It's all of the above. When it comes to carbon markets, climate finance is often about what happens with allowance revenue. That's important. But the primary goal is, or ought to be, appropriately pricing the climate externality.

It's about nudging massive private investment flows from the current high-carbon, low-efficiency path toward a low-carbon, high-efficiency one. That, in turn, means focusing on the incremental dollars necessary to sway private investments. In the end, it's all about the margin.

RIGHTING THE WRONG INCENTIVES

The incentives facing many private actors today are clearly misleading. Benefits, for the most part, are fully privatised, while many costs are socialised. That goes in particular for environmental and climate costs. The 'hidden' costs of energy investments are large and negative. While largely invisible to those doing the polluting, these costs are all too visible to society as a whole: in form of costs to health, ecosystems and the economy. In the United States, for example, every additional tonne of coal, every barrel of oil, causes more in external damages than it adds value to GDP.[2] That calculation does not even consider the large carbon externality.

IT'S ABOUT NUDGING MASSIVE PRIVATE INVESTMENT FLOWS TOWARD A LOW-CARBON, HIGH-EFFICIENCY PATH

There, one of the more important metrics is the so-called 'social cost of carbon'. The US government's central estimate is $40 per tonne of CO2 released today. The true number is likely a lot higher, especially when considering the many 'known unknowns' not quantified (and sometimes not quantifiable).[3] Regardless of the precise amount, it's the cost to society — to the economy, health, ecosystems, the whole lot — of each tonne of CO2 released today over its lifetime.

The social cost itself is inherently a marginal concept. While all of us seven billion pay a fraction of a penny of the social cost for each of the billions of tonnes emitted today, few of those doing the actual polluting pay themselves. A price on carbon, through cap and trade or a carbon tax, ensures that anyone covered by the market forces faces the right incentives. Polluters face a direct cost of pollution and, thus, are driven to pollute less. The law of demand at work.

INCENTIVES AT WORK

One of the guiding principles of economics is that people are motivated by incentives. That's not too surprising. It would be surprising if people were not motivated by what is designed to motivate them. When faced with a price on carbon, emissions go down, and investments change course.

At the level of individual businesses, solid evidence points to how existing carbon prices have incentivised investment in clean technology, research and development.[4]

In places with no external carbon price, investments can be affected by internal carbon pricing. The Carbon Disclosure Project counts over 400 companies with an internal, 'shadow' carbon price, either independently or in reaction to an external market price. That price, in turn, figures into day-to-day decisions from where to site a new facility to how to source energy.

In 1999, the World Bank conducted a study to determine the impact of a shadow price for carbon on the Bank's investments. At an internal price of $40, the highest evaluated price, almost half of the analysed investments would have had a negative net present value, and, thus, would likely not have been made. For the rest, profitability would have been significantly reduced.

Individual investments, if organised at a large enough scale, make the difference. Take the Clean Development Mechanism (CDM), a market-based mechanism that channels funding to emission reduction projects in developing countries. Countries and investors can invest in CDM projects as a way of meeting domestic reduction goals, or complying with domestic carbon prices. Through the CDM, hundreds of billions of private sector dollars have gone towards funding GHG mitigation.

With a government-imposed carbon price, reflecting the true cost of carbon to society, investment portfolios would change. Drastically. We've seen it in practice, but the current scale is not large enough to sway the majority of investments that matter.

Today, in fact, much of firms' investments towards mitigating climate change are made voluntarily.

FROM CLIMATE FINANCE TO FINANCE

Climate finance often is 'concessional' finance. That might be outright development aid. It also includes voluntary commitments like Citi's $100 billion. Citi, of course, is not alone. Goldman Sachs committed $40 billion in 2012, Bank of America $50 billion in 2013, all made over 10 years. Meanwhile, these three banks alone underwrite hundreds of billions of loans every year. Total global Foreign Direct Investment is in the trillions.

These massive financial flows won't be redirected overnight. But they do follow incentives. In fact, that's all they follow.

Enter carbon markets. They ensure that anyone covered by the market faces the right incentives. The prevailing allowance price is one good proxy of the level of ambition of any particular market. It's also what helps nudge investments into the right direction. In econ-speak, it's all about internalising externalities. In English, it's about paying your fair share and no longer socialising costs.

None of that renders what's traditionally called 'climate finance' unnecessary. There are still plenty of uses for additional monies. In particular, carbon markets are all about mitigation. Adaptation might dovetail nicely on some forms of mitigation, but it's not the primary goal. That's where foreign aid as well as government and private grants come in. If anything, those amounts need to be scaled up, too.

WITH A GOVERNMENT-IMPOSED CARBON PRICE, REFLECTING THE TRUE COST OF CARBON TO SOCIETY, INVESTMENT PORTFOLIOS WOULD CHANGE

But the true scaling happens on the investment front. That's no longer "climate finance". It's simply "finance." Re-channelling only 0.1% of total wealth under active management globally amounts to around a $100 billion shift. Efforts, of course, must not stop there. It's about channelling the full $100 trillion into the right direction.

Gernot Wagner *is lead senior economist at the Environmental Defense Fund, and co-author, with Harvard's Martin L. Weitzman, of Climate Shock (Princeton University Press, 2015). www.gwagner.com*

(1) Citigroup announced a $100 billion commitment over 10 years to finance sustainable growth on 18 February 2015. Its previous $50 billion goal was announced in 2007 and was met three years early, in 2013. (2) See: Muller, Nicholas Z., Robert Mendelsohn, and William Nordhaus. 2011. "Environmental Accounting for Pollution in the United States Economy." American Economic Review, 101(5): 1649-75. And also: US National Research Council Hidden costs of energy: unpriced consequences of energy production and use. National Academies Press, 2010. (3) See: Wagner, Gernot and Martin L. Weitzman. Climate Shock. Princeton University Press, 2015. (4) See: Dechezleprêtre, Antoine, Matthieu Glachant, Ivan Hašcic, Nick Johnstone, and Yann Ménière. "Invention and transfer of climate change–mitigation technologies: a global analysis." Review of Environmental Economics and Policy 5, no. 1 (2011): 109-130. See also: Calel, Raphael, and Antoine Dechezleprêtre. "Environmental policy and directed technological change: evidence from the European carbon market." Review of Economics and Statistics (2015). These studies analyse the impact of the EU ETS on patent activity.

PUTTING A PRICE ON CARBON, ONE JURISDICTION AT A TIME

Tom Kerr outlines how the public and private sector are working together to accelerate momentum to put a price on carbon around the world

Today, 39 nations and 23 cities, states or regions are using a carbon price. This represents the equivalent of about 7 billion tonnes of CO2, or 12% of annual global GHG emissions. This is a threefold increase over the past decade; since 2012, the number of implemented or scheduled carbon pricing instruments nearly doubled, from 20 to 38, and existing instruments are now worth about $50 billion.

China and the United States host the two largest carbon pricing initiatives, in terms of volume covered. Since 2011, China has been quietly — and successfully — running seven regional carbon trading pilots in places like Beijing and Guangdong Province, covering the equivalent of 1 billion tonnes of CO2. And the government is putting the building blocks in place to knit these pilots together into a national ETS that will launch in 2017.

In the US, programmes in California and the Northeast cover the equivalent of half a billion tonnes of CO2. California's ETS is now delivering 6.6% less climate pollution for every dollar of GDP as compared to 2009[1]; a recent report on the Regional Greenhouse Gas Initiative showed the system found similar positive benefits, estimating that RGGI has generated $1.3 billion in economic benefits and 14,000 job-years in the last three years for its nine member states in the Northeast[2].

EXISTING CARBON PRICING INSTRUMENTS ARE NOW WORTH ABOUT $50 BILLION

And let's not forget the world's pioneering emissions trading system – the EU ETS. It is now sending a more stable signal to investors and businesses, due in part to the establishment of a Market Stability Reserve. And the Province of Ontario will launch its own ETS in 2017 and link with Québec and California, showing movement toward a wider North American market.

WHY IS THIS HAPPENING?

There are a number of reasons we are seeing accelerating momentum to price carbon. First, with a global climate agreement on tap for the Paris climate summit, national governments are announcing their climate action plans. In addition to China, a number of jurisdictions — such as Korea, Switzerland and Norway — explicitly reference carbon pricing as important elements of their plans to decouple economic growth from growth in emissions.

Second, governments are becoming more confident in designing and running effective carbon pricing systems. This is evident in the new *FASTER Principles for Successful Carbon Pricing* report issued in September by the World Bank Group and the OECD.[3] These Principles capture the dynamic learning that we have seen over the past decade, and show that governments are building from one another's success to develop a common set of elements that address key political challenges such as competitiveness, impact on the poor and productive use of revenues. This body of evidence on well-designed and run carbon pricing systems is inspiring other jurisdictions to follow.

Finally, business is moving beyond simple calls to "put a price on carbon" in two important ways. They are preparing for carbon constraints by initiating programmes often referred to as "internal carbon pricing systems". In September 2015, CDP announced a nearly threefold jump in the number of global companies disclosing the use of an internal carbon price.[4] The largest growth was in Asia, due in part to the growing use of ETS by China and Korea.

HOW CAN WE TAKE THIS TO THE NEXT LEVEL?

While all of this momentum and action is welcome, it is insufficient to put the world on a 2°C stabilisation pathway. Efforts to advance carbon pricing are struggling to overcome a common set of key issues, such as a fear of losing competitiveness or the potential impact on energy prices and the poor. To address these important issues, the Carbon Pricing Leadership Coalition is being created.

This 'coalition of the working' grew out of the movement to support carbon pricing seen at the 2014 Climate Summit, and involves global businesses, governments and non-governmental organisations working together to address challenges and advance effective carbon pricing around the world, one jurisdiction at a time.

THE COALITION HAS THREE WORK PILLARS:

1. building and sharing the evidence base—through the *Principles* and other synthesis of competitiveness, alignment of policies, and equity, among others:--to address the key

issues that prevent action on carbon pricing;

2. mobilising business support for carbon pricing, through corporate 'readiness' activities like the use of internal carbon pricing and targeted policy advocacy; and
3. convening leadership dialogues globally and in key jurisdictions that need assistance in advancing their carbon pricing policies.

The Carbon Pricing Leadership Coalition will formally launch its Work Plan at the Paris climate summit in December 2015. Some partners are already beginning the work; for example, the UN Global Compact is creating a guide to internal carbon pricing, and the CDP has launched a Carbon Pricing Toolkit that enables a more detailed business-government conversation about price levels, coverage, and how to effect a smooth transition away from emissions-intensive fuels. We will also be hosting a series of Leadership Dialogues in key countries – the first of which in South Africa discussing the government's carbon tax proposal with businesses and other stakeholders.

We expect these activities to send a signal is that carbon pricing is here to stay at Paris and beyond. There is a growing set of leaders that are ready to work together to raise our collective climate ambition through successful carbon pricing implementation for years to come. The Coalition will allow these leaders to track global progress in carbon pricing implementation, convening forward-looking businesses and governments in a focused set of dialogues to successfully advance carbon pricing, one jurisdiction at a time.

THE BODY OF EVIDENCE ON WELL-DESIGNED AND RUN CARBON PRICING SYSTEMS IS INSPIRING OTHER JURISDICTIONS TO TAKE ACTION

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(1) Carbon Market California: a comprehensive analysis of the Golden State's cap-and-trade program 2012-13, Environmental Defense Fund, 2014. (2) The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States, Analysis Group, 2015. (3) The FASTER principles for successful carbon pricing: an approach based on initial experience, World Bank Group, 2015. (4) Putting a Price on Risk: Carbon Pricing in the Corporate World, CDP, 2015.

THE US: PREPARING FOR TRADING

The final rule for the Clean Power Plan opens the door for market-based trading in the US. Tom Lawler and Cameron Prell take a closer look

In late 2015, the US took what could ultimately become the biggest step in its history toward establishing regional and national carbon markets. The reason for the qualifier is that a number more steps will need to be taken by US states, each acting independently, before the statement can be true. Optimism abounds that states will choose a path to achieve newly mandated CO2 reductions from the power sector by using some form of emissions trading.

To explain, on 23 October, 2015, the US Government published Environmental Protection Agency (EPA) rules to regulate CO2 emissions from existing fossil fuel-fired power plants under Section 111(d) of the Clean Air Act. The rules – informally referred to as the Clean Power Plan (CPP) – establish both emission reduction targets and guidelines for state enforcement.

By fall of 2016, a blink of an eye in state political terms, each state is now required to devise and submit for EPA approval a compliance plan based on its own circumstance that is consistent with the EPA guidelines, and sets performance standards to achieve its state-specific target reductions between 2022 and 2030. The Clean Power Plan strongly encourages emissions trading throughout the rules as a cost-effective compliance option available to states, providing several market infrastructure and design parameters to be considered – including collaborating or linking with other states to develop regional platforms.

The EPA gives states flexibility to design a trading system using instruments that are either mass-based (short tons of CO2-equivalent) or rate-based (average tonnes of CO2 per megawatt hour of energy produced).

Under a mass-based programme, states would establish a cap-and-trade system similar to those in existence around the world, allocating emission allowances to covered entities based on a total emissions budget calculation, net of any designated set-asides for targets reductions. Under a rate-based programme, states would establish some form of baseline-and-credit system, whereby Emission Rate Credits (ERCs) would be generated by covered entities performing underneath their allotted baseline. Other zero-emitting resources deemed eligible (eg, clean energy resources) would also generate and be able to sell ERCs to covered entities operating above their respective cap. Offset credits are not included or contemplated under either approach.

However, states will still have the option to choose *not* to pursue emissions trading programmes – a point that cannot be understated here. Depending on the relative stringency of a given state's emission reduction obligation under the CPP, the state government will have flexibility to achieve compliance in any number of other means (eg, command-and-control emissions performance obligations, power plant retirements, clean energy portfolio standards, energy efficiency improvements, etc). Moreover, some states could choose a form of custom "state measures" compliance plans that will include partial or "opt-in" use of emissions trading.

From an efficiency and lowest cost of emissions abatement perspective, however, preliminary evidence favours the conclusion that many states will choose to employ trading – specifically, mass-based trading under a cap-and-trade system.

To foment this outcome, the EPA included in the final rules a pre-packaged solution comprising a set of simplified "trading-ready" standards. A state that chooses this approach would be able to wholesale adopt standardised terms, methodologies and criteria to avoid haggling over competing political interests.

States that employ the pre-packaged trading-ready approach will be required to utilise the same commodities, the same metrics, and the same methodologies and criteria as all other states that also choose to be trading-ready.

Those states that forecast being long on emissions reductions over the eight-year compliance period will naturally have economic incentive to trade with states that will be short, and vice versa. The genius of the Clean Power Plan therefore is that it provides states the ability to link with other states through the trading-ready vehicle.

The device was necessary, given the constraints of the existing Clean Air Act. The EPA does not have the regulatory authority to mandate a national cap-and-trade system absent future federal legislation. The best the agency could arguably do is to support broad-based trading by appealing to the economic interests of states.

HOPES ARE HIGH THAT THE CLEAN POWER PLAN WILL LEAD TO THE CREATION OF CARBON MARKETS FOR THE US POWER SECTOR

The EPA's strategy is consistent with how US energy markets operate. There are 48 different energy markets among the contiguous states, some deregulated and some monopolistic, but public utilities that own the regulated power plants often operate in more than one state. The utilities themselves therefore have vested interests in ensuring that states employ common compliance approaches. This highlights one of the most difficult issues state governments will need to resolve. Each state will be affected by how the adjacent and surrounding states choose to comply with the CPP, and each state will have little or no actual legal authority to affect other state decisions – it will only have the ability to coordinate regional solutions.

A regional mass-based programme in this regard may be easier to manage for most regional platforms, both because mass-based programmes already exist and are familiar (eg, the Regional Greenhouse Gas Initiative in the northeastern US, the California carbon market), and because the trading infrastructure and deployment mechanisms are much more streamlined than a rate-based programme might be. Regions that utilise rate-based programmes would have to also agree to harmonise emissions measurement and verification standards if the states were seeking to credit or incentivise clean energy or energy efficiency. This could require additional layers of regulatory enforcement that may encumber or add costs to compliance. Under a mass-based programme, incentivised eligible resources, like renewable energy or natural gas, would be more easily entitled to state

FROM AN EFFICIENCY AND COST PERSPECTIVE, PRELIMINARY EVIDENCE FAVOURS TRADING

allowance awards based on a more upfront distribution method, and all states would have greater transparency of the liquidity of the regional market over time.

Should states choose a trading programme, it will still have to consider a host of carbon market design related issues, including:

- Statewide emissions budgets during compliance periods
- Allocation and distribution mechanisms (auctioning vs. free allocation)
- Cost impacts on covered entities and end-use consumers;
- Whether a distribution scheme, and subsequent market trading, are compatible or consistent with the state's power market(s); and,
- How the overall trading programme could alter or transform market behaviour in power generation, transmission and consumption.

Central considerations will be how covered entities are able to mitigate compliance costs associated with the mandated scarcity, and how the designated recipients of allowances/ERCs are able to use the tradable commodities and receive and benefit from their associated value. In this way, the market design experience and expertise of IETA members will have direct relevance to states evaluating CPP compliance – how problems were identified and addressed under the EU ETS or the California ETS, most pointedly.

Hopes are high that the Clean Power Plan will lead to the creation of carbon markets for the US power sector, yet there are a number of contingencies and obstacles that will be encountered along the way. Most notably, more than half of the US states and several large industry groups have already challenged the legality of the CPP – challenges which will likely end up before the US Supreme Court in a few years' time. Between now and then, though, states have their marching orders. The EPA has opened several potential doors for carbon market development that states can walk through, and in some instances run through. Whether a regional or national carbon market develops will depend on how many states choose the same door.

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FLYING INTO THE FUTURE

The global aviation sector is taking action to curb its emissions, with a market-based mechanism set to be adopted by ICAO in 2016. Megan Flynn and Alec Kibblewhite map out the journey to this point and how it intersects with the UNFCCC process

The aviation industry has grown considerably over the past decades to nearly 1400 airlines operating services to around 4000 airports. The number of passengers has doubled in the last decade, to more than 3 billion in 2014, and another 65 billion passengers are expected over the next 15 years. The rise in air travel brings significant economic benefits. Globally, 58 million people have a job linked to aviation. But while the economic and social benefits from aviation are undeniably significant, they do come at a cost: GHG emissions.

Global demand continues to drive overall growth in aviation emissions, despite significant technological advances in reducing emissions. Emissions per passenger kilometre have reduced by more than 70% over the past 40 years and aviation contributes around 2% of global emissions.

Acknowledging its scale and significance in the global response to climate change, the aviation sector, through trade association the International Air Transport Association (IATA), has taken a proactive approach by setting the following ambitious targets:

1. 1.5% annual fuel efficiency improvement between 2010 and 2020;
2. Carbon neutral growth from 2020 (CNG2020);
3. 50% reduction in net emissions by 2050 compared to 2005 levels.

The second target, CNG2020, was formally adopted in 2010 by the member states of the UN International Civil Aviation Organization (ICAO). If successfully implemented, it means that the aviation industry's net emissions will not increase beyond 2020 levels despite expected industry growth.

WHILE THE ECONOMIC AND SOCIAL BENEFITS FROM AVIATION ARE UNDENIABLY SIGNIFICANT, THEY DO COME AT A COST: GHG EMISSIONS

Modelling suggests current technology, operations such as required navigation performance (RNP), infrastructure improvements and fleet renewal will make a significant, yet insufficient contribution to achieving carbon neural growth from 2020. It is anticipated that the remaining mitigation will be achieved using new technologies such as advanced biofuels, and a market-based measure (MBM) to be developed through the ICAO framework.

AVIATION AND THE UNFCCC: A UNIQUE CASE

Fuel used in international maritime and air transport is treated differently from fuel used domestically, both from a regulatory and tax perspective. The Kyoto Protocol delegated the regulation of emissions from international maritime and aviation bunker fuel to developed countries, working through the relevant UN bodies – the International Maritime Organization (IMO) and ICAO. Emissions from international bunker fuel are calculated and reported by developed countries, but are excluded from national totals and instead are reported separately within the UNFCCC framework. The practical effect of this is that emissions from international aviation bunker fuel, and therefore all international air travel, is not expected to be impacted directly by UNFCCC negotiations at COP 21 in Paris. Rather they will be regulated through agreement by countries through ICAO.

It is important to note that emissions from domestic flights do not come under the international bunker fuel framework, and are subject to any binding national emissions targets negotiated at COP 21. Negotiations in Paris may have a particular impact on the aviation industries in large countries such as Australia and Canada that rely heavily on air transport for domestic travel.

ICAO AND MARKETS

The aviation community has made considerable progress in addressing its impact on climate change. While the UNFCCC negotiations in Paris will seek to set legally-binding targets, the aviation industry, through ICAO, is currently working on how to implement the target of CNG2020 adopted by member states in 2010.

As outlined above, one of the key measures identified to meet this goal in the short term is a global MBM for the aviation industry. ICAO's member states formally resolved in October 2013 to adopt a global MBM at its next triennial assembly, and divided the design and implementation of this measure into two streams of work. Political and legal issues are addressed at the Environmental Advisory Group (EAG), while technical issues are dealt with by the Global MBM Taskforce (GMTF).

These groups are bound to propose a working model for endorsement and adoption by member states at the 39th ICAO General Assembly in October 2016. While the final form of the MBM has not yet been

agreed, it is widely expected that the global mandatory offsetting option will be adopted – a baseline and offset programme.

While the global MBM is likely to be the primary driver keeping net aviation emissions at or below 2020 levels in the short term, advanced biofuels for aviation are needed to meet the industry's longer term goals. The use of biofuel will enable airlines to reduce emissions and therefore liabilities under a global MBM.

ICAO created the Alternative Fuels Task Force (AFTF) in 2014 with a mandate to assess potential emissions reductions from the use of alternative fuels up to 2050. More importantly, AFTF was also tasked with developing the lifecycle assessment (LCA) methodology to assess the carbon emissions benefits from aviation biofuel. The LCA methodology, along with further work on broader sustainability criteria, will safeguard a high degree of environmental integrity with regards to the development and use of aviation biofuel under a global MBM.

Equally, the MBM's proposed biofuel accounting criteria (known as "book and claim") will protect against double counting whilst ensuring a system that is efficient for airlines, encouraging greater uptake of aviation biofuels.

THE AVIATION COMMUNITY HAS MADE CONSIDERABLE PROGRESS IN ADDRESSING ITS IMPACT ON CLIMATE CHANGE

PARIS AND THE ICAO NEGOTIATIONS

Although facilitating separate climate negotiations, ICAO cooperates actively with the UNFCCC Secretariat. ICAO reports regularly to the Subsidiary Body for Scientific and Technological Advice (SBSTA) – exchanging information and holding meetings of experts from both streams of negotiation and technical work.

While there has been some concern expressed that international aviation has been excluded from the UNFCCC process, solutions for reducing aviation emissions are highly technical and benefit from the support of the specialised ICAO body. Climate negotiations specific to aviation have created a forum for developing emissions reduction solutions focused on technology, and led to advancements in aircraft efficiency, biofuels and carbon markets. Lessons learned from the dedicated industry negotiations within ICAO could provide a valuable precedent for other industry specific action within or in parallel to the UNFCCC framework. Existing arrangements for information sharing between ICAO and the UNFCCC will continue to benefit both processes.

The negotiations in Paris will undoubtedly impact the process at ICAO by positioning member states on issues common to each process and by increasing publicity and scrutiny into both UNFCCC and ICAO outcomes.

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TAIWAN: LAYING THE FOUNDATION FOR A CARBON MARKET

Taiwan is set to join the growing number of countries with an emissions trading system. Hui-Chen Chien, Robert Shih and Wen-Cheng Hu look at the foundations being laid for Asia's next ETS and the prospects for engagement with the international carbon market

After nine years of deliberation, the government of Taiwan passed the Greenhouse Gas Reduction and Management Act finally in mid-2015. The Act sets a long-term target to reduce Taiwan's GHG emissions to 50% below 2005 levels by 2050, as well as eventually establishing a cap-and-trade system.

The government has also since adopted an interim voluntary target of reducing emissions 50% from business-as-usual by 2030, which equates to about 20% below 2005 levels, and it will also consider the use of international credits to meet the target.

THE ACT IN DETAIL

The Act provides a comprehensive legal framework for both mitigation and adaptation measures in Taiwan. As well as setting the legally-binding reduction target, it also provides the possibility to adjust the target depending on domestic and international development.

The Act designates the Taiwan Environmental Protection Administration (TEPA) as the central competent authority and requires it to develop the National Climate Change Action Framework. This will be reviewed every five years, as will the five-year emissions reduction targets. TEPA will also develop the GHG Reduction Action Plan, under which the central industry competent authorities will establish sectoral action programmes with economic incentives to reduce emissions.

The Act lays out the foundation to develop a domestic carbon market in Taiwan (Figure 1). Before the Act was passed, TEPA had already designated GHGs as air pollutants and introduced mandatory reporting for those emitting more than 25,000 tonnes per year. TEPA will continue the reporting programme under the Act and published the draft rules for emissions reporting and verification in September 2015.

FIGURE 1: CARBON MARKET ELEMENTS OF THE GHG ACT

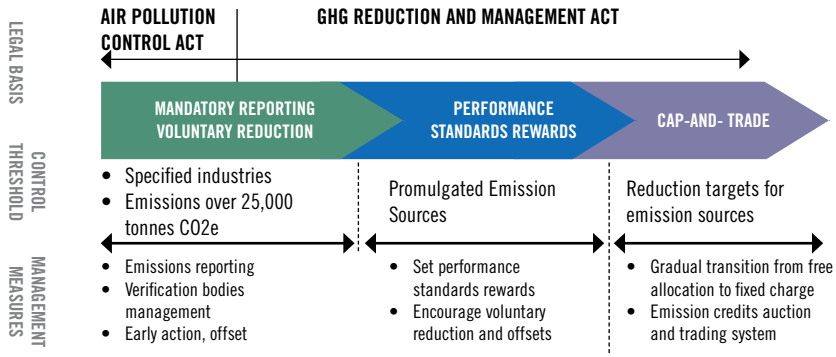
CAP	50% below 2005 level by 2050 (interim five-year phase targets)
MRV	Mandatory reporting by emitters above 25,000 tonnes/yr threshold, with third-party verification
Coverge	To be promulgated by central competent authority (TEPA)
Allocation	To be done by TEPA in consultation with industry authorities, transition from free to auction/sales
Registry	Registry in place since 2007; trading platform for domestic credits under development
Domestic Offset	Credits issued by TEPA from the domestic performance standards and offset programme
Int'l offset	TEPA will set the standards for recognising international offsets, maximum of 10% of allocation
Penalty	Three times the average market price during the compliance year, maximum of TWD 1,500/tCO2e

There will be a transition from existing programmes and rules to implement a carbon market in Taiwan (Figure 2). The programme rules for intensity-based early action (based on intensity standards for five major industrial sectors) and offset projects (based on Clean Development Mechanism and domestic methodologies) were promulgated by TEPA in September 2010. Submissions for early action and offset crediting need to get third-party verification before approval by TEPA, and the credits then are issued to the project owner's account in the national registry.

So far, over 43 million early action credits have been issued by TEPA, and 10 domestic offset projects have been registered, with one applying for credit issuance. The intensity-based early action credits can be used by entities that have commitments under the Environmental Impact Assessment law to offset part of their increased emissions, or for voluntary carbon neutrality; however, the offset ratio is still to be determined.

As the Act took effect on 1 July 2015, the early action crediting programme has ended, but the offset crediting programme will continue. Based on the previous rules, TEPA published draft rules under the Act for domestic offset projects in September 2015. The intensity-based crediting programme will evolve into the reward programme based on performance standards, which is currently under design. Since the previous intensity standards were product-based and only covered five major sectors (power, steel, cement, semiconductor, flat panel displays), the performance standards will be developed to cover more industries. The credits earned from offset projects and performance standards can later be used in the cap-and-trade system.

FIGURE 2: STEP-WISE CARBON MARKET IMPLEMENTATION



Finally, the Act authorises TEPA to establish a cap-and-trade system, considering developments at the UNFCCC level and other related international agreements. When setting the emission caps, TEPA will need to take into consideration industry trade intensity and reduction costs, as well as emissions leakage and international competitiveness. Allowances can be allocated freely, through auction, or for a fixed charge, with this charge to be adjusted according to the implementation of a tax on imported fossil fuels. .

One unique feature is that allowances for public utilities will be deducted for indirect emissions from end-users, since most of the power, oil and gas sectors are still state-owned and the energy prices are essentially set by the government. Thus, these upstream emissions will be addressed by other policy instruments such as the aforementioned tax on imported fuels, or an energy tax that is still under consideration.

INTERNATIONAL LINKAGE

Since the emissions reduction potentials in Taiwan are relatively low and reduction costs are relatively high, the use of international credits will be essential in meeting Taiwan's reduction target. Although the Act stipulates that priority will be put on procurement of domestic credits to meet the targets under the cap-and-trade system, international credits can be used for up to 10% of allocation.

TEPA, in consultation with relevant industry authorities, will set the standards for recognising international credits, while considering the UNFCCC or other international agreements, as well as factors such as energy efficiency improvement, procurement of domestic emission credits, and the long-term GHG reduction target. Before the Act was passed, TEPA has considered the CDM as the main source for international offsets, and welcomes the establishment of the voluntary cancellation platform by the CDM Executive Board. It is possible that the credits can be cancelled abroad and then issued as domestic credits in Taiwan with the proof of cancellation, similar to the current practice in the Korean ETS.

However, as the future of new market mechanisms and international linkage is still uncertain with the ongoing negotiations for the Paris agreement, Taiwan may reconsider the issue in the future, as well as look to the possibility of bilateral or regional market linkage.

LOOKING AHEAD

Although no precise timeline has been set for the establishment of a cap-and-trade system in Taiwan, TEPA is building on the existing domestic GHG programmes to strengthen the foundations for a future carbon market. Efforts are underway to set up a pilot trading platform for early action and offset credits in Taiwan.

In order to build an ETS tailored to the domestic situation but with potential for international linkage, TEPA looks forward to capacity building activities with organisations such as the German Emissions Trading Authority, the World Bank's Partnership for Market Readiness programme and IETA's Business Partnership for Market Readiness. At the same time, sharing Taiwan's past experiences with MRV, early action and offset crediting, and climate legislation can also be valuable to others looking to establish a sound foundation for emissions trading.

Carbon pricing is an effective tool for climate mitigation, and more international partnerships are emerging to explore ways for carbon market linkage. Through market mechanisms, governments can provide incentives to encourage the private sector to play an active role in rapid optimisation and maximisation of cost-effective and environmentally sound technologies. As an export-oriented economy, Taiwan also has significant investments worldwide, especially in the Asian region, and the dissemination of its low-carbon technologies can be further achieved through linking of international carbon pricing mechanisms. Such linkage is expected to minimise the costs of carbon technologies, support the growth of Taiwan's green industry, create added value in the green economy, benefit the global decarbonisation process, and maximise Taiwan's contribution to the global carbon reduction efforts.

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ALIGNING DECARBONISATION WITH COMPETITIVENESS IMPERATIVES

Defining an appropriate free allocation mechanism for industry still remains a tricky equation for governments. As the EU ETS, one of the oldest emission trading systems, begins to review the rules for the post 2020 period, it is an opportune time to improve existing design features for maximum effectiveness, write Emilie Alberola, Matthieu Jalard and Lara Dahan

As climate policies continue to operate at a largely sub-global level, the cost-effectiveness of unilateral carbon pricing policies could be undermined by the phenomenon of carbon leakage.[1] Industrial sectors that produce relatively homogeneous, energy-intensive goods and are exposed to international trade may incur the majority of the costs associated with climate policies with limited opportunities to pass-through these costs to end-consumers. Therefore, specific and targeted measures aimed to prevent the risk of carbon leakage in the most exposed sectors are necessary to ensure the effectiveness of climate policies.

While empirical studies on carbon pricing policies[2] have not shown any significant evidence of carbon leakage, this can be explained by several factors. First, carbon prices have been low and comparable to implicit prices stemming from climate policies worldwide. Second, properly implemented environmental policies are likely to increase the competitiveness of a given firm by spurring innovation and enhancing productivity.

But as carbon pricing policies expand around the world, the price on carbon may increase and businesses may transfer production to jurisdictions with weaker constraints on emissions. Safeguards must be designed properly to ensure overall decarbonisation objectives In view of this, free allocations providing economic protection to the most exposed sectors must also incorporate economic incentives to reduce emissions in production and consumption. Eventually, free allocation should be reconciled with a vision for industrial sectors as a whole, by taking into account both investment and demand patterns to forge a credible decarbonisation road map.

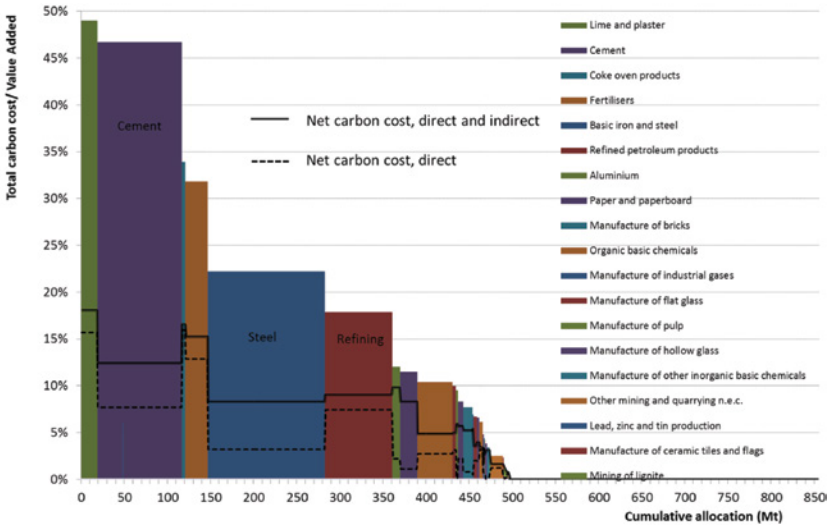
IMPROVING THE RULES

Since 2013, in accordance with harmonised EU ETS rules, free allowances have been allocated to 97% of industrial sectors on the basis of benchmarks (carbon intensity targets) and historical production levels. These have been adjusted using a carbon leakage exposure factor and a cross-sectorial correction factor to ensure allocation keeps below the free allocation cap.

In October 2014, the European Council committed to continue free allocations until 2030, even though significant evidence of carbon leakage has not been demonstrated. This raises the question as to whether or not the current free allocation mechanism can effectively and sustainably drive decarbonisation as it mitigates carbon leakage risks through to 2030. According to our analysis[3], in order for the EU ETS to be consistent with the decarbonisation roadmap for industry, three main aspects need to be addressed.

1. FLEXIBLE ALLOCATION TO ENHANCE EMISSION REDUCTION INCENTIVES

Between 2005 and 2012, free allocations earmarked for covered installations were distributed proportionally according to historical emissions levels, eliminating the economic incentive to reduce emissions. Since 2013, allocation has been proportional to sectoral benchmarks[4] and historical production levels, which is an important step toward maintaining economic incentives to reduce emissions. However, this allocation mechanism has been inflexible: volumes have been defined for a period of eight years (2013-20) and can be updated only if activity levels are reduced by more than 50% (partial cessation), and can be revised upward only in the case of increased production capacity.



The height of the rectangle soutline the estimated carbon cost of sectors in 2030 assuming a €30/tCO2e carbon price, and the width outline the estimated allocation following the proposal by the European Commission in July 2015. The black line outlines the net carbon cost (direct indirect), mitigated by the free allcoation, and the dotted line the direct net carbon cost.
Source : I4CE - Institue for Climate Economics, based on data from EC, EU TL, 2015

This lack of flexibility has given rise to perverse incentives, such as gaming of the rules to maintain activity levels above the 50% threshold that eventually led to increased emissions in the cement sector. Large surpluses in the face of an economic downturn have led to windfall profits and a muting of the carbon price signal. Implementing more flexible allocation measures, based on recent production data, would provide an adequate incentive to reduce emissions per unit of output, rather than reduced domestic production, and would be a more effective way to combat carbon leakage.

2. TARGETED FREE ALLOCATION TO ENSURE PREDICTABLE LONG-TERM PROTECTION

Provisions for Phase IV (2021-30) propose allocating 100% of benchmark-based allocation volumes to sectors that represent more than 93% of industrial emissions, most of which are not significantly at risk of leakage. Given the dwindling free allocation cap, these provisions are likely to entail an ex-post correction which could reduce allocations by 15% to all sectors by 2030, regardless of their exposure. This would imply high carbon costs for some highly exposed sectors while moderately exposed sectors would continue to enjoy large allocation volumes. In consequence, targeted allocation aimed at the sectors most exposed to carbon leakages is of utmost importance for predictable and effective protection in the long run. Defining a more targeted list of sectors using differentiated allocation rates, depending on emission and trade intensity, could be a possible solution as illustrated by the California ETS. According to our modelling results, based on reasonable economic growth assumptions, this method would allow allocation volumes to be maintained under the free allocation cap over Phase IV without any ex-post uniform correction.

Another solution would be the introduction of additional criteria that could determine the free allocation volume for exposed sectors. Such criteria could be product homogeneity (which would be a good proxy for the ability to pass through carbon cost) and process-based emissions intensity (which would better capture the potential carbon costs in the long run).

3. PROMOTING INNOVATION WHILE STEERING THE MARKET FOR LOW-CARBON MATERIALS

Public financial support for low-carbon innovation, for instance through the EU's Innovation Fund, is justified, given the high spillover of low-carbon technologies. Additionally, steering demand for low-carbon materials also requires attention. Those producers exposed to leakage and receiving free allocation are not supposed to pass-through carbon costs, meaning that the market for products with a smaller carbon footprint may fail to emerge. Implementing a consumption charge based on the quantity of materials used and the ETS price could help to maintain incentives along the value chain to consume materials more efficiently. Other mechanisms may also be warranted to drive the uptake of green steel and cement in the manufacturing and building sectors, for example, labels certifying that the materials used in the end-products are low-carbon. Going forward, systems of norms could become a lever for building closer relationship between producers and intermediate consumers. This would in turn help low-carbon producers to differentiate their products, further mitigating the risk of carbon leakage.

In order to forge a positive roadmap for the decarbonisation of industrial sectors, consistent with competitiveness imperatives, there is room to improve free allocation rules in Europe leading to 2030. A policy mix such as that described above would be likely more appropriate to drive the decarbonisation of industrial sectors, and to improve their "low-carbon" competitiveness.

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(1) The carbon cost differential between two regions is likely to lead to a delocalisation of production towards jurisdictions which are bound by weaker environmental constraints. Such carbon leakage would reduce the environmental benefits of the carbon pricing policy and would have negative impacts upon the economy. (2) Arlinghaus, J., (2015), Impacts of Carbon Prices on Indicators of Competitiveness: A Review of Empirical Findings, OECD Environment Working Papers (3) Jalard, M. and Alberola, E., 2015, Free allocation in the European Emissions Trading System (EU ETS): Identifying efficient mechanisms through to 2030. Climate Report N.51, I4CE – Institute for Climate Economics. (4) Defined as the average carbon efficiency of the 10% best performers in a sector

I4CE INSTITUTE FOR CLIMATE ECONOMICS
Une initiative de la Caisse des Dépôts et de l'Agence Française de Développement

LESS IS MORE

Carbon markets around the world have built up an oversupply of permits – is this an amenable problem or incurable disease, ask Marcus Ferdinand and Emil Dimantchev

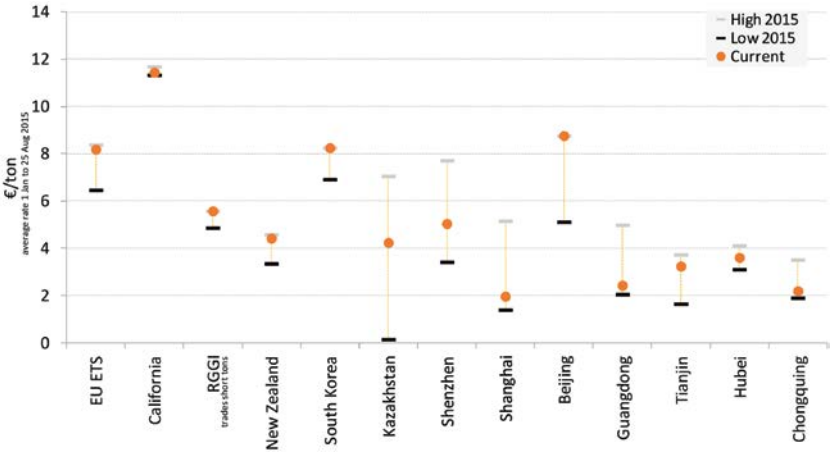
Carbon markets can reduce emissions, but their effectiveness has been limited by the prevalent practice of issuing more carbon allowances than necessary. Frequently the result of inflated emission forecasts and rigid market designs, an oversupply of permits lowers carbon prices and hurts the efficiency of markets. After learning early lessons, lawmakers in many jurisdictions have recently started to strengthen market designs. Yet consistent surpluses in many markets lead us to expect relatively stable carbon prices in the next few years in most markets.

Today, there are 17 emission trading systems (ETSs) in place in 35 countries, 12 states or provinces and seven cities. These jurisdictions are responsible for 40% of global GDP.[1] Despite the geographical diversity, carbon markets suffer from an almost universal affliction: a significant oversupply of CO2 allowances. An excess of allowances has caused markets to underperform as a tool for cutting emissions, calling into question the causes for the oversupply phenomena and potential remedies.

There seem to be two key reasons why many carbon markets are oversupplied. First, policy-makers have consistently overestimated future emission pathways used to determine the amount of CO2 allowances to be issued. Emission forecasting relies on the precision of long-term macroeconomic outlooks and energy modelling, two areas hardly known for their accuracy. Yet the practice of overestimating emissions is so widespread that it suggests there is bias, and not just forecasting error. Second, carbon markets that issue allowances based on a rigid schedule become easily oversupplied when emissions turn out lower than expected.

In Europe, both factors caused the accumulation of a large two billion tonne oversupply. Regulators expected the carbon price to be €30 ($27) per tonne in 2020, but the financial crisis and subsequent recession took them by surprise. Rapid growth of renewables and strong improvements in energy efficiency also belied regulators' expectations. As a result, the price of carbon plunged from around €30/t in 2008 to its current level around €8/t, via €3/t in 2013.

FIGURE 1: CARBON PRICES AROUND THE WORLD IN 2015 (IN €/t)



SHOULD PARIS LEAD TO A SCHEDULED PERIODIC REVIEW OF CONTRIBUTIONS, IT WILL LIKELY CREATE POLITICAL PRESSURE TO STRENGTHEN CARBON MARKETS

Currencies have been converted by using the average year-to-date euro exchange rate with the respective local currency. The cut-off date for prices is 25 August 2015. The Californian carbon market has also been oversupplied since 2014. This is because regulators set the cap of allowances based on forecasts that ultimately underestimated growth in renewables and underrated the emission-reducing potential of other climate policies. Though the market's creators expected the carbon price to be in the €11-23/t range, the current excess of allowances has pinned the price near the €9/t price floor.

The Regional Greenhouse Gas Initiative (RGGI) has likewise featured an excess of allowances as a result of an unforeseen increase in natural gas usage and the financial recession. In 2014, RGGI states cut the cap by almost half, sending the carbon price from the price floor near €1.50 per short ton (st) to its current level around €5/st. However, we project energy efficiency improvements and growth in renewables to keep the market oversupplied.

Both sides of the Atlantic, therefore, have seen an inflation of emission forecasts. All in all, one historical review concluded that European and American regulators have systemically overestimated growth in industrial emissions by around 1% per year.[2] Today, emerging carbon markets, too, show such a tendency.

SURPLUSES MAY BRING A FALSE SENSE OF SECURITY THAT COULD LEAVE COMPANIES UNPREPARED TO RESPOXND TO ANY STRENGTHENING OF CLIMATE POLICY

China's seven pilot markets are likely oversupplied. Though emission data is sparse, most large companies admit to having more allowances than necessary. What reflects this excess has been a common pattern across the pilot systems, whereby allowance prices fall ahead of compliance deadlines as companies realise their permits outstrip their emissions. The oversupply partially stems from underestimated energy efficiency potential. The architects of the Shanghai carbon market assumed only 0.5% annual improvement in CO2 emissions per megawatt-hour for 2013-15. But coal plants – the main power source – cut emissions by 3% in 2014 alone.

It is also likely that the creators of most Chinese pilot programmes resorted to generous free allocation of allowances to gain the acceptance of market participants and avoid the embarrassment of potential non-compliance. These factors, together with the availability of domestic offsets, have depressed allowance prices towards their current range between €2/t and €5/t.

Emitters in the Korean ETS, which commenced in 2015, will also receive excess allowances, according to our projections. To set the cap, the government used emission projections that assumed power demand will grow at historical rates. This expectation is perhaps optimistic, considering Korea's slowing economic, population and export growth. Government forecasters now realise this, as they have revised subsequent forecasts lower. Yet due to the market's design, the number of allowances available has remained unchanged – a similar situation to the EU ETS design.

SYSTEMIC SOLUTIONS TO A SYSTEMIC PROBLEM

Excess allowances raise a number of concerns for policy-makers and market participants. Lawmakers can send misleading signals when they build markets that later devolve into oversupply. Some companies embrace extra permits and low carbon prices. However, surpluses may bring a false sense of reassurance that leaves companies unprepared to respond to any subsequent strengthening of climate policy. Emission reductions that become necessary will be expensive if forced upon infrastructure high in both carbon and inertia.

The remedy for carbon market oversupply is twofold. First and foremost, regulators can introduce market stabilising policies. These can take the form of flexible supply mechanisms, which regulate the amount of CO2 allowances available, or price floors.

The EU has gone for the former. The agreed market stability reserve will begin to withdraw excess allowances from 2019 and release allowances when they are needed. This blends into Europe's ambition to reduce 2030 emissions by 40% compared to 1990 levels, which includes a tightening of the market's cap compared to current legislation. The constant reduction of the oversupply will likely cause EUA prices to increase, with our estimates suggesting prices at €16/t in 2020 and €30/t in 2030. This is a step forward for Europe as it helps prepare its flagship emission reduction instrument for the future. As another example, California has enjoyed a stable carbon price in the midst of an oversupplied carbon market thanks to an auction reserve price that acts as a price floor.

Second, carbon markets are most effective when their parameters are based on unbiased emission forecasts. Emission expectations determine the economic impact of these policies, which in turn delineates their politically realistic level of stringency. If regulators overestimate emissions, they will come under political pressure to set CO2 caps higher than they otherwise would and vice versa. Market stabilising mechanisms can help, but only to an extent, as their stringency also relies on political feasibility.

The allowance surpluses that pervade carbon markets lead us to expect relatively stable prices in most jurisdictions for the next few years – a notable exception being the EU ETS. When it comes to the negotiations in Paris, the current ambition level of the Intended Nationally Determined Contributions suggests lawmakers of established carbon markets will stick to current reduction targets. However, should Paris lead to a scheduled periodic review of contributions, such a tightening mechanism will likely create political pressure to strengthen carbon markets and drive prices higher.

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(1) ICAP (2015): Emissions Trading Worldwide - ICAP Status Report 2015 (2) Grubb; Ferrario (2006): False confidences: forecasting errors and emission caps in CO2 trading systems

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GETTING SERIOUS WITH CARBON PRICING POLICY[1]

David Hone and Jonathan Grant on the outlook for carbon pricing in Paris – and beyond

Governments meeting in Paris in December to adopt a new climate agreement have already agreed the ultimate goal: to limit warming to 2°C. This will require industry, energy and transport systems to transition to near-zero levels of CO2 emissions, ideally within this century. PwC's Low Carbon Economy Index shows that the transition needs to be more than twice as rapid as the reduction in emissions that has taken place in the US economy over the last decade as a result of the shift to shale gas. Imposing a cost for emitting CO2, across the economy, is arguably the single most effective public policy that can be implemented to achieve this objective. It is where governments started the climate journey nearly 20 years ago, but not where they find themselves now.

That starting point was the creation of the UNFCCC in 1992, which came on the back of the first Earth Summit, held that year in Rio de Janeiro. By 1997, governments that were party to the UNFCCC had made astounding progress, agreeing on the Kyoto Protocol and its underpinning trading regime, which was designed from the outset to see a cost develop for major emitting economies should CO2 emissions continue to rise. That cost would act as an economic incentive to reduce emissions. This was the very beginning of what is now more broadly referred to as a carbon price.

While a government-imposed cost on emissions is regarded as the most efficient means of driving change, that efficiency is also its downfall. National implementation of carbon pricing policy skews those economics, which is manageable in the short to medium term as other locations implement similar carbon costs. But, over the long term, the economy efficiently regroups around the change, with no global reduction of emissions. Activities that are penalised by the cost will most likely progressively shift to areas where the penalty doesn't exist, all other factors being equal (which of course they never are). This is instead of responding in the location where the government-imposed price mechanism is present; explaining why partial implementation of carbon costs around the world has yet to have a visible impact on global emissions. Rather, intermittent local implementation leads to a rearrangement of global activities and global emissions continue without interruption, driven by increasing demand for energy.

IMPOSING A COST FOR EMITTING CO2, ACROSS THE ECONOMY, IS THE SINGLE MOST EFFECTIVE PUBLIC POLICY FOR DECARBONISATION

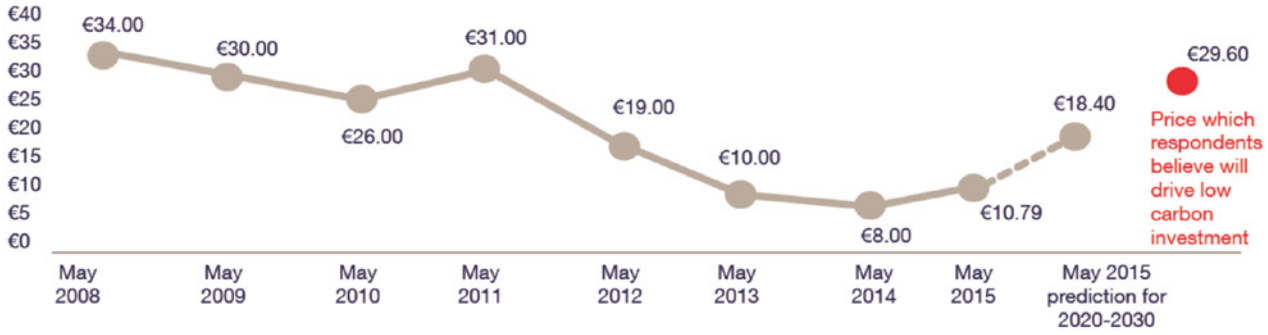
While it is unrealistic to expect a cost on emissions to emerge globally without a hitch, over time that cost must embed itself within the global economy. Arguably, this should be the single objective of a global approach to managing CO2 emissions. While the Kyoto Protocol didn't contain such a lofty objective, its approach involved price discovery through the trading of emission allowances, which encouraged the emergence of a policy driven global price.

The Kyoto Protocol's Clean Development Mechanism (CDM) and Joint Implementation, forced a standardised approach to emission reductions and introduced the beginnings of a single carbon pricing mechanism into the global economy, or at least they were meant to. Kyoto's Assigned Amount Unit (AAU) is similar to an allowance under a cap-and-trade system and is issued to participating governments with absolute targets under the Protocol. In theory, building domestic approaches on the back of the national assignment of AAUs meant that such systems could easily link up, with their domestic units exchanged for AAUs and vice versa. The commonality of the AAU also meant that nations could be quite inventive in implementing national action.

But the deal in Paris is set to scrap this system, in spite of its carbon pricing design and structure and the economic efficiency that results. The Kyoto framework was unable to progressively expand absolute targets and AAU allocation to developing countries, and rather than trying to revise that, the politics have been allowed to defeat the process. Nevertheless, as the Kyoto Protocol departs the scene, it leaves us with the legacy of carbon pricing mechanisms such as the EU ETS, the various North American sub-national approaches and project-based systems such as the CDM, together with a demonstration of their collective effectiveness in shifting funds, triggering project activity and reporting on emissions.

The current international discussion over an approach that delivers the global objective of limiting warming of the climate system to 2°C is now at a crucial point and arguably without a focus other than

FIGURE 1: AVERAGE EUA PRICE EXPECTATIONS FOR PHASE III AND BEYOND OVER SUCCESSIVE IETA SURVEYS



on the goal itself. The economic clarity delivered by the Kyoto Protocol and its carbon price is rapidly coming to an end, being replaced in many instances by a series of actions implemented by decision-makers in cities and states. But building a strategy as the sum of local actions to meet an extraordinarily difficult global goal may well be self-defeating. Rather, what is needed is a clear international focus on a single primary objective: getting a government-imposed cost associated with CO2 emissions into the global energy and industrial economy.

While the implementation of a carbon emissions cost will initially trigger a range of activities throughout the global economy, its eventual purpose is twofold: either to reduce the extraction of fossil fuels which become uneconomic compared to low or zero emission alternatives or to implement carbon capture and storage (CCS), as these are the only two mechanisms available for addressing the accumulation of CO2 in the atmosphere.

The real aim of applying a cost to emissions of CO2 is to encourage investment in low-emission energy, industrial and transport infrastructure so that emissions begin to fall within the economy and long-term lock-in to high-carbon emissions, the result of continued construction of facilities such as coal-fired power plants, is avoided. This requires a government-imposed cost of carbon that drives such behaviour. A survey conducted by IETA earlier in 2015 suggested that a price around $30 per tonne of CO2 could achieve this. That cost of carbon could start to encourage fuel switching away from coal and towards natural gas (though that depends entirely on the relative prices of these commodities at any point in time).

In the case of CCS, some sources[2] have suggested that around $100 per tonne may be needed to drive this technology forward now, but a lower carbon cost in combination with technology funds directed at CCS demonstration could deliver projects in the near term. As the technology matures, the carbon cost needed to trigger CCS activity may settle below $100 – but recognising that government policy remains the deciding factor for prices to reach such a level. But in all cases, project developers will need to have confidence that the policy mechanism establishing a cost of carbon and its effectiveness in delivery are there to stay.

Scenarios ask "what if?" questions to explore alternative views of the future and create plausible stories around them. They consider long-term trends in economics, energy supply and demand, geopolitical shifts and social change, as well as the motivating factors that drive change. In doing so, they help build visions of the future. As such, scenarios offer useful insight into the development of new policy mechanisms and approaches to manage the climate issue. This has long been at the heart of the Shell scenario efforts, where emissions mitigation has featured in all the outlooks published over the last two decades.

The most recent New Lens Scenarios, published in 2013, are no exception. For the first time, the scenarios extend out far enough to see full resolution of the mitigation challenge with emissions close to net-zero by the end of the century. This is achieved through a major transition of the energy system and the application of CCS on a very large scale. Not surprisingly, the cost of carbon plays a very important role. While the New Lens *Mountains* scenario takes a strong regulatory approach to mitigation, effectively requiring the use of CCS, the *Oceans* scenario looks more to the market and a cost on carbon emissions to drive change. But for the scale of change that the *Oceans* scenario envisages, policy-driven carbon prices need to permeate the global economy rapidly and at levels in developed and emerging economies that almost no current systems are delivering today. The scenario is underpinned by global convergence on the cost of carbon in the second half of the century that drives consistent deployment of CCS, with a strong starting point around 2020. That starting point ranges from modest levels in developing economies (eg, such as the proposed South African government-imposed carbon tax of ~$10 per tonne CO2) through to a level in a system such as the EU ETS that fosters a shift away from

COST-EFFECTIVE ACTION TO ADDRESS EMISSIONS WOULD ENCOURAGE MORE AMBITION IN FUTURE

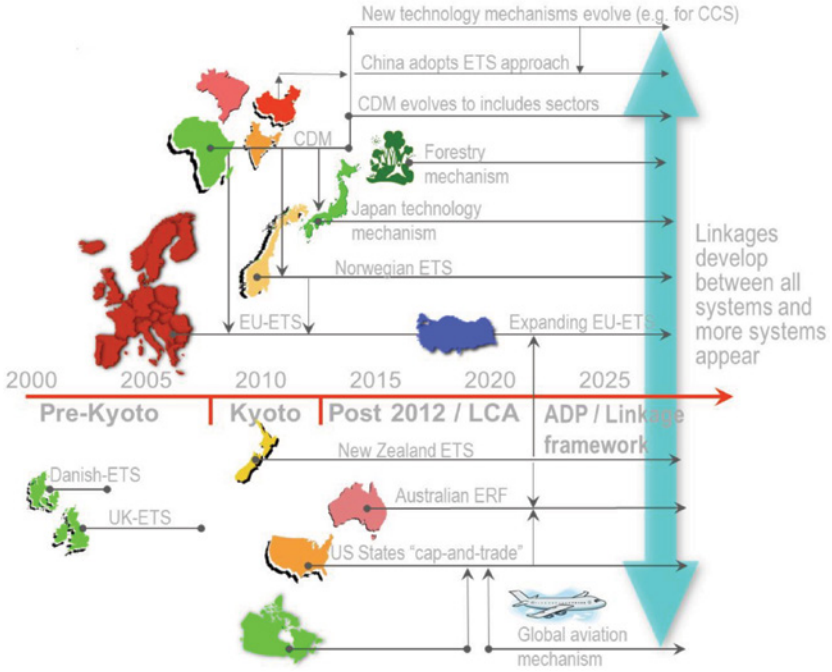
coal and encourages natural gas, solar PV and wind.

Despite numerous governments now seriously considering or implementing policies that deliver a cost on emissions, few contemplate carbon levies that would drive such rapid change. A rising cost on emissions in leading developed countries with a starting point somewhat higher than the IETA survey seems to be out of reach today as concerns about competitiveness abound. But such an outcome could be envisaged if emitters and policy-makers in those countries had confidence that carbon pricing policies implemented by many more governments would become well established and show some sign of convergence.

The key to such confidence is a global framework that encourages the national implementation of allowance based systems for managing emissions and then offers the tools to link these systems. This in turns fosters a degree of convergence on the appropriate cost of carbon and therefore diminishing resistance to implementation on the back of competition concerns. And cost-effective action to address emissions would encourage more ambition in future.

But such a linkage framework needs a starting point, which is why there are proposals from IETA to this effect in front of the national negotiators for consideration in Paris and subsequent COP discussions. The details can be filled in later and by others, such as through the Networked Carbon Markets initiative under the World Bank or similar institutions, but even these ideas may not gain traction if a bolthole isn't created in the new agreement. The Paris summit could open the door to the possibility of a global approach to putting a price on carbon and accelerating the low-carbon transition.

FIGURE 2: A GLOBAL LINKING FRAMEWORK COULD BRING ABOUT THE NEEDED CARBON MARKET



(Source: IETA GHG survey 2015)

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__Jonathan Grant__ is a director in PwC UK's climate team and has attended the UN negotiations on and off since the lead up to COP 3 in Kyoto in 1997. He has worked on energy and carbon issues for clients such as the European Commission, BP, Masdar, Trading Emissions Plc, and governments from Peru to Qatar to Singapore. In 2014, Jonathan was seconded to the UK's Green Investment Bank to develop the investment strategies for grid infrastructure, transport and renewables. Prior to joining PwC, Jonathan spent 10 years in the oil industry. Jonathan co-chairs IETA's UNFCCC working group.

(1) In this article the term "carbon price" refers to a government-imposed carbon pricing mechanism, the two main types being either a tax on the sale of fossil fuels, based on their carbon intensity, or a quota system setting a cap on permissible emissions in the country or region and allowing companies to trade the right to emit carbon (aka as allowances). This should be distinguished from some companies' use of what are sometimes called "internal" or "shadow carbon prices", which are not prices or levies at all but individual project screening values. (2) Carbon Capture and Storage Association

NOTES

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