EXECUTIVE SUMMARY

IETA
INTERNATIONAL EMISSIONS TRADING ASSOCIATION

GHG GREENHOUSE GAS MARKET 2013

THE 10th EDITION

looking to the **future** of carbon markets

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ITRI Industrial Technology Research Institute

GREENHOUSE GAS MARKET 2013

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About the International Emissions Trading Association (IETA): IETA has been the leading voice of the business community on the subject of carbon markets since 2000. IETA's 140 member companies include some of the world's leading corporations, including global leaders in oil, electricity, cement, aluminum, chemical, paper, and other industrial sectors; as well as leading firms in the data verification and certification, brokering and trading, legal, finance, and consulting industries.

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Althelia Ecosphere is an asset management platform dedicated to pioneering new and profitable solutions to address challenges arising from climate change and the depletion and degradation of forests and other natural ecosystems. It manages the Althelia Climate Fund and Althelia Sustainable Landscapes Fund, vehicles set up as public private partnerships to deliver innovation and finance at scale, catalysing the transition towards sustainable land use and conservation of natural ecosystems in Africa, Latin America and Southeast Asia. Our portfolio demonstrates that competitive financial returns can be fully aligned with sound environmental stewardship and social development impacts that include: • Positively transformed land-use models delivering social, economic and environmental outcomes; • Economic and livelihood benefits realised by a wide spectrum of local stakeholders; • Reduced greenhouse gas emissions; • Conservation of biodiversity and ecosystem function, and improvement in conservation status of threatened and endangered species.

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Society and businesses continue to confront mounting risks arising from climate change and resource depletion, whilst striving to meet the burgeoning demands of a growing global population. Today, we use the equivalent of nearly two planets to meet demand for natural resources and waste absorption, meaning that we make our living through an unsustainable drawing down of Earth's 'natural capital', rather than living off of the 'interest'... We have now reached the point where these limits are increasingly felt and where, as a result, ensuring the wellbeing and prosperity of present and future generations requires a realignment of economic principles with ecological realities.

Althelia Ecosphere is an asset management platform pioneering new and profitable solutions that align economy with ecology to address these systemic challenges. It manages the Althelia Climate Fund and Althelia Sustainable Landscapes Fund, vehicles set up as public-private partnerships to deliver innovation and scaled-up finance to catalyse the transition towards sustainable agriculture, land use and conservation of natural ecosystems in Africa, Latin America and southeast Asia.

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Dirk Forrister
President and CEO,
IETA

GHG Market Report 2013:
Looking To The Future Of Carbon Markets

ON THE GLOBAL POLITICAL STAGE, climate change often occupies a space in the background. It affects many other issues – environment, energy, economic and security. Any crisis of the moment is capable of upstaging the climate issue – since leaders perceive it as always important, but rarely essential to their local politics. For that reason, climate decisions are too often prone to delay. At least, until something bad happens. And then policymakers have lots of explaining to do.

That's why climate negotiators set deadlines for major decisional conferences – like Kyoto and Copenhagen. The next "big event" for climate decisions is set for Paris in 2015. No one wants another circus like Copenhagen – so this time, there is pressure to resolve issues earlier (like in Peru next year?) to avoid testing the "Big Bang Theory" of climate policymaking again.

Nevertheless, the Paris date will serve as the main fulcrum for leveraging major decisions – on the governance framework, technical standards for MRV, market mechanisms, technology and finance. In the COPs planned for Warsaw and Peru, these issues will be fleshed out and texts will begin to emerge.

It is critical for business to remain engaged, because the markets of the future will be shaped in this process. We must maintain a strong, consistent voice in favor of market-based approaches. With markets emerging around the world, we have more allies than ever – but the challenges are growing stronger, given the latest scientific reports.

This report surveys the landscape of greenhouse gas market development – from its scientific drivers through its growth prospects and operational challenges. It will delve into international policy design as it impacts an increasingly "bottoms up" world of national and subnational markets. It will investigate how linkages between markets could emerge to deliver more robust benefits.

Science Drivers:
The 4 numbers that matter

For business, science is the fundamental driver behind the policy decisions adopted at local, national and international levels.

The climate negotiations are about to get a strong push from the scientific community. In the 5th Assessment Report from the Intergovernmental Panel on Climate Change described by leading IPCC scientists in these pages, the scientific imperative for action is becoming more clear.

In IETA communications, we typically focus on three key numbers: the Copenhagen aim of preventing warming of more than 2° C, which implies limiting atmospheric concentrations to around 450 parts per million – which in turn implies that emissions from the developed world must be reduced by 80% or more.

But we need to learn a fourth number: The IPCC's latest report introduces a new concept –the "1 Trillion Ton" budget for emissions this century. The IPCC says we've passed the 500 billion mark. Researchers project that, without effective mitigation measures, we're set to emit the 1 trillionth tonne in 2040 and leave the emissions budget empty for the remainder of this century.

The global community needs to come together behind a broad set of solutions, powered by market mechanisms. To meet this need, we'll need a robust network of international carbon markets – with Europe, Asia and the America's linked to promote action where it can reduce emissions the fastest and cheapest. We'll also need Carbon Capture and Sequestration (CCS) and other technological solutions to deliver in a big way.

Market Growth and Future of Linkages

In 2013, carbon markets continued to advance across the globe. While traded volumes in traditional European and Kyoto markets declined, new markets in California and Shenzhen began to trade – albeit with low volumes and cautious participants. But more markets are poised to launch, from other Chinese pilots to Kazahkstan and South Korea.

Importantly, discussions on linking and market coordination moved from the academic to the practical, offering an encouraging sign for the future.

Many market participants expected the first major links to emerge between the EU ETS and the Australian market. After Australia's elections in 2013, this prospect grew more uncertain with the new government's pledge to abolish the current pricing program. The new Australian government is setting the stage for change, but the process is far from complete. As a result, the future for fully linked markets may prove to be a dream deferred. But other markets offer more positive signs.

China is working diligently to design its national carbon market with a view to future links with others. It enjoys collaborative working relationships with Europe, Australia and California, all aimed at harmonizing designs while preserving domestic priorities. Chinese leaders aim to get their national market up and running before engaging in formal links – but they intend to design it to be "linking ready" for the future.

At Carbon Forum North America, Québec's Environment Minister Yves-François Blanchet announced that his government had reached agreement with California on a market linkage. This will enable the formation of the first common carbon market at the state/provincial level in North America – a major breakthrough.

These national and sub-national steps could influence global policy developments. At the international level, negotiations on a "framework for various approaches" (FVA) and a "new market mechanism" (NMM) afford a valuable opportunity to use international institutions to assist in linking markets - and to deliver the economic benefits broader market coverage brings.

Offsets and Standards

Another characteristic of the post-2012 era involves expanded routes for obtaining offset supplies. The leading examples are California/Quebec and Japan.

In California and Quebec, the offsets markets are slow but steady – with California issuing its first compliance offsets in August and Quebec soon to follow. Each of these jurisdictions is operating its own offsets program, which draws on wider international developments. But they also offer innovative crediting opportunities not seen under the Kyoto Protocol, such as destruction of ozone depleting substances (ODS). 2014 will see this market grow as the programs link and more projects are approved by the regulators.

Japan's "Joint Crediting Mechanism" (JCM) is bringing technology, climate and development policy together as an alternative to the CDM for the 2013 -2020 period. Again, designers of the JCM are taking lessons from the CDM in adopting methodologies for their programs, which will operate under supervision of joint committees with developing country partners. Many questions remain about the ultimate fungibility of these instruments in international markets. But they are proving to be an attractive testing ground for key jurisdictions, like Indonesia, Kenya and Mongolia to explore new crediting alternatives.

Climate Finance

Climate goals require financing to become a reality. Market mechanisms have shown the power of carbon finance to make progress possible towards reducing emissions. But the discussion has to be broader, so that large scale capital financing can be channeled to assist in major infrastructure change.

As nations grapple with how to mobilize sufficient financing for the climate challenges, one thing is clear: public financing alone is not enough. There must be

solutions that attract private sector financing in order to meet the need.

In 2013, the business community began a concerted effort to engage in the development of the Green Climate Fund (GCF). The fund is taking shape in fits and starts, trying its best to avoid the pitfalls of paralysis that so often plague climate negotiations. But unfortunately, the Board's operations reflect some of the same hallmarks of climate talks – and are in dire need of a strong dose of pragmatism.

Building Business Networks for Climate Progress

To achieve the ambitious change surveyed in this report, the business community must continue building knowledge and capacity around the world. Despite the best intentions of policy-makers, no emissions market works unless business makes it work – by participating and delivering the benefits of emissions reduction, technology deployment and financial innovation.

The tool of emissions trading is new to business in many parts of the world – so there is a huge need for experienced market professionals to share their experiences and build confidence with business counterparts around the world. It's one thing for a government official to tell a company about the benefits of emissions trading. But its quite another for a business professional to discuss with a colleague how it works in practice – and how a company can remain profitable and grow its business while meeting climate goals.

In 2013, IETA members launched the "Business Partnership for Market Readiness (B-PMR)," an initiative to conduct business-to-business dialogues with corporate participants in new carbon markets. With missions in China and South Korea, the B-PMR helped inform the main industrial players about market preparedness and good business practices. Next year, we hope to expand our reach to a few new jurisdictions.

Strengthening the Core

Finally, this year the carbon market community worked hard to create opportunity from the many challenges in the EU ETS. We remind ourselves that it is still early days in carbon markets, so it is important to stick to the fundamentals and continue building a strong market infrastructure for the decades to come.

In recent years, Europe's carbon markets slumped due to multiple factors: the economic decline in Europe, market impacts of complementary measures to the EU-ETS, and uncertainty about future policy requirements. In response, the European Commission continued to advance its case for "backloading" as a near term measure. After a successful vote in the EU Parliament, "trialogue" negotiations are expected to take place between the European Council, the Parliament and the Commission. Decisions are due in the near future, which will ultimately be subject to a formal endorsement by the Parliament and European Member States.

Alongside this "near term" effort, the Commission began a diligent effort to consult with business on structural reforms for the post 2020 market – and start reflecting on Europe's 2030 energy and climate policy. With six structural measures under review, attention in Brussels is narrowing – with increasing attention on the merits of an automatic supply adjustment mechanism to address extreme changes in demand levels.

In the longer term, it is essential that policymakers focus on ways to consolidate the policy agenda, with the ETS as its central pillar. This consolidation needs to integrate renewable energy and energy efficiency measures into the market structure – and it needs to satisfy Member States that auxiliary national measures can be phased out.

The future of carbon markets is challenging, because near term political trends are so dominated by broader concerns about restoring the global economy. Yet there is a profound need to address climate concerns –and a wealth of associated market opportunities.

Just remember the "Big 4" numbers: 2° C, 450 ppm, 80% reduction and 1 Trillion Tonnes.

Dirk Forrister
President and CEO
International Emissions Trading Association (IETA)

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CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS

On 27 September 2013, the Intergovernmental Panel on Climate Change (IPCC) meeting in Stockholm, Sweden, approved the Summary for Policymakers of the Working Group I contribution to the IPCC's Fifth Assessment Report (IPCC WGI AR5) and accepted the underlying report Climate Change 2013: the Physical Science Basis[Δ]. With this milestone, the first of three major IPCC reports was launched; the second on Impacts, Adaptation and Vulnerability will be released in March 2014 and the third on Mitigation of climate change in April 2014. The IPCC's fifth assessment cycle will be completed in October 2014 by a short Synthesis Report that draws on the assessments made by all three Working Groups.

IPCC reports are policy-relevant but not policy-prescriptive. It is the role of the IPCC to provide governments with a comprehensive assessment of the most up-to-date scientific technical and socio-economic knowledge on issues related to climate change. Climate change projections assessed are based on a range of specific scenarios. From this assessment, policymakers obtain information on potential consequences from climate change depending on the scenario.

The Working Group I contribution to the IPCC's Fifth Assessment Report

The Working Group I report was developed by an international team of 259 scientists who were selected in May 2010, and also involved over 600 contributing authors. Like all IPCC reports, it went through a multi-stage review process with over one thousand expert reviewers worldwide as well as governments. The author teams comprehensively assessed sources of scientific and technical information in the course of their work and over 9,200 scientific publications are cited in the WGI report, more than three-quarters of which have been published since the last IPCC assessment in 2007.

As well as the short Summary for Policymakers, the report has a longer Technical Summary and 14 chapters. Nineteen headline statements in the Summary for Policymakers serve as a compact, concise and comprehensive narrative for the Summaries and the full report. The 14 chapters of the report include an assessment of observations of the climate system, with separate chapters covering changes in the atmosphere and surface, the ocean and the cryosphere, as well as information from paleoclimate archives. The assessment report further includes chapters dealing with the carbon cycle, the science of clouds and aerosols, radiative forcing and sea level change. Coverage of climate change projections is extended compared to earlier IPCC assessment reports by assessing both near-term and long-term projections in separate chapters. Monsoon systems, the El Niño phenomenon, and many other modes of climate variability are covered in a chapter on climate phenomena and their relevance for future regional climate change. An innovative feature of the WGI AR5 is the Atlas of Global and Regional Climate Projections (Annex I), which is intended to enhance accessibility for users and stakeholders.

This comprehensive and robust scientific assessment provides a firm foundation for considerations of the impacts of climate change on human and natural systems and ways to meet the challenge of climate change.

Observed changes

Observations of the climate system are based on direct measurements and remote sensing from satellites and other platforms. Global-scale observations from the instrumental era began in the mid-19th century for temperature and other variables, with more comprehensive and diverse sets of observations available for the period 1950 onwards. Paleoclimate reconstructions extend some records back hundreds to millions of years.

*IPCC Working Group, Technical Support Unit; †IPCC Working Group, Co-Chair [Δ] IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, in press.

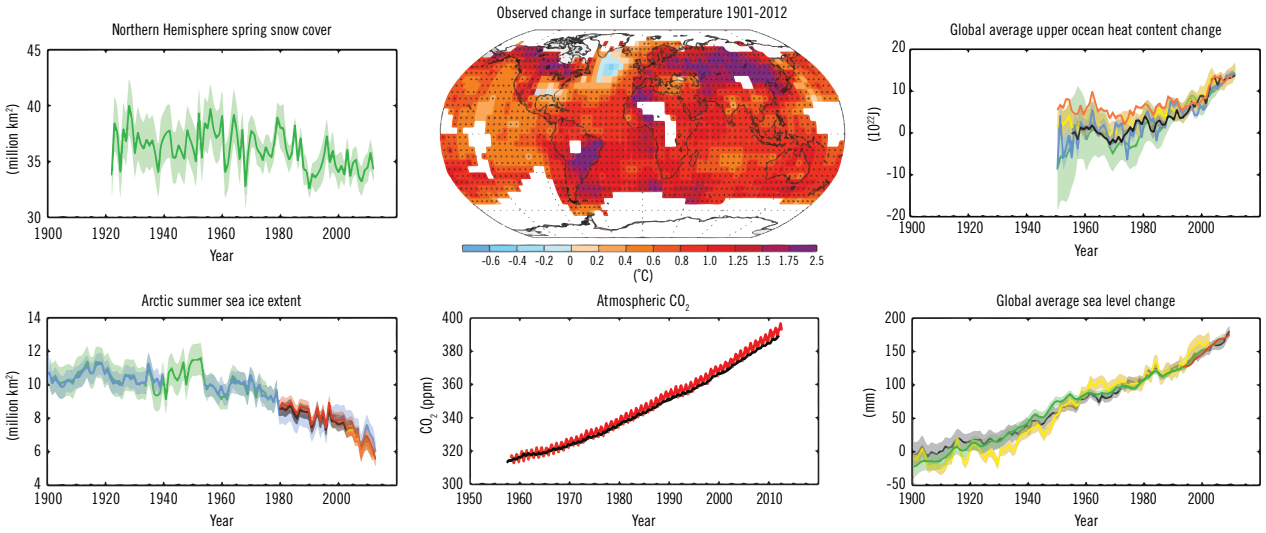

FIGURE 1: MULTIPLE OBSERVED INDICATORS OF A CHANGING GLOBAL CLIMATE. THE MAP SHOWS OBSERVED SURFACE TEMPERATURE CHANGE FROM 1901 TO 2012 DERIVED FROM TEMPERATURE TRENDS DETERMINED BY LINEAR REGRESSION. TRENDS HAVE BEEN CALCULATED ONLY WHERE DATA AVAILABILITY PERMITS A ROBUST ESTIMATE, AND ALL OTHER AREAS ARE WHITE. THE '+' SIGN INDICATES WHERE THE TREND IS SIGNIFICANT. TIME SERIES OF OBSERVED CHANGES ARE: EXTENT OF NORTHERN HEMISPHERE MARCH-APRIL (SPRING) AVERAGE SNOW COVER; EXTENT OF ARCTIC JULY-AUGUST-SEPTEMBER (SUMMER) AVERAGE SEA ICE; CHANGE IN GLOBAL MEAN UPPER OCEAN (0–700 M) HEAT CONTENT; CHANGE IN GLOBAL MEAN SEA LEVEL. FOR THESE TIME-SERIES, COLOURED LINES INDICATE DIFFERENT DATA SETS, AND WHERE ASSESSED, UNCERTAINTIES ARE INDICATED BY COLOURED SHADING. CHANGE IN ATMOSPHERIC CONCENTRATIONS OF CARBON DIOXIDE (CO2) FROM MAUNA LOA (RED) AND SOUTH POLE (BLACK) ARE SHOWN SINCE 1958. BASED ON WGI AR5 SPM AND MODIFIED FROM SPM FIGURES 1, 3 AND 4.

Observations of changes in the climate system are thus based on multiple lines of independent evidence (see Figure). The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

The IPCC's Fourth Assessment Report (AR4) in 2007 already concluded that warming of the climate system is unequivocal. It is now assessed that many of the observed changes since the 1950s are unprecedented over decades to millennia. Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850. In the Northern Hemisphere, 1983–2012 was *likely*[‡] the warmest 30-year period of the last 1400 years. The rate of sea level rise since the mid-19th century has been larger than the mean rate during the previous two millennia.

Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010. Over the last two decades, the Greenland and Antarctic ice sheets have been losing mass, glaciers have continued to shrink almost worldwide, and Arctic sea ice and Northern Hemisphere spring snow cover have continued to decrease in extent.

The atmospheric concentrations of carbon dioxide (CO_2), methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. CO_2 concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification.

Drivers of climate change

Natural and anthropogenic substances and processes that alter the Earth's energy budget are drivers of climate change. Radiative forcing quantifies the change in energy fluxes caused by changes in these drivers; positive radiative forcing leads to surface warming, negative radiative forcing leads to surface cooling.

The assessment finds that total radiative forcing is positive, and has led to an uptake of energy by the climate system. The largest contribution to total radiative forcing is caused by the increase in the atmospheric concentration of CO_2 since 1750. The total natural radiative forcing from solar irradiance changes and stratospheric volcanic aerosols made only a small contribution to the net radiative forcing throughout the last century, except for brief periods after large volcanic eruptions.

Understanding the climate system and its recent changes

Understanding recent changes in the climate system results from combining observations, studies of feedback processes, and model simulations. Compared to AR4, more detailed and longer observations and improved climate models now enable the attribution of a human contribution to detected changes in more climate system components. In the WGI AR5, the IPCC is now able

[‡]Italics are used to denote formal IPCC probabilistic terminology indicating the assessed likelihood of an outcome. Where appropriate, other findings are simply formulated as statements of fact without using this terminology. See Chapter 1 of the IPCC Working Group I Fifth Assessment Report for further details on the uncertainty terminology used.

to state as a fact that human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system.

Observational and model studies of temperature change, climate feedbacks and changes in the Earth's energy budget together provide confidence in the magnitude of global warming in response to past and future forcing.

Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes. This evidence for human influence has grown since AR4. It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century.

Future global and regional climate change

Projections of changes in the climate system are made using a hierarchy of climate models ranging from simple climate models, to models of intermediate complexity, to comprehensive climate models, and Earth System Models. These models simulate changes based on a set of scenarios of anthropogenic forcings. A new set of scenarios, the Representative Concentration Pathways (RCPs), was used for the new climate model simulations. The four scenarios of future greenhouse gas concentrations and aerosols span a wide range of possible futures.

It is evident that continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.

Projections of future warming are also considered with reference to climate targets such as 2°C or 1.5°C relative to 1850 to 1900. The assessment finds that global surface temperature change for the end of the 21st century is *likely* to exceed 1.5°C in all but the lowest scenario considered, and *likely* to exceed 2°C for the two high scenarios. Warming will continue beyond 2100 under all RCP scenarios except the lowest. Warming will continue to exhibit inter-annual-to-decadal variability and will not be regionally uniform.

Heat waves are *very likely* to occur more frequently and last longer. As the Earth warms, currently wet regions are expected to receive more rainfall, and dry regions to receive less, although there may be regional exceptions. As the ocean warms, and glaciers and ice sheets reduce, global mean sea level will continue to rise, but at a faster rate than experienced over the past 40 years.

Stabilisation of global temperature requires limiting cumulative CO_2 emissions to a finite budget.

Stabilization of global temperature requires limiting cumulative CO_2 emissions to a finite budget. The assessment finds a near-linear relationship between total cumulative CO_2 emissions and global temperature change. Cumulative emissions of CO_2 largely determine global mean surface warming by the late 21st century and beyond. For any given temperature target, higher emissions in the earlier decades therefore imply lower emissions by about the same amount later on. Most aspects of climate change will persist for many centuries even if emissions of CO_2 are stopped. This represents a substantial multi-century climate change commitment created by past, present and future emissions of CO_2.

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Gian-Kasper Plattner holds the position of Science Director at the IPCC WGI TSU since 2009. He has a PhD in Climate and Environmental Physics and held research positions at the University of California Los Angeles, University of Bern and ETH Zürich. His research focuses on the contemporary and future carbon cycle from regional to global scales, using a hierarchy of numerical physical-biogeochemical models to study the ocean component of the Earth System and its role in nutrient and carbon cycling and climate.

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Simon Allen is the Senior Science Officer at the IPCC WGI TSU, where he has been employed since 2009. Prior to this, he earned his PhD at the University of Canterbury, New Zealand. His primary role has been to support the scientific development of the Fifth Assessment Report. His research interests are in the general fields of glaciology and climate change impacts in high mountain regions.

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Pauline Midgley was appointed Head of the IPCC WGI TSU in 2009. She has a PhD in atmospheric chemistry and her career path has taken her from the UK to the USA and Germany, coordinating environmental research activities in the halocarbon industry, in a European-wide project on tropospheric research, and providing scientific support to the Global Change Division of the German Federal Ministry of Research. From 2006 she ran the German IPCC Coordination Office.

Thomas Stocker
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Thomas Stocker was elected Co-Chair of IPCC WGI in 2008. A natural scientist, he has held research positions in the UK, Canada and the USA. Since 1993 he has been Professor of Climate and Environmental Physics at the University of Bern. His research encompasses the development of climate models of intermediate complexity, modelling past and future climate change, and the reconstruction of the chemical composition of precipitation and greenhouse gas concentrations based on ice cores from Greenland and Antarctica.

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THE STATE OF CARBON PRICING AROUND THE WORLD – AN OVERVIEW

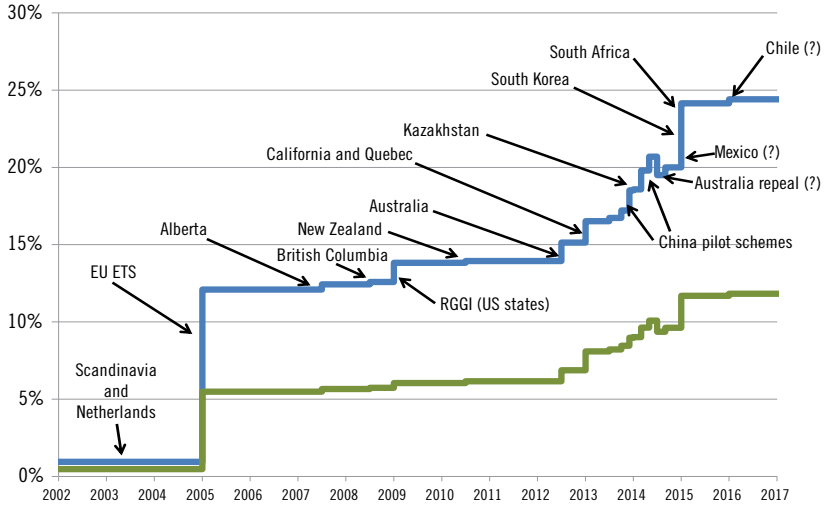
THE SPREAD OF CARBON PRICING: Carbon pricing's spread around the world over the last decade has been remarkable. Once confined to a few small northern European economies, it has become a worldwide phenomenon, with more than a dozen major schemes either in place or under development around the world. Two or three years from now, assuming current programmes run to schedule, carbon pricing will be in place in jurisdictions that together account for a little under a quarter of total global CO_2 emissions from energy and industrial processes (see Chart – Blue Line). If carbon pricing in China extends nationally coverage will increase to over 40%.

Not all emissions in these jurisdictions are priced, as some governments seek to reduce emissions in particular sectors, for example surface transport in the EU, using other policy instruments. Nevertheless, over 10% of the world's energy and industry CO_2 emissions are likely to be priced by around the middle of this decade (see Chart – Green Line).

The diversity of approaches

Parts 1 and 2 of this report look at existing and forthcoming emissions trading schemes in the Europe, Asia, North America, and elsewhere. The picture that emerges is of vigorous and diverse activity, with different schemes reflecting different circumstances and regulatory approaches. For example, California is about to complete its first year of compliance within its cap-and-trade system, with traded volumes increasing as market participation escalates (Chapter 3). On the East Coast, the Regional Greenhouse Gas Initiative (RGGI) has completed its review and made substantial changes to the allowance budgets and the design of the market (Chapter 6). Further north, Québec is also moving ahead with its carbon market and has agreed its linkage with California. All of this is occurring against a backdrop of forthcoming federal regulations for certain sectors in the United States (Chapter 7).

CHART 1: COVERAGE OF CARBON PRICING IS INCREASING RAPIDLY.
Carbon Pricing Coverage
(energy and industry CO2 emissions of jurisdictions with carbon pricing as a % of global emissions)

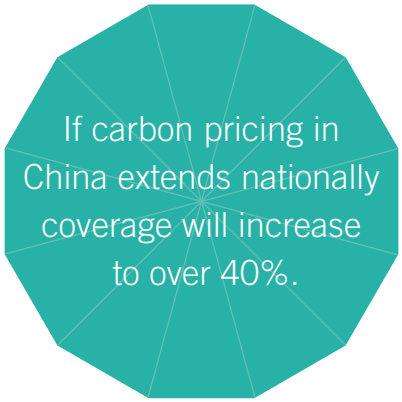


NOTE: THE BLUE LINE SHOWS THE PROPORTION OF WORLD ENERGY AND INDUSTRY CO2 EMISSIONS OCCURRING IN JURISDICTIONS WITH CARBON PRICING, SO THAT IF ALL JURISDICTIONS HAD CARBON PRICING SCHEMES THIS LINE WOULD REACH 100%. THE GREEN LINE SHOWS THE PROPORTION OF GLOBAL CO2 EMISSIONS FROM ENERGY AND INDUSTRY THAT ARE PRICED. THE GAP BETWEEN THE TWO LINES REPRESENTS THOSE EMISSIONS THAT ARE EITHER SUBJECT TO OTHER POLICY INSTRUMENTS IN JURISDICTIONS WITH PRICING, SUCH AS SURFACE TRANSPORT EMISSIONS IN THE EU, OR NOT COVERED BY POLICY AT PRESENT. QUESTION MARKS INDICATE LEGISLATION IN PROGRESS BUT NOT YET ENACTED OR WHERE IMPLEMENTATION APPEARS UNCERTAIN. SOURCE: RIO TINTO ANALYSIS.

As a consequence, an increasing body of experience is emerging around the world. Policy makers can draw on this experience to modify and improve their schemes over time. California has been able to learn from the EU experience (Chapter 19). The EU may now in turn be able to benefit from the experience of California and elsewhere. The fall in the price under the EU ETS, still the world's largest carbon market, has been one of the major features of the last year and this has heightened the debate about EU ETS reform (Chapters 1 and 2).

One continuing area of diversity is the extent to which schemes seek to manage both volumes and prices. IETA has always maintained that emissions markets have advantages over non-market instruments, and emissions trading has emerged as the predominant pathway to establish clear price signals across the world. However, governments may pursue carbon taxes to send price signals to emitters on abatement. Such measures may be well suited to their local circumstances, for example in small economies

such as British Columbia, or those such as South Africa where there is a need to establish administrative capacity. Yet even under a tax some of the benefits of trading can be realised. For example, trading of offsets is planned to form part of the proposed South African carbon tax (Chapter 12). Alberta, which limits emissions per unit of output rather than placing an absolute cap but allows trading around this, has a buyout price that effectively caps the market price, with payments going into a fund for clean investments, but it is looking to raise the level of this price, which may increase the potential for trading (Chapter 6).



A number of schemes, including California, Québec and RGGI use various allowance reserve mechanisms to contain prices and Korea is looking at potential responses to rapid price movements (Chapter 10). In China, the setting of prices seems likely to be subject to at least informal guidance, and there is consideration of whether a carbon tax may complement trading (Chapter 9). Kazakhstan will be learning the lessons of the pilot phase in 2013 to drive an effective carbon price for covered firms from 2014 onwards (Chapter 11). South Africa is moving ahead with a carbon tax, planned to be set at ZAR 120/tCO_2 but with the possibility of offsets to reduce the compliance costs faced by entities (Chapter 13). Indeed, looking across the schemes reviewed in section 1 and 2 what is striking is how, in practice, there is no dichotomy between trading and taxes, but a spectrum of design possibilities available to regulators that allow benefits from trading to be realised.

Common themes

Despite the diversity of approaches, many common themes are emerging as different jurisdictions tackle similar issues. Part 3 of the report looks at some of these themes.

Most markets allow for the use of offsets, but there is a great deal of variety in the quantity, types of offset, and place of origin allowed under different schemes (Chapter 15). The variety of rules for using offsets has been accompanied by a variety of offset protocols. Schemes in North America have tended to restrict offsets to those created in the state or province covered, or the country as a whole, thereby excluding international offsets. In contrast, the EU has welcomed these, though with growing restrictions. Australia had also made provision for extensive use of international offsets, but the new government has expressed its intention to move away from using international measures under its Direct Action scheme. Negotiations at the International Civil Aviation Organisation (ICAO) in October agreed to put in place a Market Based Mechanism for implementation by 2020, and offsets will form a major part of airline compliance with the sector's target (Chapter 14).

Schemes also vary in the choices they make about their coverage (Chapter 17). Some schemes, including the EU and pilot schemes in China, are restricted to large emitters, but others extend more widely. California and Quebec extend to gas distribution and transport from their second phase beginning in 2015. There is no clear trend over time, with some recent schemes favouring wider coverage and others remaining more restricted. This may it part reflect concern that emissions trading may not be the most appropriate tool for some sectors. For example, the EU already has very high gasoline taxes in many countries, equivalent to around USD 500/tCO_2 in the UK and Germany for example (if VAT on the duty is included in the estimate), plus increasingly stringent vehicle emissions standards, which are already creating strong pressure to reduce emissions.

Given the fragmented nature of carbon pricing globally all governments are concerned about industrial competitiveness. There is a remarkable similarity in the level of shielding given to emissions intensive trade exposed industry. However the details vary. For example the EU sets its benchmark at 100% of the best 10% of industry while Australia sets compensation based on 94.5% of industry average.

The approach to compensating for the increased costs due to emissions from electricity generation (indirect emissions) varies a good deal. In the EU it takes the form of direct financial compensation at the discretion of member states, in Australia allowances are freely allocated to large consumers, and in California freely allocated allowances are given to distribution companies which must use the funds to reduce the impact on consumers. However, the level is again somewhat similar across jurisdictions. The effect on different industries will depend very much on their circumstances, as detailed modelling makes clear (Chapter 18).

MRV is an area where there is much potential for transferring lessons (Chapter 16), and this is likely to be a particular issue for international emissions across sectors and regions. This will form a major part of the UNFCCCs future role in overseeing countries achieving their GHG reduction targets (Chapter 8).

Links between schemes

Part 4 of this report looks at emerging links between emissions trading schemes, which have the potential to lower the total cost of abatement. Linkage has been limited so far. The planned link between the EU and Australia now looks unlikely to proceed. The Quebec and California schemes are due to be linked in 2014. This was always intended, with both being members of the Western Climate Initiative (WCI), and with designs which have deliberately been aligned with this in mind. However, despite their integration there remain differences, for example in the scope of offsets. Linking also needs to be considered in the wider context of policy alignment, and the potential benefits derived from co-ordinating across design features and policies to harmonise approaches (Chapter 21).

Indirect linkage was expected by many to occur via offsets, with a common pool of offsets under the CDM providing some commonality between schemes, although not necessarily equalising allowance prices between schemes as offset volumes would be limited. However in practice there has been little commonality, with a wide diversity of arrangements for offsets among different emissions trading schemes. For example Japan is establishing its own international offset arrangements, the Joint Crediting Mechanism (JCM), to meet its own national abatement goals (Chapter 22).

There may be more to be gained in the near future from establishing carbon pricing schemes with similar infrastructures than from trying to match rules. The Partnership for Market Readiness (PMR) and its private sector equivalent the B-PMR have made significant progress in spreading understanding of what is needed to establish new carbon markets (Chapters 23-24). At the international level, these issues are being dealt with under the Framework for Various Approaches and New Market Mechanism (FVA/NMM) discussions between governments (Chapter 20). Opportunities also exist for greater coordination and alignment between carbon policies alongside the formal linking process (Chapter 21), although there remain advantages in innovation and diversity among schemes.

Financing Low Carbon development

Part 5 looks at the role that the UNFCCC and other international mechanisms might play in greater linkage, and in furthering the spread of carbon pricing. Establishing Nationally Appropriate Mitigation Actions (NAMAs) will play an important role in defining how countries can measure and improve their performance (Chapter 28). Some jurisdictions are likely to remain outside carbon pricing, at least for some years. However carbon pricing can continue to play a role in sustainable development through the use of offsets and the flow of funds to developing countries. There are several potential routes to finance including the Green Climate Fund (GCF), which remains a promising mechanism for getting funding flowing to developing countries (Chapters 27 and 30). Meanwhile the traditional instruments of CDM and JI may still have a role to play (Chapters 31 and 32). Reducing deforestation provides a critical component for global emissions reduction, with progress in Brazil in the last decade an example of what can be achieved. REDD+ has the potential to further this process (Chapter 28). Market mechanisms may also help finance adaptation (Chapter 33).

A way forward

The challenges of establishing emissions trading schemes can appear daunting. But international endeavours to spread knowledge, such as the PMR and B-PMR, are being complemented by bilateral exchanges of experience, such as those between China and the EU and that recently established between China and California. Such exchanges can only help the learning process.

Carbon pricing schemes are currently diverse, and this may create some lack of consistency in the price signal for abatement. However diversity remains a strength in many ways. It allows different approaches to be tried and lessons to be learned. Carbon pricing is still in its early days and the cycle of implementation, review, learning and revision is likely to continue to be the norm for some years to come. If this can take into account the widest range of experience it is likely to be all the more effective. If it does there seems no reason why carbon pricing should not continue its remarkable spread.

About the Author:

Adam Whitmore is currently Chief Advisor Energy and Climate Policy at Rio Tinto. He has over 20 years' experience of working in the energy industries and has taken a particular interest in climate change policy for much of that time. He worked mainly as an energy economist covering a wide variety of policy, strategic, commercial and regulatory issues.

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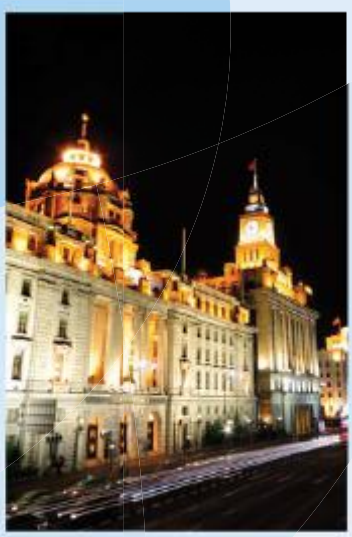

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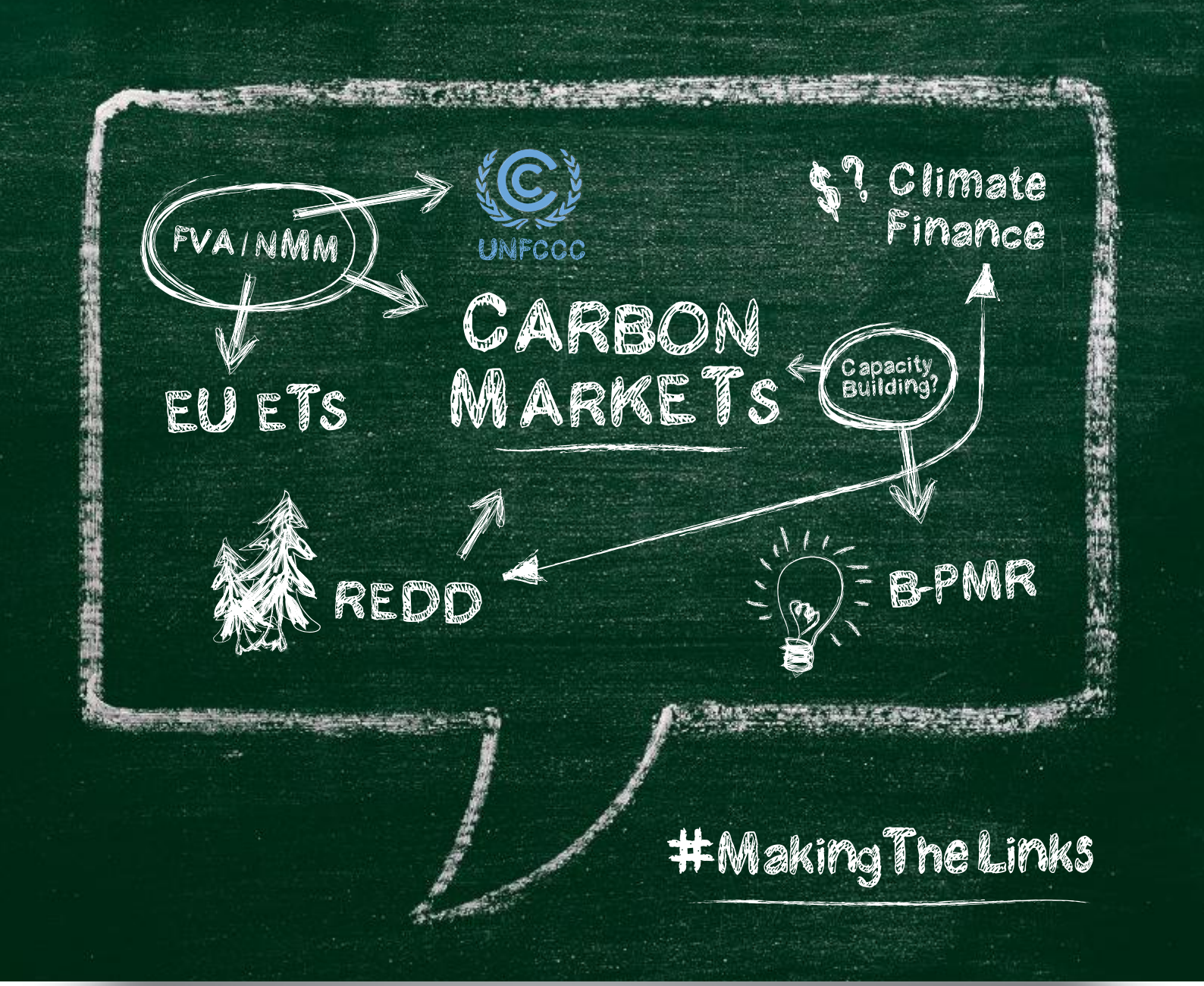

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