

2019 GREENHOUSE
GAS MARKET REPORT



IETA
A IS FOR AMBITION



IETA'S 20TH ANNIVERSARY

This year, IETA decided to return to an annual report format to consolidate the year's achievements in one place. We hope you find it to be a useful round-up of major climate policy developments, research insights and market trends. It also gives us an opportunity to reflect on IETA's accomplishments as part of our 20th Anniversary.

AT THE DAWN OF 2019, it seemed that the ink was just about dry on recent ETS reforms. In Europe, California, Canada and South Korea, carbon markets began to settle into new realities. But, as the year progressed, we saw strengthening measures appearing in many places, as new leaders stepped up to further align their programmes to the goals of the Paris Agreement. It seemed like we just saw this movie, and the sequel was already upon us!

Interestingly, leaders emerged not just in government, but in business as well

Interestingly, leaders emerged not just in government, but in business as well. Company after company announced intentions to get to net-zero by a date certain. As incoming President of the European Commission, Ursula von der Leyen announced her intention to strengthen Europe's 2030 targets from 40% below 1990 levels to 50-55%, aimed at a net-zero goal in 2050. This shouldn't have

come as a surprise, because so many companies are making similar pledges, both in Europe and around the world.

Even in the United States, where the Trump Administration is weakening federal climate policies and withdrawing from the Paris Agreement, we saw Duke Energy – once the largest emitter in the US – pledge to its customers and investors that it would pursue a reduction target of 50% by 2030 and net zero by 2050.

It is clear that the Paris Agreement is beginning to have impact in terms of a private sector response. But at the heart of these pledges is a stark reality: the “net” in “net zero” implies that trading across companies, sectors and borders will be available. Importantly, the sectors must draw in removal strategies, both technological and terrestrial.

IETA's research project with the University of Maryland demonstrated this in stark relief this year. Simply put, Article 6 can make or break efforts to get to the Paris temperature goals. If the international community embraces Article 6 fully, the economic models show that the existing commitments could save \$250 billion

annually for citizens – and if this savings was redeployed in more climate action, it could achieve an additional 50% above the current commitments (or an extra 5 billion tonnes of emissions reductions). If you add nature-based solutions, the savings grow to \$320 billion per year in 2030 that could be reinvested for a further 4 billion tonnes of mitigation. Taken together, trading and natural solutions could support nearly a doubling of climate ambition by 2030.

It is clear that the Paris Agreement is beginning to have impact in terms of a private sector response

Of course, this is in the fictional world of economic models. The real world will not be so perfect. But the modelling study, published with support from the World Bank's Carbon Pricing Leadership Coalition and a host of other sponsors, showed the size of the prize we are fighting for. Even if Article 6 only works in some places,

20 YEARS

the cooperation will deliver benefits – and it will enhance the ability to meet Paris goals.

This year's Report offers perspective on IETA's humble beginnings 20 years ago – including its role in launching the VCS

This year's Report offers perspective on IETA's humble beginnings 20 years ago – including its role in launching the VCS. It tracks the progress of carbon pricing around the world, as seen by business participants and market professionals. It offers a brief review of the Article 6 modelling results. Finally, it looks into the future of “net zero” and the role that removal strategies will play.

We hope you find this edition instructive and inspiring. With 2020 around the corner, we all know that it is time to increase our resolve to develop climate solutions that endure ... that scale ... that transcend and transform. Enjoy the read!



A handwritten signature in blue ink that reads "Dirk Forrister".

DIRK FORRISTER
CEO & President



GREENHOUSE GAS MARKET REPORT

About the International Emissions Trading Association (IETA): IETA is the voice of business on carbon markets around the world. Established in 1999, IETA's members include global leaders in the oil, electricity, cement, aluminium, chemical, technology, data verification, broking, trading, legal, finance and consulting industries. www.ieta.org

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01

EMISSIONS TRADING: FACTS, MYTHS, SUCCESSES AND FAILURES – A PERSONAL VIEW

Emissions trading veteran and IETA Fellow Bill Kyte reflects on the progress of cap-and-trade, what lessons have been learned – and what is fake news.

EMISSIONS TRADING, in the form of cap-and-trade, as a tool for reducing carbon emissions is 20 years old. Despite its critics and detractors, the EU Emissions Trading System (ETS) has been the backbone of the bloc's carbon reduction strategy since its inception in 2005, while emissions trading is becoming the instrument of choice for many governments around the world. The Kyoto Protocol and the Paris Agreement – both agreed under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) – have opened up the possibility of international emissions trading.

MYTHS AND FACTS

Myths have grown up about emissions trading and these still persist despite the proven success of the policy. Some critics have dismissed emissions trading as 'paying for pollution', others has castigated it as 'all about profiting from trading', while some industrial sectors have criticised it as a 'cap on growth', and politicians have often stated that 'we need to get the price right'.

These myths stem from a lack of understanding of how emissions trading works. The basic concept of a cap-and-trade scheme is very simple: politicians agree on a limit on emissions (the 'cap') which is reduced over time to meet an agreed target; allowances to emit are then distributed through some mechanism, such as by auctioning them, to installations in the programme. These allowances can be freely traded among participants to discover the lowest abatement cost. Finally, the installations have to surrender the

appropriate number of allowances to cover their actual emissions during a compliance period. It is the combination of the cap with trading that underpins the environmental and economic benefits of emissions trading.

Emissions trading at a national or international level enables industry to achieve the required reductions in carbon emissions in the most economically efficient way. Companies are allocated an emissions target. Those that can reduce emissions at low cost can go further than their target and sell any excess allowances to companies which are finding it more difficult or expensive to reach their target. Conversely, those companies which have found it difficult to reduce emissions can buy the extra permits they need from those who have gone further than they needed to, effectively paying someone else to do their abatement for them. Trading through a market enables the identification of the least cost reductions and ensures that sufficient reductions are made even when production is growing, meaning there is no cap on growth.

Any unilateral action to address climate change will inevitably raise fears about competitiveness and carbon leakage and these need to be addressed.

OPTIONS FOR GOVERNMENTS

Emissions trading is one of a suite of options that governments have for reducing carbon emissions. The main options are: command and control, voluntary/negotiated agreements, and the use of economic instruments (carbon taxes, emissions

It is the combination of the cap with trading that underpins the environmental and economic benefits of emissions trading

trading). Each of these has its strengths and suitability for different sectors and thus all have a role to play in a national carbon reduction strategy.

A number of academics maintain that a carbon tax is superior to emissions trading and this can be attractive to governments which are well versed in the practice of taxation. However, a carbon tax suffers from the grave disadvantage that its environmental result is uncertain and so continual adjustment is needed to achieve the reductions required, which introduces significant inefficiencies especially in sectors with long investment cycles. A true carbon tax should be set at a level to cover the externalities and should wither away when the required objectives are reached. There is also a danger that the tax becomes regarded solely as a revenue raiser, leading to rising rates as emissions fall.

Unlike a carbon tax, the environmental outcome is certain and ensured with emissions trading, but the price is not; instead, the price is determined by the carbon market at a level to meet the cap at least cost.



Emissions trading at a national or international level enables industry to achieve the required reductions in carbon emissions in the most economically efficient way

Emissions trading has proved to be very successful in the US, with the Allowance Trading Program for sulphur dioxide put into place in 1995. This provided the springboard for the voluntary UK ETS which ran from 2002 to 2009, which in turn paved the way for the mandatory EU ETS which started in 2005. However, even with the lessons learnt from the two earlier schemes, the EU ETS was a bold step in that it covered over 11,000 installations in multiple sectors, spread across multiple jurisdictions and where there was no technical removal fix as there was in the US sulphur programme (flue gas desulphurisation). These considerations led the EU to designate the first three-year phase of the EU ETS as a 'learning by doing' period with lighter penalties and requirements compared to later phases.

THE 'GOLDEN RULES'

During the analysis, prior to the setting up of the UK ETS, I proposed a number of 'Golden Rules' which I believe are still valid and provide a useful yardstick for evaluating the lessons learnt over the past two decades.

These 'Golden Rules' set out a number of the criteria that an ETS must meet in order to be successful.

Environmental rationale: the trading scheme must, and must be seen by all parties, to be achieving its environmental objective. Perception is important as low allowance prices in the EU ETS have led to calls to 'get the price right' through price controls, whereas the low price is in fact an indication that the ETS is working in meeting the cap. The remedy for low prices is to tighten the cap to take account of major economic recessions and the impact of competing technologies, such as renewables and nuclear, where subsidies and guaranteed running have achieved reductions at significantly higher costs. It is the total cost of achieving the reductions, not the carbon price, that matters.

Economic rationale: the trading system must, and must be seen by all parties, to be more flexible and cost-effective than other ways of achieving the environmental objective. Care needs to be taken that subsidies used to encourage emerging technologies, such as renewables, are phased out when they become mature so that the carbon price truly reflects the marginal cost of decarbonisation.

Credible: the system must be credible since only credible systems succeed. Hence the administrative procedures must be adequate to ensure compliance with the

climate change goal. Robust monitoring and verification of emissions and financial transactions are the key to credibility.

Simplicity: this is essential and deviations from simplicity should only be introduced when demonstrably necessary. Simplicity is perhaps the key Golden Rule. Multitudes of academic and institutional studies, of ever-increasing complexity, have been undertaken seeking illusory perfection. No system will be perfect and good simple, pragmatic solutions will succeed where more complex ones will fail. It is an established fact that any instrument functions best when it has a single well-defined objective; multiple objectives tend to fail. One of the major criticisms of the EU ETS is that it has not enabled sufficient new investment, which ignores the fact that investment will not take place, without subsidies, if there is already an oversupply in any given market. The key to encouraging new replacement low-carbon investment through an ETS is to ensure that the cap is sufficiently stringent to match the science.

**Simplicity is
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Equity: without perfect knowledge (in which case there would be no need for trading) any system will be inequitable particularly during the early years. In a successful system, there will be something for everyone and inequities will rapidly diminish with time. Since the valuation of companies and their investment policies have been based on certain explicit and implicit rights, it is important that any trading system does not introduce a step-change shock to the status quo but rather enables the achievement of the desired objective. Free allocation is often used in the startup phase of an ETS to avoid these shocks, but needs to be phased out as things progress. In the EU ETS, the continued use of free allocation to combat carbon leakage and address competitiveness issues has led to significant distortions, with some sectors making substantial windfall profits while other sectors have faced unequal treatment. Any remedy for carbon leakage should be through other fiscal measures, which could be financed from the revenues from the auctioning of allowances. Any such measures need to be applied equitably to avoid market distortion and not, as in the EU ETS, left to each member jurisdiction's discretion.

Transparency: the system must be transparent so that there is national and international confidence in the system. An imperfect system with good transparency is to be preferred to any opaque system. Transparency is the key to credibility in ensuring that there is a level playing field for all.

Credit for past action: it is often claimed that the system must give credit for action already taken which has resulted in certifiable reductions. However, in practice it is difficult to establish and those who have undertaken early action have proven to be those who have adapted best to being subject to a cap in an ETS.

Certainty: in an increasingly uncertain world, in order to inspire business confidence, encourage innovation and investment, there must be a high degree of predictability so that business can invest. Change will always be necessary, but any changes must be predictable and well communicated.

The major lesson learnt from the EU ETS is that cap and trade, on a major scale, is effective at reducing emissions and that linking is possible

Inclusive: the process should be as inclusive as possible in the long term, though some restrictions may be necessary in the short term. Carbon markets are developing across the globe and, out of necessity, are national and regional – though many are interested in linking with others in the long term. A global carbon market, linking all major emitting sectors including aviation and shipping, offers the best hope of achieving the global carbon reduction that the planet needs while ensuring that there are no competitiveness issues.

LESSONS FROM THE EU ETS AND LOOKING AHEAD

The major lesson learnt from the EU ETS is that cap and trade, on a major scale, is effective at reducing emissions and that linking is possible. Other lessons are that care must be taken to ensure that there is not over allocation in the early stages and that the use of offsets, such as from the CDM or a future mechanism established under Article 6 of the Paris Agreement, must be well managed from the outset. The role of overlapping policies and the need to ensure policies work harmoniously must also be taken into account in the design of an ETS. The introduction of the Market Stability Reserve in the EU ETS has proven to be effective in combating the large surplus created from these sources.

The EU is considering strengthening its climate targets and the possible widening of the EU ETS. These proposals will need careful consideration and can draw on the emerging knowledge from other systems worldwide.

CONCLUSION

My hope is that those developing these markets and the UNFCCC negotiators seeking to operationalise Article 6 of

the Paris Agreement take note of the Golden Rules – in particular, the need for simplicity, transparency and credibility.

The EU ETS has shown that a cap-and-trade system is a very successful tool to reduce carbon emissions. Two of the lesser talked about benefits are that the EU ETS has focussed minds in EU boardrooms and that, as it applies at installation level, many small unheralded improvements have been made at installations in all sectors. The lessons learnt from the EU ETS are being taken on board in the many emerging markets being developed around the world. Time will tell if the measures taken will be successful in avoiding some of the issues that the EU has faced. In time, these emerging schemes will have lessons for the EU ETS.

Formerly of Powergen and E.ON, Bill Kyte participated in numerous IETA working groups and was named a Fellow in 2013. His contributions to the UK emissions trading scheme in the late 1990s, as a founder of the UK Emissions Trading Group, helped pave the way for the EU ETS. He was awarded an OBE by the Queen in 2003 for 'services to the environment in the power sector'.



DISCLAIMER

The views expressed in this article are my own based on over 30 years working on climate change policies in the UK, EU and internationally and have not been endorsed by IETA.



ON THE ORIGINS OF IETA

This month marks IETA's 20th anniversary. One of its founders, Frank Joshua, recounts the IETA origin story.

THIS MONTH marks 20 years since IETA was officially launched. The story of its beginnings, at a UN Conference on Trade and Development (UNCTAD) meeting in London at the IPE, is well known. But, in actual fact, the real story of IETA's origins begins in June 1992.

Twenty-seven years ago this month, the Earth Summit was held in Rio. While most famous for culminating in the establishment of the UN Framework Convention on Climate Change (UNFCCC), the discussions also took on how to design a global carbon tax. Recognising the administrative headache of such an endeavour, UNCTAD proposed a novel solution: put legally-binding caps on carbon emissions and use markets to trade carbon emission allowances and carbon credits.

UNCTAD's suggestion was the brainchild of Michael Grubb, who – at the time – was Professor of Petroleum Economics at the Royal Institute of International Affairs in London. Grubb had first presented his cap-and-trade idea in 1989 to Ken Dadzie, then Secretary-General of UNCTAD.

Dadzie immediately saw the potential for a global carbon trading system to transform the way we deal with global climate change and the relationship between developed and developing countries

Dadzie immediately saw the potential for a global carbon trading system to transform not only the way we deal with global climate change, but also the economic and financial relationship between developed and developing countries – with clean technologies, finance and management services flowing from North to South, and supplies of carbon credits flowing in the opposite direction.

The general response was “Nice idea, Mr Dadzie!” But inside UNCTAD “trading pollution” was widely panned... But the boss wanted it done! After making the rounds within UNCTAD, the Michael Grubb dossier eventually landed on my desk.

By 1992, I was in charge of carbon trading in UNCTAD's Finance Division. In my quest to find a conference room in Rio to hold a seminar on carbon trading during the Earth Summit, I reached out to Paolo Protasio, who I had met in 1986 when he was chairman of the Latin American Trading Association in Rio de Janeiro. This June 1992 Rio Carbon Trading Seminar was the start of a beautiful journey that led all the way to the formation of IETA seven years later...

Fast forward to the summer of 1996, with Kyoto Protocol negotiations well underway. I organised the First UNCTAD Emissions Trading Policy Forum, hosted by Dr Richard Sandor in Chicago. There, for the first time, the idea of an industry-led international emissions trading association was floated. By the time the Second UNCTAD Emissions Trading Policy Forum convened a year later in Toronto, hosted by Maurice Strong, the UN's Deputy Secretary General at the time, the idea of an industry-led emissions trading association was actually on the conference agenda. The December 1997 Kyoto Protocol agreement gave us added impetus. At the

following year's UN climate talks, in Buenos Aires, a steering committee led by Maurice Strong, Bjorn Stigson, President of the World Business Council on Sustainable Development (WBCSD), and myself was given the task of delivering the International Emissions Trading Association (IETA)... which we did in June 1999, just seven months later.

To be clear – carbon trading was a controversial idea from the start. And although the Government of Brazil, led by Ambassador Gylvan Meiro Filho, was the main driving force behind the Clean Development Mechanism (CDM) for carbon credits, the Brazilian government by and large had serious reservations about cap and trade – fearing that it could be used to constrain the growth and development of developing economies.

But by 1997, the head of UNCTAD was now the former Finance Minister of Brazil, Ambassador Rubens Ricupero, who had also chaired the Rio Earth Summit in 1992. Ricupero gave me his full support to push ahead with the launch of IETA. And, in turn, I offered to nominate Paulo Protasio, with the backing of the Government of Brazil, to be the first President of IETA.

Things moved very quickly then, and with the EU ETS kicking off in 2005, IETA's work and membership soon exploded.

It's satisfying to be here, 20 years on, and see what our hard work has achieved. But there are still so many challenges ahead, and our work is far from done. Over the past 20 years, IETA has asserted itself time again as the leading voice of business on carbon markets and has successfully contributed thoughtful and meaningful input to policy arena all around the world. I look forward to seeing what IETA can achieve in the next 20 years!

Cooperative approaches as envisioned in Article 6 of the Paris Agreement have the potential to significantly accelerate the rate at which emissions are reduced, finds a report by IETA, the University of Maryland and the World Bank's Carbon Pricing Leadership Coalition. Clayton Munnings from IETA summarises the key takeaways.

NEGOTIATIONS REGARDING Article 6 of the Paris Agreement, which focuses on international cooperation, are expected to be front-and-centre at COP25 in Madrid. Ahead of these negotiations, IETA, in partnership with University of Maryland and with support from the Carbon Pricing Leadership Coalition at the World Bank, undertook an assessment of the potential of Article 6 to provide cost savings and facilitate enhanced ambition.

The resulting report finds that international cooperation through carbon trading under Article 6 of the Paris Agreement could halve the cost of implementing Nationally Determined Contributions (NDCs), thereby saving an estimated \$250 billion annually by 2030 alone.

The costs remain constant and these savings are instead used to enhance ambition, then an additional 5 billion tonnes of carbon dioxide emissions would be reduced in 2030, thereby achieving enhanced ambition. But realising these benefits requires careful consideration of the framework design and implementation.

BACKGROUND

The Paris Agreement established an international framework for addressing climate change rooted in national action. Parties pledge to achieve short-term (to 2030) domestic goals through NDCs and report on their progress towards achieving these goals. Unfortunately, current NDC pledges are insufficient to limit the average surface temperature increase to the agreed goal of 1.5°C (IPCC, 2018). There is an urgent need for parties to become more ambitious in their commitments.

Article 6 of the Paris Agreement allows parties to produce internationally

transferred mitigation outcomes (ITMOs). These have the potential to lower the cost of abatement and so, it is hoped, increase appetite for more ambitious pledges. About half the parties which have submitted NDCs have signalled an interest in using Article 6 (World Bank and Ecofys, 2018). To date, however, there are no rules to guide how this should be done. Finalising these guidelines will take centre stage at COP25.

METHODOLOGY

The open source Global Change Assessment Model (GCAM), which considers the energy, economy, agriculture and land-use systems of 32 geopolitical regions across the globe, was used to construct four different scenarios to assess the potential value of Article 6 (JGCRI, 2017; JGCRI 2018). These are:

- A reference scenario, which assumed no new policies or actions to reduce greenhouse gas emissions after 2010 (GCAM's calibration year);
- An independent implementation

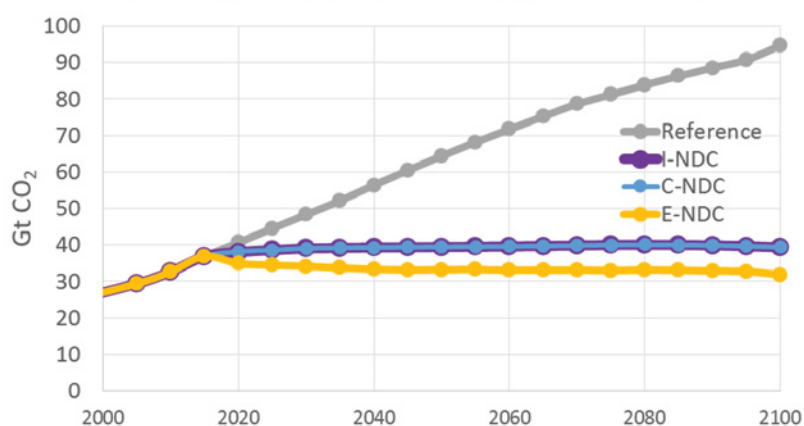
of NDCs (I-NDC) scenario, which assumes that countries meet their 2030 NDC commitments through independent implementation and continue decarbonising on their own;

- A cooperative implementation (C-NDC) scenario, which assumes that countries meet their NDC commitments making use of Article 6 collaboration; and,
- An enhanced ambition (E-NDC) scenario, which assumes that the funds each country would have spent on pursuing its NDC independently is used to pay to mitigate carbon emissions through cooperative mechanisms.

KEY FINDINGS

Figure 1 shows that I-NDC and C-NDC scenarios have identical global emissions by 2100. However, since cooperative mechanisms are more economically efficient, C-NDC creates an opportunity to increase mitigation ambitions without increasing cost.

Global CO₂ Emissions from Energy and Industry





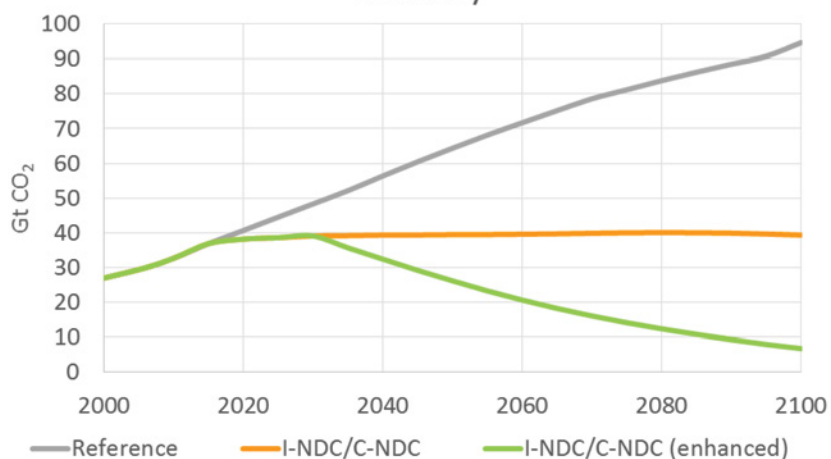
By 2030, global emissions for the I-NDC scenario is roughly 5 billion tonnes of CO₂/year greater than the E-NDC scenario over the course of the century. These additional benefits can be made achieved through the perfect implementation of Article 6 via international carbon trading.

Current NDC commitments are not enough to limit the global temperature rise to below 2°C. Countries need to increase their ambitions over time. The following scenarios were developed to assess the value of Article 6 after 2030:

- I-NDC-Increased assumes that countries implement their NDCs to meet their commitments through 2030 and then accelerate efforts to decarbonise their economies, opting for an independent approach in both instances.

The Paris Agreement established an international framework for addressing climate change rooted in national action

Global CO₂ Emissions from Energy and Industry





Article 6 may create peer pressure if countries choose to import only from regions with credible NDCs

- C-NDC-Increased assumes that countries implement their NDCs to meet their commitments through 2030 and accelerate efforts to decarbonise their economies, opting for a cooperative approach in both instances.

In both scenarios, we assume that countries decarbonise their economies at an accelerating rate of 5% per year after 2030, which is consistent with the Paris-Increased Ambition scenario in Fawcett et al (2015). Compared with I-NDC and C-NDC scenarios, both I-NDC-Increased and C-NDC-Increased scenarios reduce global CO₂ emissions by 34% in 2050 and 83% in 2100 (Figure 2) and decrease the probability of temperature change exceeding 2°C in 2100 by 26%.

CONCLUSION

Article 6 has the potential to either

International cooperation through carbon trading under Article 6 could halve the cost of implementing NDCs

lower the cost of achieving NDCs or enhance regional ambitions out to 2030. Yet implementing Article 6 remains a challenge, in part because the rules around the creation and trade of ITMOs are not clear, given the heterogeneity in targets and policies across NDCs (Das, 2015; Hood and Soo, 2017; Mehling et al, 2018; Rose et al, 2018).

Article 6 may create peer pressure if countries choose to import only from regions with credible NDCs (Mehling et al, 2018; Iyer et al, 2015; La Hoz Theuer et al, 2018; Peters et al, 2017). As we have mentioned, cost savings achieved through Article 6 could be used to enhance ambition after countries achieve their initial

pledges (Metcalf and Weisbach, 2011; Calvin et al, 2015; Ostrom, 2010; Lutter and Shogren, 2002; Becker, 2000; Hohne et al, 2017).

However, Article 6 may also create a countervailing pressure for countries to keep their ambition low via the “free-rider effect”. To protect against this effect and ensure cost savings and enhanced abatement, our research team is modelling the impact of a “carbon club” with a “ratcheting mechanism” to ensure that when cost savings are accessed by countries via Article 6 that country-level targets become more aggressive over time.

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**IETA has been
at the heart of the
debate between
business and
government on
climate change
since 1999**



Ahead of the UN climate talks presided over by Chile, negotiator Juan Pedro Searle Solar lays out the transformative power and impact a fully-operational Article 6 could have on the world's economy

THE PARIS AGREEMENT foresees carbon markets as a fundamental tool to reduce greenhouse gas emissions, highlighting it as one of the essential means to meet the goals of controlling the temperature increase to less than 1.5°C and to achieve carbon-neutrality by 2050. To this end, parties included Article 6 in the Agreement and defined it as an instrument that opens spaces for cooperation and that, through the international transfer of mitigation outcomes (ITMOs) and/or emission reductions (from the Mechanism under Article 6, paragraph 4), will allow countries to reduce emissions more cost-effectively and to balance the global burden of reaching those mitigation levels by mid-century. In short, it enables the establishment of a market for issuance and transfer of certificates between countries and/or other actors (authorised by the parties involved), in order to accelerate the required decarbonisation and lower the costs of clean technologies with high mitigation potential, among other benefits.

LOWER COSTS, HIGHER AMBITIONS

Article 6 has the potential to reduce the overall cost of implementing Nationally Determined Contributions (NDCs), the emissions reductions that each party to the Agreement has planned. According to the World Bank, climate finance and carbon markets could reduce this cost by \$115 billion in 2030 and by \$1.9 trillion in 2050, while increasing resource mobilisation, taking into account the experience with the CDM, where each \$1 invested in mitigation projects is estimated to have leveraged between \$5-10 of private investment in the low-carbon transition.

An ongoing study by IETA – while estimating lower cost reductions (\$350 billion by 2050 and \$990 billion by 2100) – emphasises that these would be realised only if the parties apply cooperative approaches under Article 6, making it clear that all countries would achieve more for less if they act together. Similarly, this study indicates that Article 6 has the potential to further reduce 5 billion tonnes of CO₂ annually from 2030, thereby accelerating the decarbonisation of the world economy.

This mutual cooperation between the parties would also have a positive effect on the cost of implementing public policies, which could be reduced by 55% in 2030 and by 41% in 2050. These figures were estimated considering the great heterogeneity of existing NDCs. To the extent that they become more ambitious and comparable, such estimates could change and be even more promising in terms of costs and expected reductions when parties act together.

CHILE AND ARTICLE 6

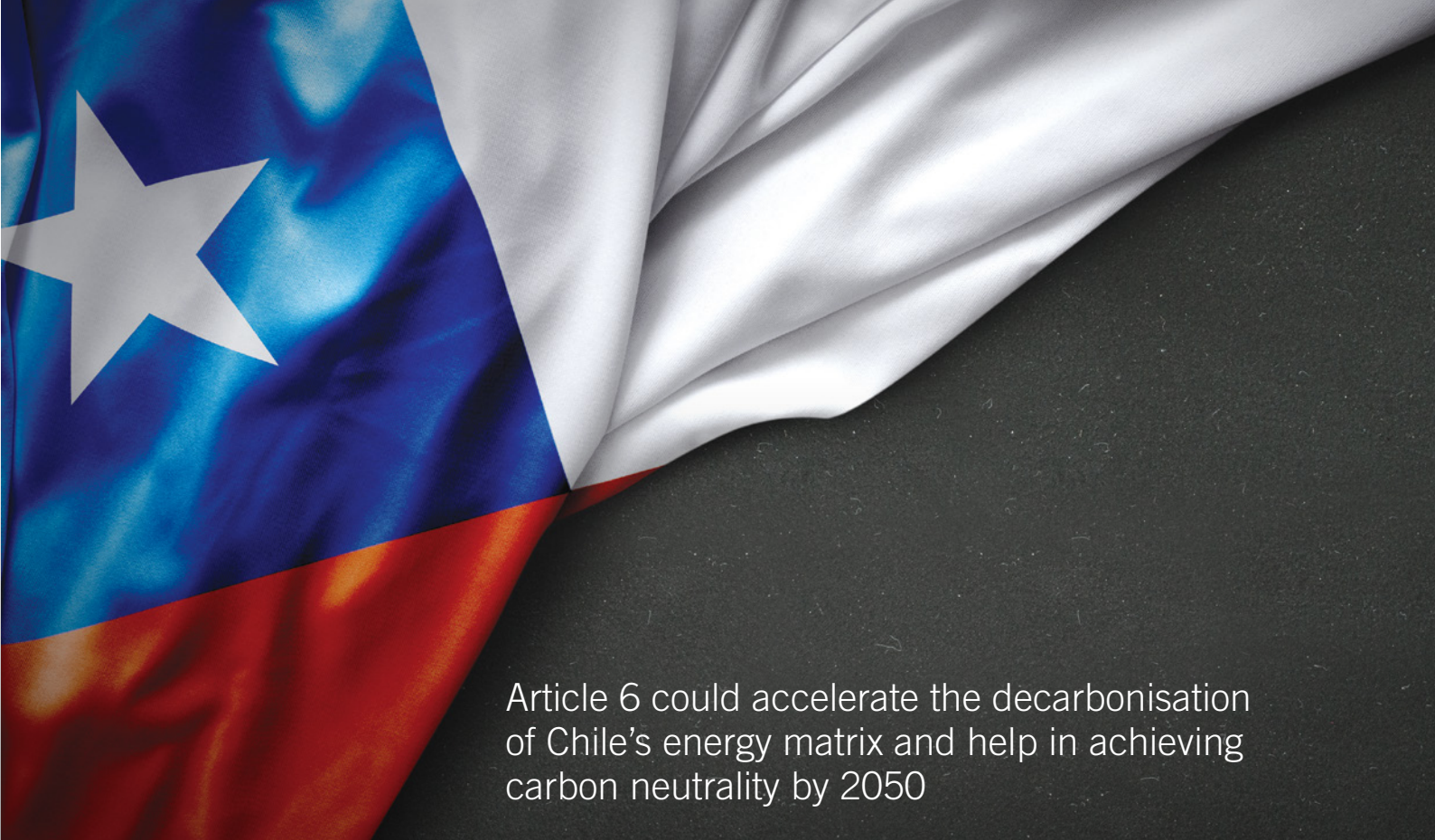
The full operation of Article 6 –as part of a comprehensive national climate policy– could accelerate the decarbonisation of Chile's energy matrix and help in achieving carbon neutrality by 2050 (as well as maintaining it over time, or even go “negative”). The measures which will have the greatest impact on GHG emissions reduction include the phasing-out of coal-fired power plants (a concrete commitment between the government and the main energy utilities was recently adopted in June 2019); an increase in renewable energy generation, energy efficiency, and

electric vehicles; and the electrification of energy intensive sectors such as mining and cement. If measures to maintain – or even increase – the absorption capacity by forests are in addition to this strategy, the country would likely become carbon neutral by 2050 or a bit earlier, becoming a world leader in addressing climate change at the levels required by science.

This scenario is not seen without carbon pricing. By no means. As a way of fomenting or accelerating this transition, especially in the energy sector, the country will require carbon pricing instruments that lead to mitigation outcomes towards Chile's NDC or for other purposes. As such, ITMOs, offsets, emissions allowances or other forms of mitigation outcomes envisaged under Article 6 are needed to facilitate a cost-effective transition in Chile.

Article 6 could become an essential pillar towards national decarbonisation, since the financing flow from the transfer of certificates with other parties, will facilitate investments in those technologies with high mitigation potential, which today are more

The full operation of Article 6 could accelerate the decarbonisation of Chile's energy matrix and help in achieving carbon neutrality by 2050



Article 6 could accelerate the decarbonisation of Chile's energy matrix and help in achieving carbon neutrality by 2050

Parties need to adopt the rules of Article 6 at COP25 in December

expensive to implement in the country, such as energy storage, carbon capture and utilisation or storage, geothermal energy and the electrification of transport and industrial processes, among others. Likewise, this financial flow could also accelerate the expected trend of increasing renewables, such as solar and wind, as well as the withdrawal of coal-fired power plants.

ARTICLE 6 IN LIMBO

However, with so much at stake, Article 6 rules were not adopted at last year's UN talks (COP24), since parties needed more time to understand the technical and political implications.

The negotiations stumbled upon several key issues of this article, in particular one that is cross-cutting to the successful implementation of the Paris Agreement in general, and that is closely linked to the transparency system advocated and supported by this Agreement: to avoid double counting when mitigation outcomes or emission reductions are transferred

between parties towards or beyond NDC achievement. This is known by the term of "corresponding adjustments" and is particularly important for the proper implementation of aspects of Article 6, especially for Article 6.4 units that are transferred internationally and for the potential transition of certificates, methodologies and project activities from the CDM. In "simple" terms, these are additions or subtractions (based on the GHG emissions inventory? or the NDC?) when a party transfers or acquires (adds or subtracts emissions respectively) a mitigation outcome or an emission reduction certificate.

Other relevant unresolved issues include the metrics by which an ITMO should be expressed (eg, tonnes of CO₂ equivalent, megawatt hours or others); transition of the Clean Development Mechanism transition from the Kyoto Protocol to the Article 6.4 mechanism; the charge of a Share of Proceeds for each ITMO transaction under Article 6.2 — which would mainly fund climate change adaptation efforts in the most vulnerable countries— and the application of an "overall mitigation in global emissions" concept (OMGE), whereby a party that generates reduction units deducts a percentage of these units and does not use them for its NDC nor transfers them to another party, ie, these

unused units are cancelled, generating a net benefit for the atmosphere. OMGE was agreed in Article 6.4 but not in cooperative approaches (Article 6.2). For the latter, its application could even discourage the creation of ITMOs and the consequent market, according to some views.

EXPECTATIONS FOR COP25

Parties need to adopt the rules of Article 6 at COP25 in December. Completing this final piece of the Paris Rulebook would ensure that this Agreement is in full implementation mode from 1 January 2020. The level of robustness and granularity of the rules should be such that it allows Article 6 to be immediately used by countries, leaving some technical issues pending for a subsequent work programme.

The risk of not approving the rules in Madrid could result in a two- to four-year delay in the instrument being fully operational – delaying the start of new efforts under Article 6. All this, with the consequent slower impact on the progress of national contributions, whose first compliance period is due by 2030.

Juan Pedro Searle Solar is a negotiations advisor for markets and Head of Article 6 cluster, COP25 Presidency.

It's crunch time for ICAO, with a decision on the first round of offset credits for the sector's emissions reduction system imminent. Annie Petsonk takes a close look at how the applicants measure up.

THE MOMENT of decision has arrived for the International Civil Aviation Organization (ICAO), the world's international airlines, and the integrity of carbon offsets. Before the end of 2019, it is expected that ICAO's 19-member Technical Advisory Body (TAB) will have conducted its review of the first 14 carbon credit programmes that have applied for eligibility for the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), by evaluating these to see how they measure up against the CORSIA Emissions Units Criteria (EUCs) that the 36-member ICAO Executive Council adopted in 2018.

It is expected that TAB will forward its recommendations to the Executive Council in time for the Council to consider them at its March 2020 Session; decide which if any of the 14 programmes, and potentially project types, meet the EUCs and are therefore eligible for use by the world's international airlines toward their CORSIA obligations; and, as directed by the 2016 ICAO Assembly Resolution establishing CORSIA, decide which vintages of these

emissions units airlines may use. The credibility of ICAO's work to address aviation emissions stands or falls on the robustness, transparency and integrity of these actions.

The stakes are high, not just for the future of aviation, but also for the global effort to bend the trajectory of climate pollution down and avert further climate catastrophes. Here's why.

Starting in 2021, CORSIA limits the net carbon dioxide emissions of flights between participating countries at the average of 2019-20 levels. CORSIA's monitoring, reporting, and verification (MRV) requirements apply to all ICAO Member States as of 1 January 2019, and its emissions caps run from 2021 through 2035. Current estimates are that CORSIA will result in some 2.5 billion tonnes of demand for emission reductions from credits and fuels, more if the cap is tightened over time as a result of triennial evaluations.

CORSIA requires airlines to either take direct steps to lower their emissions, through technology innovations and operational changes that improve efficiency and reduce total emissions; use CORSIA-eligible alternative fuels with demonstrably lower emissions over their life cycle; or offset their emissions using credits from programmes, and potentially project types, that have been determined by ICAO's Council, acting on the recommendations of the TAB, to meet CORSIA's eligibility requirements.

To the extent that airlines burn alternative fuels that, on a lifecycle basis, demonstrably reduce emissions by a quantified amount as compared to conventional fossil fuel, airlines can reduce the amount of carbon credits they need to purchase, provided those fuels meet CORSIA sustainability and related criteria. An ICAO body similar to the TAB is expected to be convened to review alternative fuel certification programmes and make recommendations to the Council as to which meet CORSIA's fuels requirements – including traceability throughout the end-consumer – and have properly quantified the life-cycle reductions, taking into account direct and indirect effects. The fuels rule-set framework has not been finalised, but is expected to be adopted by Council in late 2019 or early 2020.

The ICAO rules for carbon credits and fuels – the product of six and half years of intensive technical and political negotiations, plus another six months for the fuels rules to be finalised – could yield robust results, but only if they are applied with integrity by ICAO's TAB, its fuels advisory body, and the Council. A high-integrity CORSIA could limit a fast-growing source of global emissions and spur greater ambition in the aviation sector and in other sectors as well, including fuels. But secretive, selective, or vague application of the rules could allow dubious carbon credits and fuels into CORSIA. If CORSIA opens a door to double-claimed credits, it will set global climate action back rather than take it forward.

The full operation of Article 6 could accelerate the decarbonisation of Chile's energy matrix and help in achieving carbon neutrality by 2050



If CORSIA becomes an entrepôt of questionable emissions units and fuels that result in more, not less, emissions, that would destroy ICAO's credibility and undermine the emerging international carbon market under the Paris Agreement.

Full adherence to the plain language of the CORSIA EUC and the carefully developed Supplementary Information for Assessment of Emissions Unit Programs, which is Appendix A to the CORSIA Application, would in principle guard against bad outcomes. Key among the EUCs are requirements for robust additionality; transparency; measures to assure permanence/address reversals; and the avoidance of double counting.

Implementation of the last criterion is crucial. It would be advanced significantly if, at their next meeting, the Parties to the Paris Agreement adopts a strong set of Article 6 implementation guidelines that call for corresponding adjustments for all mitigation transfers, including use in CORSIA, and if the TAB and Council follow these guidelines. But even if the Parties do not reach agreement on the guidance, airlines have already signalled that they, like a large number of other corporate actors, do not want to use emissions reductions that are “double counted” – once in CORSIA and again in the Paris Agreement. Thus, it is incumbent on programmes to demonstrate to the TAB and the Council that they do not, and will not, allow for double counting.

If CORSIA becomes an entrepot of questionable emissions units and fuels, that would destroy ICAO's credibility and undermine the emerging market under the Paris Agreement

How do the 14 programmes stack up against the EUCs? The responses are quite varied, with many applications either incomplete or simply lacking in key requirements. Consider the transparency criterion. The EUCs provide that “Carbon offset credits must have a clear and transparent chain of custody within the offset program. Offset credits should be assigned an identification number that can be tracked from when the unit is issued through to its transfer or use (cancellation or retirement) via a registry system(s).” The Supplementary Information Appendix provides that “The program registry (or registries) should...transparently identify unit status, including issuance, cancellation, and issuance status.”

But the programme applicant with the largest potential pipeline of offset credits, the Clean Development Mechanism (CDM) of the Kyoto Protocol, seems to have no transparent way to track whether its credits have been used by Kyoto Parties for compliance purposes. The CDM didn't even complete an application for CORSIA, as other programmes did. Instead, it simply

submitted a five-page letter with a few generalised assertions.

On transparency, the letter says, “The Kyoto Protocol's ITL [International Transaction Log] assesses the holdings of all units in national registries and the CDM registry to ensure that each unique unit is held in only one account at a time and to ensure that units which have been cancelled or retired are not subsequently transferred from the cancellation or retirement accounts.” However, as the ITL is not public, there is apparently no way for airlines or the public to discern whether any particular CDM units held in national registries have in fact been cancelled or retired. So, the CDM seems to fail the transparency criterion.

Other programme applications include a requirement that the project developer sign a statement averring that the developer has not cancelled units twice – but in the absence of publicly viewable registries tracking cancellations on the basis of unique serial numbers, there is no basis for verifying these statements, so these programmes would seem not to meet the transparency criteria at this time.

(1) See Brazil's Amazon Hydroelectrics in the United Nations Clean Development Mechanism (CDM): Defrauding Investors, Cheating the Atmosphere?, November 2017, Environmental Defense Fund et al.

Table: CORSIA programme applicants, round 1

1. American Carbon Registry
2. British Columbia Offset Program
3. China GHG Voluntary Emission Reduction Program
4. Clean Development Mechanism
5. Climate Action Reserve
6. Forest Carbon Partnership Facility
7. Global Carbon Trust
8. Gold Standard
9. myclimate
10. Nori
11. REDD.plus
12. Thailand Greenhouse Gas Management Organization
13. The State Forests of the Republic of Poland
14. VCS Program (managed by Verra)

A further requirement of the CORSIA EUCs is additionality, and there the CDM seems to have trouble as well. Additionality problems with certain project types and locations of projects in the CDM have been well documented, including huge hydroelectric dams in Brazil which were built even though carbon finance didn't materialise and some of which were tainted by the massive Operation Car Wash scandal¹. While many CDM projects and methodologies don't suffer from these problems, the five-page letter makes no attempt to sift the additionality wheat from the chaff.

Few of the applications address double-counting squarely. As the CDM letter notes, in 2016, the ICAO Assembly underscored that the CDM must align with decisions of the Council, including on vintage, timeframe, and avoiding double-counting. The EUC specify that eligible programmes must have measures in place to avoid the reduction being counted twice, ie by both an airline and the project's host country. Yet the CDM letter does not address the double counting issue, nor do a number of other applications. The absence of information on how programmes – including the CDM – address double counting should render them ineligible at this time.

Looking ahead, programmes that cannot now meet the eligibility criteria may wish to improve their procedures, update their applications, and re-submit them when the second CORSIA application period opens in March 2020. In the meantime, it is vital to CORSIA's credibility that the TAB's recommendations be made publicly available prior to the Council's decisions. That transparency is essential if ICAO is to clear up the clouds of suspicion that otherwise will hang over its process.

As those paying attention to the aviation industry's developments know, the combination of CORSIA's emerging market and the "Greta Effect" are incentivising wide interest and investment in efforts to

crack one of the toughest decarbonisation challenges, civil aviation. With sunshine on the process and robust application of the EUC, including the Supplementary Information, a high integrity CORSIA could catalyse action in the aviation industry, build confidence for taking on a more ambitious 2050 target, and ripple outward through carbon markets to broaden the economic incentives to drive net climate pollution to zero worldwide. But if ICAO fails, nations will take into their own hands the effort to cut aviation carbon pollution, with costly regulatory patchwork the result.

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Annie is a graduate of Harvard Law School and The Colorado College, which awarded her an honorary degree.



Looking ahead, programmes that cannot now meet the eligibility criteria may wish to improve their procedures, update their applications, and re-submit them when the second CORSIA application period opens in March 2020

INCREASED AMBITION, FALLING EMISSIONS: WHAT'S IN STORE FOR EUROPEAN CARBON?

The incoming European Commission has high ambitions for Europe's climate goals, and wants to re-open the 2030 package, only one year after its final elements were decided. Increased ambition would mean tightening the cap of Europe's flagship EU ETS. Power sector emissions are on a rapidly declining pathway, and higher long term ambition is already embedded in the current framework, argue Anders Nordeng and Hæge Fjellheim.

THE DEBATE on Europe's climate ambition is set to intensify with a change at the helm of the European Commission. A discussion on a 2050 climate neutrality target is already well underway, and the pressure to ramp up the 2030 emission reduction target beyond 40%, against 1990 levels, has gained new momentum.

Drawing an emissions trajectory between now and 2050 necessarily means taking a view on where to be in 2030. The new Commission president Ursula von der Leyen promised the European Parliament that she would push for more ambition. Green Deal commissioner Frans Timmermans said "as soon as possible, [he] will put forward legislative proposals that will help us to reduce emissions by at least 50%, or even better, by 55%". Once they take office in December, they will instruct their teams to start drafting proposals to be presented to the European Parliament and the Council in 2020. Then comes the hard part of convincing the two bodies that now is the right moment to reopen the 2030 targets. In early November, a majority in the European Parliament's environment committee called for raising Europe's 2030 emission reduction target to 55%. The draft resolution will be tabled for a plenary (unbinding) vote in late November, ahead of the UN climate talks which begin in Madrid on 2 December.

Among the member states, Denmark, France, Luxemburg, the Netherlands, Portugal, Spain and Sweden have formed a pro-climate coalition and have repeatedly pushed to ramp up the 2030 reduction

target. Poland has resisted, and Germany has been undecided. In order to change the 2030 target, the new executive would need to convince all member states.

If reopening the 2030 target proves unfeasible in 2020, a possible opportunity could present itself in 2023, the year of the first global stock-take under the Paris Agreement. If other big economies, such as China and India show progress, that could be a good moment for Europe to raise its own ambitions.

With the current 40% target, what does the legislative framework actually imply in terms of cuts in the emissions trading sectors? And how far is Europe really from a track towards the deeper emission cuts vowed by van der Leyen? We argue that higher ambition is already implicit in the current framework and that the speed of power sector decarbonisation is only set to accelerate further in the years to come. Against this backdrop, we ask whether it might actually be politically feasible to beef up Europe's climate targets.

"DE FACTO" CLIMATE TARGET 45%

The current headline target for 2030 was set by European heads of government in 2014. To implement the target, EU lawmakers reviewed and amended the ETS directive (for energy and industry) and the effort sharing regulation (for other sectors). Both were aligned with the 40% objective when they were adopted in early 2018 and implemented through national reduction targets for the non-traded sectors and an accelerated tightening of the EU ETS emission cap from 2021 onwards.

In June that year, the EU went on to set new targets for share of renewable energy and energy efficiency improvements, both ending up higher than what the Commission had initially proposed. They are not aligned to the headline target. Outgoing Climate and Energy commissioner Miguel Arias Cañete argued that, with strengthened ambitions for renewables and energy efficiency, Europe should be able to achieve deeper emission cuts and therefore be in a position to raise the 2030 target to 45%.

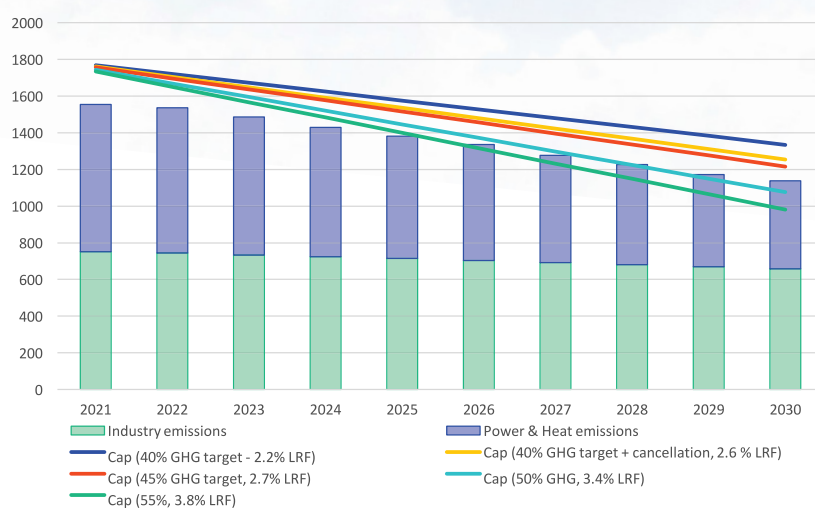
This would translate into a more aggressive reduction in the EU ETS cap year on year, as illustrated in the figure below. We find that this represent a linear reduction factor 2.7% over Phase 4 (2021-30) – up from the 2.2% stipulated in the current legislation. (This assumes that the mitigation effort split between the traded and the non-traded sectors is kept constant.)

CARBON ALLOWANCES WIPED OUT FOR GOOD

Another aspect is the upcoming invalidation of EUAs from the supply flexibility mechanism, the Market

Drawing an emissions trajectory between now and 2050 necessarily means taking a view on where to be in 2030

**FIGURE 1: IMPLIED LRF AND CAP TRAJECTORIES 2021-30
UNDER MORE AMBITIOUS CLIMATE TARGETS**



Stability Reserve (MSR), from 2023 onwards. The provision to invalidate ('cancel') allowances sitting in the reserve beyond the previous year's auction volume was a novelty that made its way into the Phase 4 review negotiations at a late stage. We estimate that, in 2023, the provision will wipe out some 2.5 billion allowances, with a further 1.2 billion cancelled by 2030 – bringing the total number to 3.7 billion,

Higher ambition is already implicit in the current framework

equivalent to two years of emissions in the traded sectors.

What does this mean? In terms of market balance and carbon price formation over the next decade - nothing for the former and probably not much for the latter. From a long-term perspective, however, the picture looks different. Figure 1 shows that the current system operates with an "implicit" linear reduction factor of 2.6%. The cap development is found by distributing the volumes of cancelled allowances from the MSR until 2030 over the full period until 2050 (assuming no further cancellations beyond 2030).

Without the invalidation provisions, the 3.7 billion allowances would have returned to the market at some point when supply was tighter. At the outset the MSR was a supply-neutral mechanism; what it held back from the auctions would return, eventually. The cancellation provision thus represents a de facto increase of the EU's long-term climate ambition.

RAPID GREENING OF EUROPEAN POWER SECTOR

The actual emissions trajectory for the ETS sectors will depend not only on the EU ETS specific legislation; other policies (both EU level and national) will also have a huge impact, most notably coal phase-out and a more rapid uptake of renewables for electricity production.

We estimate a steep decline in in Europe's power sector emissions in the years to come. EU power sector emissions stood at nearly 900 million tonnes in 2018, and we expect them to be 40% lower by 2030. Figure 1 illustrates the role of the power sector in meeting Europe's 2030 climate ambition.

With our expectations for decarbonising Europe, the figure also shows that with (implied) caps consistently below actual emissions, there should be room for the policy framework to follow suit. To some extent that should make the 2030 debate easier, by framing it as a simple adjustment of the nominal target to an actual reality on the ground. That said,

At the end of the day, the ambition level of the EU ETS and all other climate policy instruments is a political decision

outgoing climate commissioner Cañete did not succeed with that strategy in 2018.

If a new 2030 headline reduction target is set at 50% or higher, and assuming the ETS will continue to do its share of the abatement effort, that will require a more significant increase of the LRF throughout the period.

The ambition level of the EU ETS and all other climate policy instruments is a political decision

POLICY IS LIKELY TO BECOME KEY PRICE DRIVER AGAIN

The 2050 discussion is ongoing. Most stakeholders would like to conclude in the early part of 2020, or at least in time for Europe to be able to present concrete plans at the UN climate summit in Glasgow in November 2020 (COP26). If Poland, Hungary and the Czech Republic can be brought onboard with promises of fresh sources of finance, that timeline seems reasonable.

The 2030 discussion is set to gain momentum from the new commission, but it remains to be seen how ambitious the concrete proposals will be, and how well they will go down with the European Parliament and Poland/other central European member states.

Independently of that, there are several key policy developments scheduled for the years to come, all of which are in some way relevant to the discussion on 2030 targets overall, and on the role of the EU ETS in achieving them. First up after the 2050 plan is the MSR review in 2021. The intake rate will surely be discussed, as will the thresholds and the question of cancellation. We also see the ETS debate is turning towards new ideas such as border tax adjustments (to avoid carbon leakage) and expanding the scope to include new sectors such as intra-EU shipping.

MORE OR LESS NEED FOR TIGHTENING?

At the end of the day, the ambition level of the EU ETS and all other climate policy instruments is a political decision. When the phase 4 revisions were negotiated, carbon prices lingered around €5. That low price helped create political sympathy for a supply side intervention to balance the market.

Today, carbon is trading around €25/t. That makes a difference and helps reduce the share of coal in the power mix. Going forward, we forecast the reference EUA-contract to reach €28 in 2020, and peak at €33 in 2022. At such levels, policy makers no doubt feel less need for further tightening (even though the merits of the ETS should be assessed in terms of emission abatement, not on the price as such).

To conclude, we see two opposing narratives trying to set the direction for the ETS framework. On one hand the argument that accelerating the cap reduction is a no-brainer, that it simply means adjusting targets to a new reality of fast decreasing emissions. Even with an LRF at 2.7%, the cap is set to be higher than actual emissions every year out to 2030. On the other hand, opponents will say that the ETS is already delivering abatement and high prices, hence that there is no need for further action. It remains to be seen which narrative will prevail.

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North America is host to a myriad of carbon pricing programmes, from the original market in the northeast of the US to national approaches in Canada and Mexico. Each is taking a different tack, allowing different styles to be tested. Our authors take a look at some of the various programmes being implemented – or planned – across the continent.

MEXICO:

IT'S PILOT TIME

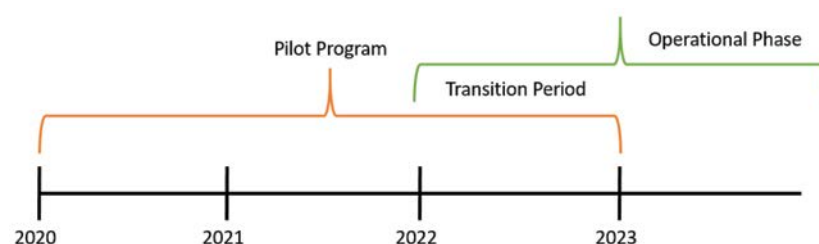
Emissions trading systems have proven to be the most efficient and cost-effective way to reduce greenhouse gas emissions. According to a recent study conducted by Thomson Reuters (2018), it is expected that emissions trading will expand throughout the world and a high percentage of the surveyed ETS participants agree that the market instrument compels them to reduce emissions.

In April 2012, the Mexican Congress unanimously approved the General Law on Climate Change (LGCC by its acronym in Spanish), which was implemented in October of the same year. This marked Mexico as the first developing country to design and implement an integrated climate change law.

In April 2018, the LGCC was revised. One of the most important changes was the modification of article 94 in which language for the “possible implementation of a Mexican ETS” was replaced by a decree for its obligatory implementation. The ETS will be implemented gradually and progressively, limiting the exposure of Mexican industry to competitiveness risks facing international markets (Brun, 2019). The amended law was enacted in July 2018, and finally on 23 May 2019 the government released a draft rule for the pilot emissions trading system¹ for public consultation.

(1) It should be noted that a first version of these bases was released for public consultation at the end of 2018 but they were withdrawn by the incoming administration to make revisions and corrections.

Figure 1: Implementation Phases of the Mexican ETS



ENERGY	INDUSTRY
• Exploitation • Production • Transport • Distribution • Hydrocarbons • Generation • Transmission • Electricity distribution	• Automotive industry • Cement and lime • Chemistry • Food and beverages • Glass • Iron and steel • Metallurgic • Mining • Petrochemistry • Pulp and paper • Other industries that generate emissions from stationary sources

This document establishes that the implementation of the Mexican ETS will consist of two phases: the first one will be referred to as Pilot Program and it will last 36 months, which includes a one-year transition period towards the Operational Phase (full implementation).

The following are some of the principle characteristics of the pilot programme:

- Greenhouse gas coverage: Only CO₂ (whereas the Operational Phase will cover all the GHGs included in the General Law on Climate Change).
- Sectoral coverage: Energy and industry, specifically the following subsectors:
- Emission threshold: Those facilities that in addition to belonging to the aforementioned sectors have annual

A federal offset programme is currently being developed to increase the supply of offsets available to OBPS participants

emissions from stationary sources that match or exceed the threshold of 100,000 tCO₂ will be included in the Mexican ETS. This translates into approximately 308 covered facilities in the whole country.

- Emission coverage: Approximately 45% of national emissions.
- Use of offsets: It is possible to use offsets for up to 10% of compliance. These offsets will not lose validity between the Test Program and the Operational Phase.
- Allocation method: Grandfathering
- Flexibility mechanisms: price collar for auctions, market reserves of allowances, and banking (throughout the Test Programme).

During the Pilot Phase, non-economic penalties for non-compliance are included to encourage participation. These penalties include not allowing the monetisation of allowances unless the participants fulfill the liabilities (in accordance to the deadlines/ established periods), and a reduction of two allowances in the first period of the Operational Phase for each one that the participant does not deliver during the pilot.

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- MexiCO₂

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CANADA: BACKSTOP ENSURES PRICING GOES NATIONAL

Canada's carbon pollution pricing system, also known as the Federal Backstop, is made up of two components: the fuel charge, which is a charge placed on fossil fuels used in a 'backstop' jurisdiction, and the Output-Based Pricing System (OBPS) for industrial facilities. The programme is currently imposed wholly or in part in provinces and territories that did not implement an equivalent carbon pricing programme, as determined by the Federal government; Manitoba, Ontario, New Brunswick, Yukon and Nunavut are backstop jurisdictions. British Columbia,

Quebec, Nova Scotia, Northwest Territories, and Newfoundland and Labrador have their own, federally approved, provincially administered carbon pricing systems. Saskatchewan and Prince Edward Island have province-specific hybrid programmes. Alberta has its own mechanism for large emitters and will have the fuel charge imposed as of 1 January 2020.

The fuel charge started at C\$20/tonne of CO₂e on 1 April 2019 and will increase by C\$10/tonne of CO₂e on 1 April of each year until 2022, when it reaches C\$50/tonne of CO₂e. Under the OBPS stream, industrial facilities with annual emissions of 50,000 tonnes of CO₂e or higher will face a carbon

Figure 2: 2019 Carbon prices across Canada

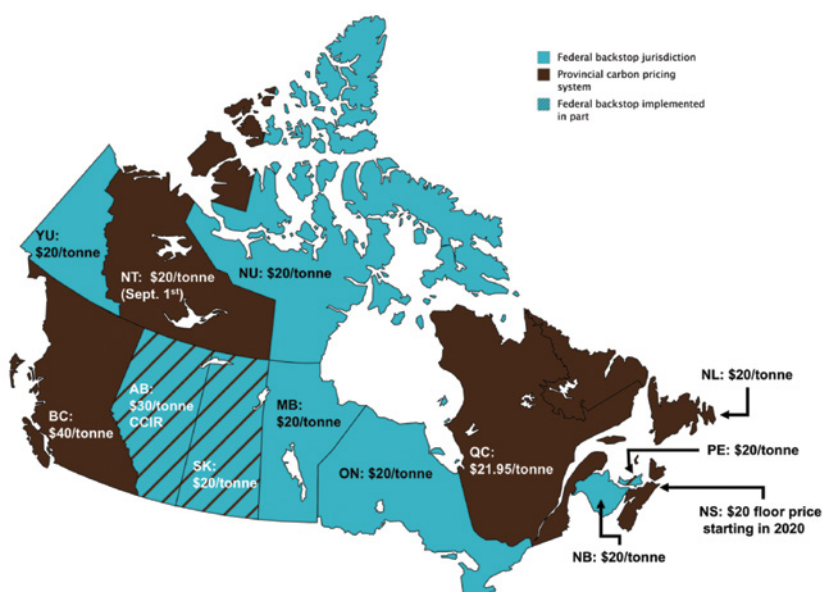
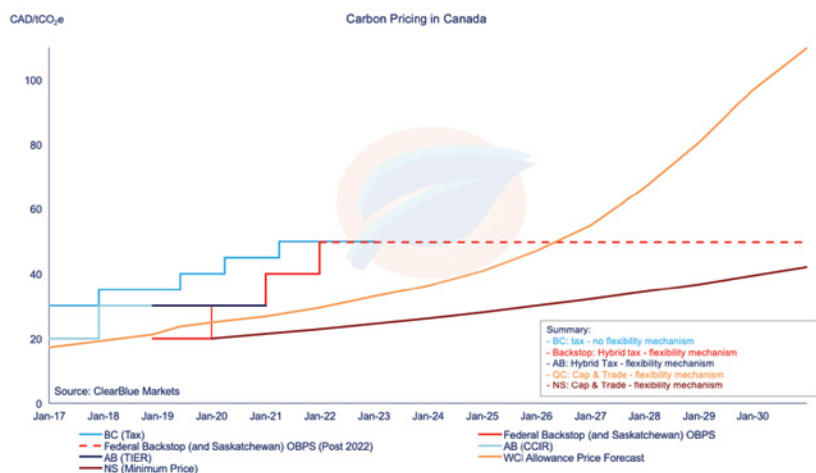


Figure 3: Carbon prices in Canada



price on the portion of their emissions that are emitted in excess of a specified limit. These emissions limits are based on Output Based Standards, calculated as a percentage of the national average of a sector's emissions per unit of production. The standards vary between sectors and are also based on emissions-intensive, trade-exposed measurements. Facilities which emit below their limit will generate surplus credits that can be sold or used for future compliance obligations. Compliance for mandatory facilities began on 1 January 2019. Industrial facilities with annual emissions of 10,000 tonnes CO₂e or higher and meet certain criteria can voluntarily participate by opting in to the OBPS.

Compliance options for covered OBPS facilities include any combination of surplus credits, offsets or paying the excess emissions charge, which mirrors the fuel charge price. Compliance units, such as offsets and surplus credits, represent a lower cost compliance option for covered

facilities. Offsets from approved existing provincial offset programmes, known as Recognized Units, can be used for compliance in the OBPS.

It is expected that credits from agriculture, waste, land use and forestry project types in the BC, Alberta and Quebec's offset programmes will be prioritised. A federal offset programme is currently being developed to increase the supply of offsets available to OBPS participants. Regulated facilities can use compliance units such as offsets and surplus credits to cover 100% of their compliance obligation in the first three compliance years. The usage limit for compliance units drops to 75% in 2022, meaning facilities would have to cover at least 25% of their compliance obligation by paying the C\$50/tonne CO₂e excess emissions charge.

The Federal Backstop is revenue neutral, meaning the proceeds will be returned to households, industry, institutions, and small- and medium-sized businesses in the

The Federal Backstop is revenue neutral, meaning the proceeds will be returned to households, industry, institutions, and small- and medium-sized businesses in the jurisdiction from which they were collected to support climate action

jurisdiction from which they were collected to support climate action.

The constitutional justification for the implementation of the Greenhouse Gas Pollution Pricing Act, which underpins the fuel charge and OBPS, is currently being challenged in court. Ontario and Saskatchewan have launched different constitutional challenges, both of which were rejected in their respective Provincial Courts of Appeal. These decisions have been appealed to the Supreme Court of Canada, with the hearings tentatively scheduled for March 2020. Alberta has also launched its own challenge and Manitoba has filed for judicial review of the programme. Quebec is an intervener in Saskatchewan's constitutional challenge to protect its cap-and-trade system. As the Liberal Party won a minority in the October election, it is expected that the Federal government will continue with the implementation of the Pan-Canadian Framework on Clean Growth and Climate Change, which includes the Federal Backstop. A programme review in 2022 will assess what areas of the backstop need to be adjusted to ensure Canada is on track to meeting its targets and determine if the price of carbon will increase above \$50/tCO₂e beyond 2022.

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RGGI: READY FOR EXPANSION

Immediately following the 5 November legislative elections in Virginia – where Democrats took control of both the House of Delegates and the Senate (there is already a Democrat in the Governor's office) for the first time in a quarter century – RGGI prices jumped \$0.10. The sudden uptick reflects market sentiment that the demise of Republican control in the state clears the way for it to join RGGI – which could happen as early as the new compliance period starting in 2021.

The state could link with RGGI using the consignment auction mechanism in their current rules – or they could re-write the rules to fully join RGGI. The current

ban on the state expending any funds to participate in RGGI, which was put into the budget at the last minute by Republicans, only covers the current budget, so should not cause any delays for the incoming Democratic majorities in both the House and Senate.

Meanwhile, 2020 will see the return of New Jersey to the north-east power emissions trading system, following its departure in 2011. Pennsylvania is also seen as a likely future participant, with Governor Tom Wolf (D) having issued an executive order in October for the state to develop a power sector ETS in line with RGGI.

Justin Johnson
- IETA

ALBERTA: A NEW TIER

Alberta's emission trading system under the Carbon Competitiveness Incentive Regulation (CCIR) remained in effect for 2019 but is anticipated to be replaced by the Technology Innovation and Emissions Reduction (TIER) framework on 1 January 2020. The re-elected Liberal government requires Alberta to meet the federal Pan-Canadian Pollution Pricing Benchmark, which sets a minimum price on carbon and scope of covered emissions. Compared to CCIR, TIER will regulate most of the same industries under revised emissions limits, based on a combination of facility-specific and sector-specific product level emission intensities. Many regulated emitters can expect their compliance obligations to reduce next year as emissions reduction benchmarks are revised to 10% below each facility's 2013 through 2015 average emissions; this compares to CCIR benchmarks based on up to 20% reductions below a sectors' 2013 through 2015 production-weighted average emissions.

The electricity sector is expected to drive the largest compliance demand under TIER; covered electricity generators will continue to have a benchmark set at the emissions intensity of Alberta's best combined-cycle natural gas-powered electricity generator (good-as-best-gas) or

0.37 tCO₂e/MWh, which will not be subject to a tightening rate. Conventional oil and gas facilities that are below the threshold may apply to opt-in to TIER and will also be eligible to aggregate multiple facilities to streamline reporting and compliance requirements.

The TIER Fund price has been set at \$30/tCO₂e to align with the federal benchmark. There has yet to be any confirmation as to whether the fund price will rise in step with the federal one to reach \$50/tCO₂e by 2022. Like CCIR, TIER will allow the same options for meeting compliance obligations. This includes reducing facility emissions, remitting Alberta-based emission offsets, Emissions Performance Credits, and/or paying into the TIER Fund.

Separately, the Government of Alberta repealed the carbon levy of \$30/tCO₂e in May 2019. The broad-based carbon levy applied to heating and transportation fuels, with large emitters under CCIR exempt from these charges. In response, the federal government has announced intentions to replace this repeal with the federal carbon levy beginning January 1, 2020.

**Chelsea Bryant, Bennett Chin
& Zach Harmer**
- ClimeCo

TCI: TACKLING TRANSPORT EMISSIONS

The nine jurisdictions working together on the Transportation and Climate Initiative (TCI), a proposal to develop a cap-and-invest programme for the transportation sector in the Mid-Atlantic and Northeast, are due to release a draft MOU for public comment in mid-December in the latest step towards finalising the programme proposal. The states and the District of Columbia have been consulting with stakeholders and the public since the release of the draft framework in late September.

Much of the programme detail has yet to be seen, although the states have confirmed that TCI will cover finished gasoline and on-road diesel.

One of the major outstanding issues to be resolved is the point of obligation

One of the major outstanding issues to be resolved is the point of obligation. The original proposal from TCI was to use EIA's 'Prime Supplier' as the point of obligation, although a number of industry stakeholders have pushed back on that approach, raising questions about efficiency, the need to create an entirely new system, and the fact that many suppliers are not 'prime suppliers', among other concerns.

TCI has been listening and it is expected that they will ultimately propose that the point of obligation be at the terminal rack in most cases – accounting for the fact that some fuel movements are terminal-to-terminal and a small amount of the fuel does not pass through a terminal in the TCI region. The obligation is expected to be a state-by state obligation rather than a single region-wide one because of legal issues around state jurisdiction and the complexities of adding or subtracting states from the programme.

While the draft MOU will have more details and will be released along with some of the modelling results that will be used to determine the cap and the stringency of the programme, there are likely to be many design features that haven't been decided. Once the draft MOU is released, TCI will take stakeholder comments on the draft before finalising it in 2020, at which point individual states will have to decide if they want to sign on to the programme. It is expected that state rulemaking processes will take most of 2021 – meaning that the earliest start date for the programme is January 2022.

Justin Johnson
- IETA

IETA AND THE VERIFIED CARBON STANDARD (VCS): CELEBRATING 12 YEARS OF PROMOTING QUALITY AND DRIVING IMPACT

The Verified Carbon Standard, which finds its roots in IETA's history, has been a mark of quality and integrity since it began. Naomi Swickard and Anne Thiel recap the standard's history and how it continues to adapt to the changing demands of the market.

WHEN IETA was launched 20 years ago, spurred by the development of the Kyoto Protocol, it was with the overarching intent of finding ways to achieve emission reductions and climate goals through market solutions.

One of the early tools for trading carbon emission allowances and carbon credits was the Clean Development Mechanism (CDM). While initially intended as a way for developed nations to meet their Kyoto targets via investments in emissions-reducing projects in developing countries, the rise of carbon trading saw private sector companies tap the mechanism to achieve carbon neutrality goals. This, however, meant that they needed a way to buy credits more efficiently for voluntary purposes. Out of this situation grew an increasing interest in developing a rigorous system for carbon offset projects similar to the CDM, but outside the UN framework and intended primarily for such voluntary purposes.

One of the early tools for trading carbon emission allowances and carbon credits was the Clean Development Mechanism

However, despite a desire by companies to ensure voluntary offsetting was credible, early approaches lacked the oversight of a standards body. When evaluating sellers and the credits they offered, companies would often rely on intermediaries they trusted or were forced to assess the quality of carbon credits themselves. As some less trustworthy project developers tried to make their way into the field, distrust of the credits they were selling grew quickly and soon most project developers who were not using the CDM were labelled “carbon cowboys” – people looking to make a quick buck without any intention of ensuring the integrity of the emissions reductions they offered.

In response, IETA, The Climate Group and the World Economic Forum launched an initiative to develop the first voluntary carbon standard. The organisations convened a team of global carbon market experts to draft the first requirements of what would become the Voluntary Carbon Standard (VCS), later renamed Verified Carbon Standard. The World Business Council for Sustainable Development (WBCSD) joined the effort soon after. The VCS was first released for public comment in 2006 and officially launched in 2007.

It immediately became one of the most frequently used standards¹ and has held this strong position throughout the years. By creating this standard, IETA planted the

seeds for a mechanism that has promoted high-quality carbon credits while also adapting to changes in market conditions and innovating to bring new project types to the market, and therefore has been instrumental in driving finance to the most impactful types of carbon projects.

A few years ago, in response to increasing demand for ambitious sustainable development and environmental standards, the organisation managing the VCS started to expand its work into new arenas, including the Sustainable Development Verified Impact Standard (SD ViSta) and in 2018 rebranded as Verra to reflect this broader scope.

WEATHERING DIFFERENT SEASONS

When the VCS was first released, voluntary carbon market activity was picking up quickly, and trading nearly doubled in 2008. However, the carbon market, like the rest of the world, was not immune to the global financial crisis, and the market experienced a slowdown as general economic activity decreased and companies cut discretionary spending. The years following the financial crisis had some ups and downs, but despite these early rocky years, standardisation continued to permeate the market, with the vast majority of credits sold to voluntary buyers adhering to third-party standards, the largest portion of which were verified under the VCS. During the 10 years the annual State of Voluntary Carbon Markets by Forest Trends' Ecosystem Marketplace has tracked market share of voluntary carbon standards (2007-

(1) https://www.forest-trends.org/wp-content/uploads/2017/06/2008_StateofVoluntaryCarbonMarket2.pdf

In the early days, the largest portion of emission reductions came from renewable energy



17), the VCS has consistently been the most commonly transacted offset project standard; from 2014 to 2016, VCS held an average of 54% of the market share.

As we near the end of 2019, the VCS and voluntary carbon markets are going strong. As of 1 October, the VCS had issued more than 83 million credits and retired more than 35 million in 2019, each representing one tonne of CO₂ equivalent – a record for the standard.

While there are various suggestions as to what's driving the increased activity – including pre-compliance purchases in anticipation of the International Civil Aviation Organization's (ICAO) Carbon Offsetting Scheme for International Aviation (CORSIA) and Internationally

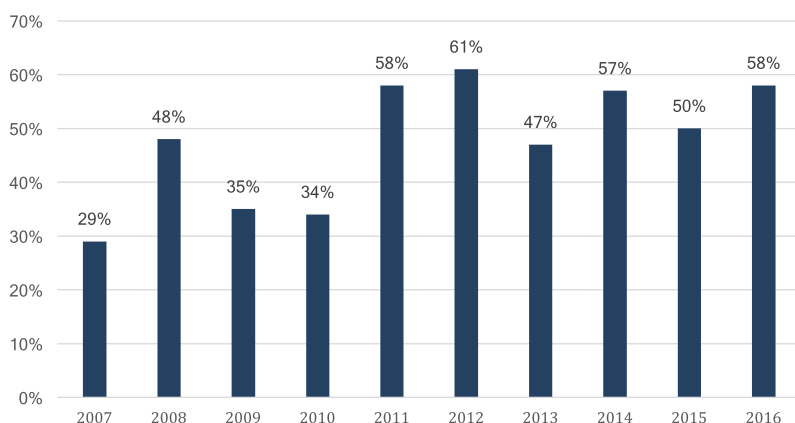
Transferred Mitigation Outcomes (ITMOs) under the Paris Agreement – a significant amount of the growth is likely a result of the voluntary market itself picking up. Climate change and mitigation options like offsetting are now covered in major news outlets every week, and most people have come to recognise that the Paris Agreement alone will not keep global warming below 1.5°C. Companies and individuals are waking up to the problem and taking action – and they see offsets as part of the solution.

Along with the overall growth in markets, there has also been a shift in the types of projects and programmes that are producing emission reductions and removals. In the early days, the largest portion of emission reductions came

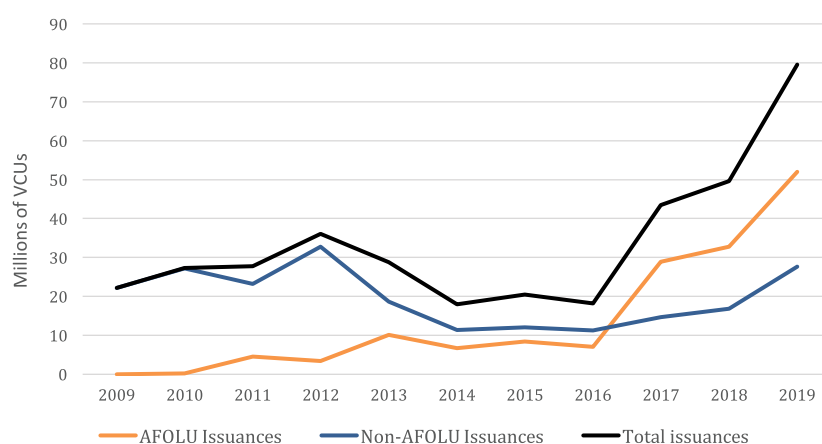
from renewable energy; in terms of land-based projects, the CDM only included afforestation/reforestation activities. The VCS, with critical backing and key inputs from IETA and its members, pioneered bringing a broad range of Agriculture, Forestry and Other Land Use (AFOLU) activities into carbon markets, including Reducing Emissions from Deforestation and Forest Degradation (REDD); Improved Forest Management (IFM); Afforestation, Reforestation and Revegetation (ARR); and Agricultural Land Management (ALM), which over the years has expanded to include grasslands, shrublands and wetlands (or “blue carbon”). Also, VCS’ innovative approach to permanence, addressed by the use of a “non-permanence risk buffer” instead of temporary credits, unlocked significant investment in land-based carbon projects.

Since 2016, offsets from land-based projects have started to outpace all other issuances under the VCS Programme. There has been an increasing realisation that these land-based activities are critical to achieving our global climate goals. Companies, governments and investors have also become more confident in the rigor and workability of these critical investments. The VCS Jurisdictional and Nested REDD+ (JNR) Program, released in 2012, has paved the way for these projects to integrate (ie, “nest”) within government-led REDD+ programmes, ensuring they complement and support government-led efforts.

VCS Market Share 2007-2016



Source: Ecosystem Marketplace State of the Voluntary Carbon Market reports



CORSIA has taken an open architecture approach, meaning programmes like the VCS that meet the Emissions Unit Criteria will be able, once approved, to provide offsets that airlines can use to meet their commitments

LOOKING AHEAD: MAXIMISING IMPACT

Adapting to changing circumstances, anticipating future opportunities, and finding ways to maximise our impact – these have always been the drivers that advance the work at Verra and in the VCS Program. We are now at a very salient point in time when quite a few exciting policy and market changes lie ahead of us.

ICAO is on the brink of approving CORSIA, paving the way for a whole new market for offsetting emissions from airline travel, with 73 member states representing 87.7% of international aviation activity having indicated that they will volunteer for the pilot and first phases of the scheme, committing to carbon-neutral growth from 2020.

CORSIA has taken an open architecture approach, meaning programmes like the VCS that meet the Emissions Unit Criteria (EUC) will be able, once approved, to provide offsets that airlines can use to meet their commitments. Verra is developing updated JNR rules and guidance, including ways to support projects to become nested in emerging national or subnational REDD+ programmes, which will give both

projects and programmes a better chance of being able to participate in this new market, assuming the VCS is approved. In addition, we are seeing the development of domestic compliance markets around the world that are drawing on the capacity and infrastructure created under the VCS. For instance, Colombia levied a tax on fossil fuel distributors that can be paid instead by retiring a Verified Carbon Unit issued by the VCS. A similar tax provision will be in place in South Africa next year.

With the Paris Agreement coming into force, Verra is participating in the IETA- and ICROA-led discussions focused on addressing the interaction between the voluntary carbon market and post-2020 accounting frameworks that will exist under the Paris Agreement (and other mechanisms), particularly in light of the ongoing Article 6 negotiations. This collaboration aims to ensure that voluntary action continues to drive significant finance towards robust, additional climate action around the world.

Version 4 of the VCS seeks to achieve the same objectives. One of the most important changes in this recently released version is the fact that grid-connected renewable

energy projects in non-least developed countries will be excluded, as these project types have in many cases moved beyond the need to rely on carbon instruments as a source of critical, early-stage finance. As a result, this revision will ensure that carbon finance targets those activities most in need of it.

In addition, Verra has also expanded its scope to focus more broadly on environmental sustainability, in recognition of the fact that climate action and global sustainability issues go hand in hand. That scope expansion has led to the development and recent release of a standard to assess projects' advancement of the Sustainable Development Goals (the Sustainable Development Verified Impact Standard) and is driving the current development of other new standards, such as an assessment framework for landscape sustainability and a plastic crediting mechanism. Behind this change is the realisation that unless we view – and tackle – global sustainability challenges, we run the risk of, in the words of Michael Mann, “playing checkers when nature is playing three-dimensional chess.”

Anne Thiel, Communications Manager
Anne is responsible for managing and implementing Verra's communications strategy, ensuring effective ongoing outreach to our stakeholders while also supporting Verra's programs and telling the stories of how they are making a difference. She oversees the production of outreach and marketing materials for the organization, conducts social media outreach, and is the point person for media inquiries.

Prior to joining Verra, Anne was the Communications Manager at Forest Trends, a DC-based international NGO focused on developing and promoting economic incentives for conservation where she managed all outreach activities.

Naomi Swickard, Chief Market Development Officer
Naomi is responsible for ensuring continued and growing uptake of Verra standards. She also provides strategic input to the ongoing development of standards frameworks including the Landscape Standard, a new initiative which provides outcome-based metrics for assessing sustainable production at the landscape scale.



Over the past
20 years, IETA
has asserted
itself time again
as the leading
voice of business
on carbon markets





With increasing attention on nature-based solutions to climate change, Chandler Van Voorhis explains the different types of forestry projects and outlines an innovative approach to put nature on the balance sheet.

WE COULD GO carbon neutral across the world's built environment tomorrow and still have a climate, water, and biodiversity problem. Swapping out emitting sources for lower-emitting ones like wind and solar (yes, there are carbon emissions associated with renewable energy) is being less bad going forward. Renewable energy and efficiency do absolutely nothing to address what is up in the atmosphere now. Enter nature.

It is time to think of trees, grasses, and soil as a technology – nature's technology. We need both human's technology and ingenuity, coupled with the genius of nature deployed on scale. One repairs the past, and the other lessens the impact going forward.

Even with forestry, there are important distinctions. Think of it in terms of sport: Reducing Emissions from Deforestation and Degradation (REDD) is like playing goal-line defense, while Improved Forest Management (IFM) is more like an attacking defense and Afforestation and Reforestation (A/R) is pure offense. To win, we need all three!

It is time to think of trees, grasses, and soil as a technology – nature's technology

REDD has received the most attention on the global stage, partly as a way to get various countries to the negotiating table. However, REDD's future might not be best as a carbon credit but rather as part of a global insurance reserve. In carbon markets, forestry projects undergo a risk buffer analysis during the verification process and a percentage of credits must be taken off the issuance to contribute to the registry buffer. Nature-based investments have long investment cycles, and the buffer concept complicates the investment. Better to buy an insurance wrap and keep the credits.

Working with various global reinsurers, the main issue with providing an alternative to self-insurance has been the lack of a backstop. What if REDD projects could use federal and sovereign lands as a backstop, building capacity, and efficiency in the global system? So instead of REDD being a commodity, it would receive an annual premium paid for by projects throughout the world.

Around 2008, our firm, ACRE Investment Management (ACRE), looked at this very issue with a leading bank. The US Federal Government has 75 million acres of Class III lands (lands with high degree of fire risk); note the issue of wildfires over the last several years in the US. The proposal was to create a Fuels Trust that, under the Healthy Forest Initiative, would turn the firefighting component of the US Forest Service into mandatory expenditures to which the Bank would write a bond against

to front-load the fuel treatment of the lands. By reducing risk and putting the stand back into productive growing conditions, the carbon would flow into a reserve that the industry could use as a backstop to insurance coverage. We called this The US Federal Carbon Reserve. But, like many things in Washington, DC, timing and arguing where the dollars would go (general treasury vs. agency) killed a logical step to creating real change. Now is the time to revisit the role of insurance in nature-based solutions. Not everything needs to be a commodity, and REDD has the greatest opportunity to create a backstop, becoming the world's goal-line defense!

IFM has emerged as a leading way to aggressively go on the defensive. Because one does not need to create the forest – IFM has the advantage of being able to be deployed rapidly and in short investible time frames. For example, more than 96% of all California ARB forestry volume has come from IFM projects.

But, to play offense, we need to go beyond the forest assets that are here today. We need to reforest! After all, according to the IPCC, one-third of all the emissions since 1750 have come from land-use change, predominately deforestation. Reforestation cleans the air, purifies water, and provides critical habitat. Unlike REDD or IFM, where someone else established the trees, reforestation is totally different. In order to produce carbon credits with reforestation, you must create the forest first. This



Our problems with climate change are as much structural as they are real

fundamental difference, along with an inverted yield curve, is the principal reason why reforestation is in a different asset class.

Like all biological forms, trees go through a maturation process that looks like an S Curve of growth. With IFM or REDD investments, given the stands are mature, all that is needed to create the carbon is determine where to start counting. Establishing a baseline is much easier than having to first create the forest. Again, we need all three. The point is to draw the distinctions.

Despite these challenges, reforestation remains the most scalable, deployable, lowest cost technology for removing carbon from the atmosphere. Most technologies fail getting to scale. If we remove human ego from the equation, we will start to understand the genius of nature. Trees are scale. People in all parts of the world know how to plant trees. What we need is the vehicle and the alignment of incentives to do it.

When we take all the above technological approach — man's ingenuity coupled with nature's genius

— we start to draw new linkages and networked solutions. For example, if we deployed blockchain as a means to tie the transactional marketplace to the biological work, how would this speed up the velocity of repairing the past? If we started to incorporate carbon intensity with currency valuations or how nations' GDP is determined, what effects would these structural and modifications have on how natural capital is incorporated on the balance sheet?

Our problems with climate change are as much structural as they are real. The man-made structures of yesteryear are binding our hands today. We need to think outside of the box, and sometimes the key to thinking big is thinking small first. While much attention has been focused on national or international frameworks, ACRE has been helping to pioneer a revolutionary structure at the local level.

There are two principal ways to scale: vertical and horizontal. Most scaling exercises are focused on the former.

In the US, it is essential to realise that the federal government and state governments tax income or velocity, whereas the counties tax the stored wealth in property. Since World War II, the gap between the velocity of the economy versus the appreciated gain of wealth stored in property has widened, just as the unfunded mandates have been kicked from Washington to the state capitals and down to the county. This has created intense

pressure on counties with limited tools, other than more development and raising property values. Roughly 70% of the income a county receives from taxes goes to funding its share of public education. The county public school's next most significant source of funds comes from the state and a smaller slice from the federal government.

In Virginia, the way the state government determines which county gets what is through a composite index — 50% the real estate value in the county, 40% the gross receipts, and 10% population. However, many counties employ land use-value taxation. By taxing the use-value, farms are not forced to sell to developers. While development can create short term revenue, the long tail from growth can be very costly for counties.

Instead of getting caught in this vicious trap, what we have done in Virginia is to create an economic engine for the county and the landowners. Because Virginia is a Dillion Rule state, which means counties have no more power than is expressly granted to it by the state, state legislators, in the last session, amended the Industrial Development Act, which is the underlying authority that allows counties to spawn Economic Development Authorities (EDAs), which have broad power. But we needed it to give specific authority to aggregate landowners for forestry and agriculture for the purpose of accessing carbon markets.

It is essential to realise that carbon is rooted in property. So, as the EDA aggregates landowners (forest and agriculture) to transact with multinational buyers, a portion of the revenue will go to the county and a portion to the landowners. For the county, this stream of income can help with the deferred taxes that have accumulated between the land-use and real estate difference. For the landowner, they now have carbon income annually that

We are on the frontier of putting natural capital on the balance sheet of counties in a profound way

can help with the carrying costs of the property. Additionally, because many of the buyers are multinational corporations with credit ratings and counties have credit ratings, the opportunity to securitise the revenue stream is present. Such securitisation can help front-load income to other infrastructure needs in the county. Carbon rooted in real property and commoditised through carbon markets can generate wealth without causing more built infrastructure needs. This is revolutionary, and we are seeing how scale happens horizontally across the landscape. With the law passed, we are standing up the first EDA and are working with other states to mimic what Virginia has done. We are on the frontier of putting natural capital on the balance sheet of counties in a profound way.

There is a lot in the wind of change that is being floated in conversations in the nature-based solutions community. The numbers are huge — for example, \$100 billion per year and up. This would be an unleashing for the ideas above and many more. It is time to think big and new.

Chandler Van Voorhis is the Co-Founder and Managing Partner of ACRE Investment Management, LLC, whose GreenTrees' platform is the world's leading carbon reforestation project by credit issuance.





**Trading and
natural solutions
could support
nearly a doubling
of climate ambition
by 2030**



10

CAN ARTICLE 6 BENEFIT AFRICAN COUNTRIES?

Mandy Rambharos takes a look at the impact Article 6 could have on African nations and their development goals – driven by a need to ensure access to energy.

THE AFRICAN UNION'S Agenda 2063¹ eloquently articulates the shared desires and aspirations for a sustainable and prosperous continent. Prosperity is elaborated, among others, as an environment with ecosystems that are healthy and preserved, with climate resilient economies and communities. The means to achieve this kind of development lies in cooperation domestically, regionally and internationally. Article 6 of the Paris Agreement suggests this kind of cooperation as a means to promote sustainable development, among other benefits.

Although some African countries have experienced economic growth in the last few years, international investment has largely slowed in most countries. For this majority, the lack of economic growth has stagnated job creation, leading to large unemployment numbers. Further, access to sustainable energy remains a significant challenge. The energy predicament is elaborated in the World Energy Council's 2018 Trilemma report², which states that the sub-Saharan region continues to be greatly challenged in all three aspects of the energy trilemma³ due to large infrastructure gaps.

The existing stock of power infrastructure is also suffering from inefficiencies and insufficient quality of supply to support growing energy demand. Access to sustainable energy is key to unlocking investment and sustainable development on the continent. Through the cooperation already alluded to, Article 6 could play a pivotal role in this regard.

Often carbon markets are linked only to mitigation and emissions reductions; the argument being that we price carbon purely to drive reductions and that sustainable development is merely a co-benefit. However, there is a broader narrative that says that we price carbon for sustainable development itself: not as an add-on benefit, but to drive development that is sustainable.

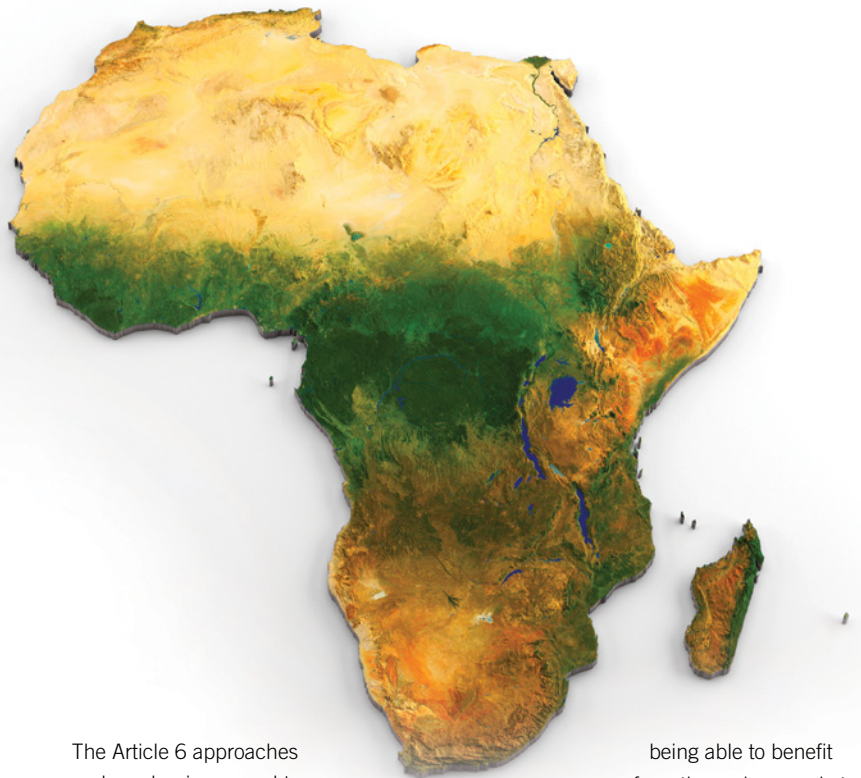
The WEC Trilemma report goes on to say that to unlock Africa's resource potential and meet future energy demand, the region must take bold and more collaborative actions to attract investment by improving energy policies and the regulatory framework, building institutional capacity and improving its on-grid and off-grid energy supply. Linking carbon markets to sustainable development is just the kind of bold, collaborative thinking that is required to unlock this vast potential.

For example, an Article 6 approach could promote the development of solar microgrid projects between countries in the different African regions. If this approach includes an option for part ownership of the plant by a community and part ownership by the developers, this will increase the attractiveness for the community to contribute to their development (and contribute to the country's NDC) while the developer receives a portion of the carbon credit benefit. This type of project also lends itself to increased job creation.

Further, the microgrid plant would be built according to thresholds that will withstand extreme climate events predicted for those areas, thereby reducing the vulnerability of the community to events that could otherwise result in the loss of electricity and the knock on impacts of loss of income. In other words, such an initiative would be using an Article 6 approach to create climate resilient economies and communities.

There is a myriad of such projects, which include international cooperation and investment with clear sustainable development benefit that could be unlocked by a well-designed carbon market approach. Indeed, many African countries make reference to market mechanisms in their Paris Agreement contributions, in order to assist them in both the implementation of their NDCs and the sustainable transformation of their economies.

African countries are interested in Article 6 approaches and mechanisms if they function in a practical, inclusive and equitable manner



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However, African countries are interested in Article 6 approaches and mechanisms if they function in a practical, inclusive and equitable manner. These criteria are enablers for the relevance of Article 6 in African countries especially given the experience with the CDM where African countries did not benefit as much as they could have had the design been more equitable.⁴ The CDM, although ground-breaking with important lessons, simply did not suit all country contexts. African countries have minimal emissions which were not attractive for investors looking for large projects to generate significant carbon credits. The changes to the CDM offerings to include programmatic approaches and standardised baselines addressed this to some extent, but it could be argued they came too late in the game for Africa to benefit.

The Article 6 approaches and mechanisms need to be accessible and meet real sustainable development needs to be beneficial to African countries.

The reality of current circumstances is that most African countries do not have the resources to develop new systems in the short term. Current systems and structures that support carbon market transactions are those that carbon market systems and infrastructure were developed for the CDM, so it stands to reason that the Article 6 requirements must look at using current architecture where relevant, albeit with tweaks and adjustments.

From a philosophical perspective, there must also be a balance between the requirements for the cooperative approaches outlined in Article 6, paragraph 2 and the mechanism in paragraph 4. In reality, countries without the resources to implement their NDCs in the short to medium term are more likely to participate through the Article 6.4 mechanism. Placing more onerous requirements on 6.4 compared to 6.2 could compromise the turnaround time of activities linked to the former compared to the latter, leading to African countries again not

being able to benefit from the carbon market compared to those countries with the means to implement 6.2 activities. Given that both 6.2 and 6.4 are serviced by the same (suppressed) demand, this is a genuine concern. This does not mean that both 6.2 and 6.4 must come with onerous requirements; rather it means that the design of both must be equally practical and implementable without compromising environmental integrity.

The aspiration of African countries is sustainable development underpinned, in many cases, by access to sustainable energy. The aspiration for Article 6 is for cooperation that will allow for higher ambition in mitigation and adaptation actions and to promote sustainable development and environmental integrity. The parallels are striking, but cannot be realised until the operationalisation of Article 6 is agreed to the satisfaction of all. This is a daunting ask but one to which African countries are working hard to make a positive contribution.

Mandy Rambharos is Climate Change and Sustainable Development Manager at Eskom and is writing in her personal capacity. The views expressed herein do not represent the views of Eskom Holdings, the Government of South Africa or the African Group of Negotiators to the UNFCCC.

(1) African Union Agenda 2063 www.au.int (2) World Energy Council 2018 Trilemma Report (3) Defined as: energy security, energy equity, and environmental sustainability. (4) Greiner, S, Chagas, T, Krämer N, Diagne El Hadji Mbaye – Article 6 options paper

11

PILOTING FOR POST 2020 CARBON MARKETS

Preparations for the next generation of carbon markets are underway, as there is no time to waste. Virender Kumar Duggal outlines how an initiative by the Asian Development Bank is helping countries in the region prepare for what's next.

ARTICLE 6 of the Paris Agreement lays the foundation for post-2020 carbon markets by enabling countries to use mitigation outcomes from others toward their Nationally Determined Contributions (NDCs). The bottom-up ethos of the Paris Agreement is reflected in Article 6.2, which provides a framework for bilaterally or multilaterally developed cooperative approaches. Article 6.4, by contrast, provides for a centrally governed mechanism for mitigation and sustainable development.

The establishment of two routes to use carbon markets was deliberate, to provide alternatives for countries when implementing their respective NDCs, and to make it possible for countries to design and select carbon market instruments to fit specific conditions.

Countries will need access to a selection of effective instruments to implement the Paris Agreement

Many countries have indicated that they plan to use international carbon markets to support the implementation of their NDCs, including 26¹ of the Asian Development Bank's (ADB) developing member countries (DMCs) in Asia and the Pacific. The objectives for engaging with international carbon markets will differ between countries, and they can use Article 6 strategically to complement, accomplish and enhance their domestic mitigation policy objectives. Self-determination and alignment with national priorities is a key part of the Paris Agreement's bottom-up approach, and the potential ways in which countries will use Article 6 could be very different. For example, for some countries it is one instrument to achieve a conditional NDC target, for others it is about being able to link emissions trading systems or being able to offer an overachievement – ie, an emissions reduction – to the market.

In the coming months, the implementation of the Paris Agreement will be high on every country's agenda, with the first ratcheting up of NDCs required by 2020. Countries will need access to a selection of effective instruments to implement the Paris Agreement, some of which will be developed domestically, others internationally with support from climate finance, and under the framework of Article 6. These instruments, tools, or

mechanisms, need to be elaborated, tested, proven, regularly reviewed and improved for ensuring their effectiveness and credibility.

GETTING READY FOR A NEW GLOBAL CARBON MARKET

Although Parties are yet to finalise the international regulatory framework, actors from government and the private sector can engage in pilot activities that will give them essential on-the-ground experience as part of these preparations. Pilot activities can contribute to the development and road-testing of alternative approaches for many of the elements of Article 6, in particular for those aspects of market-based cooperation that are new under the Paris Agreement as compared to the Kyoto Protocol.

Pilot activities will also bring about much needed capacity in participating countries to explore a broader scope for mitigation approaches, contribute to the development of international rules through practical insights, and serve as a proof of concept by demonstrating how Article 6 can deliver mitigation through international cooperation. They will also help to develop, test, and implement tools that can enhance the ambition and effectiveness of climate action.²

In early 2019, the ADB launched the Article 6 Support Facility (A6SF) under its Carbon Market Program to contribute to this process.³ A6SF is a \$4 million facility funded by the ADB, the Government

(1) UN Economic and Social Commission for Asia and the Pacific. 2017. Responding to the Climate Change Challenge in Asia and the Pacific: Achieving the Nationally Determined Contributions (NDCs). Bangkok. (2) ADB, 2018, Article 6 of the Paris Agreement Piloting for Enhanced Readiness, Manila <https://www.adb.org/sites/default/files/publication/469851/article-6-paris-agreement.pdf> (3) <https://www.adb.org/projects/50404-001/main> (4) A Guidebook for Pilot Activities under Article 6 is currently being prepared under the A6SF. (5) Further details can be found in ADB publication "Decoding Article 6 of the Paris Agreement, <https://www.adb.org/publications/decoding-article-6-paris-agreement>



Pilot activities can contribute to the development and road-testing of alternative approaches for many of the elements of Article 6

of Germany, and the Swedish Energy Agency, to provide technical, capacity building and policy development support to ADB's DMCs. A6SF is supporting DMCs to identify, develop, and pilot mitigation actions and will provide support to help DMCs set up institutional arrangements to facilitate their participation in post 2020 carbon markets. Through A6SF, ADB will encourage innovation in the development of mitigation actions, contribute to achieving a critical mass of expertise, draw lessons from pilot activities, and enhance the ability of DMCs to contribute to international negotiations and their preparedness to operationalise Article 6.

The importance of contributing to the realisation of mitigation opportunities in Asia and the Pacific is obvious. Strong economic growth means the region is responsible for a significant share of global emissions, and this share is growing. All instruments possible will be required to shift to a low-carbon development path. Being the region that historically attracted the main share of CDM projects, and is now showing leadership in carbon pricing through emissions trading schemes (Kazakhstan, PR China, Republic of Korea, Tokyo) and carbon tax initiatives

(Singapore), Asia and the Pacific has an opportunity to be a leader in using market-based instruments to mitigate climate change.

WHAT TO EXPECT

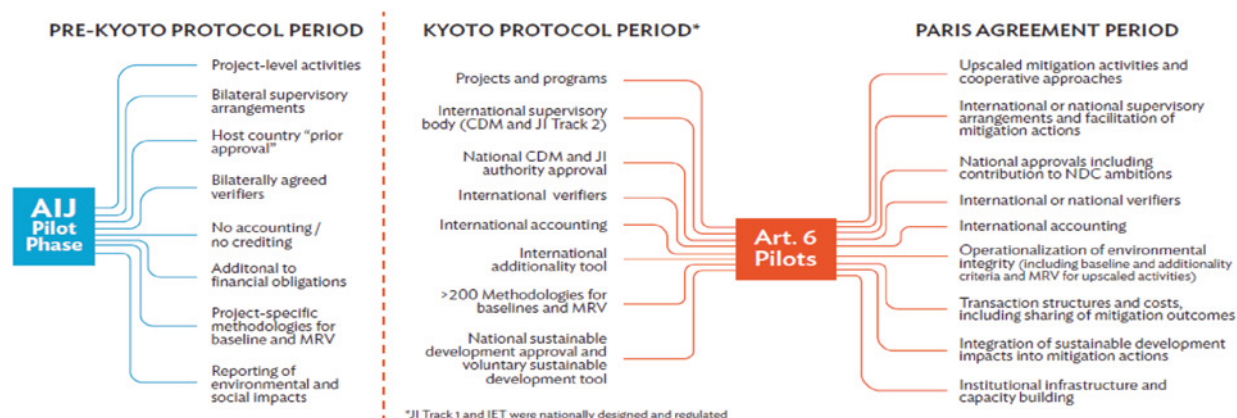
ADB is working with its DMCs to understand their approaches to Article 6, and to ensure that piloting of Article 6 activities will contribute to enhanced capacity to use markets. The DMCs will decide on the type of support they need, and the role of A6SF will be to provide support and to ensure that the experience and knowledge gained is transferred to a wider audience. The starting point for engaging with a DMC is developing a more detailed understanding of its plans for NDC implementation, and A6SF will work with DMCs to encourage them to take a strategic approach to Article 6. There could be many building blocks in such a strategy and the approach may vary depending on national circumstances and priorities.

The A6SF is a facilitator and knowledge provider and, to some extent, it will be an instigator. The realities of policy and regulatory development, national capacity development and the need to secure investments, implies that the A6SF will

mainly work with two approaches to piloting. On the one hand, there will be testing of implementation of Article 6 provisions and their national interpretations on mitigation activities already in a pipeline of activities. This can still mean that the activities go beyond existing NDCs by speeding up, broadening, or deepening emission reductions. On the other hand, there will be development of concepts and virtual pilots that at some point during the 2020-30 period may result in emission reductions and lead to the creation of ITMOs. A6SF can, through capacity-building and policy development support, contribute to the design and preparation of the types of activities that will require a longer time for planning and implementation, including activities that will be based on policy interventions and have a sectoral or sub-sectoral scope. As part of this it will be critical that A6SF provides practical guidance on how to design and implement pilot activities.⁴ What is essential for A6SF is that practical lessons are learned about what works and what doesn't, that these are shared widely, and that they help with a prompt start for Article 6 after 2020.

Market-based approaches under Article 6 include new elements that were not part of the Kyoto mechanisms. Under Article 6, up-scaling of mitigation activities is a key issue, as is the role of the host country and its decision processes. MRV, data collection, accreditation, and the overall emission impact of the activity (relevant to the NDC) will now also need to be

Learning by Doing: Testing the New using Experience of the Past



AIJ = Activities Implemented Jointly, CDM = Clean Development Mechanism, IET = International Emissions Trading, JI = joint implementation, MRV = Monitoring, Reporting and Verification, NDC = nationally determined contribution.
Source: Author.

The importance of contributing to the realisation of mitigation opportunities in Asia and the Pacific is obvious

considered on the national level and alternate approaches for how this will work need to be explored.⁵ The process for creating the ITMOs also needs to be tested, including what the actual tradeable unit representing the emission reductions may be (ie, the carbon credit). Beyond the national level, ways to engage and models for cooperative approaches need to be tested.

The mitigation action that is the basis of the pilot activity is also a critical consideration. It could range from projects and programmes to mitigation policy instruments. It should most likely not be a completely new type of mitigation action, which would require a significant amount of work to manage from a technical point of view and become the focus of the pilot activity. Rather, it should be something that is understood well enough and is not the central focus of the pilot activity.

Pilot activities under Article 6 can build on a wealth of experience from the Kyoto

Protocol mechanisms while testing new concepts and elements. One may recall that piloting was also undertaken under Activities Implemented Jointly (AIJ) as the forerunner to the Kyoto Protocol mechanisms. However, as reflected in the diagram below, the approaches piloted under AIJ were relatively simpler. In the AIJ pilot phase, there was more focus on the types of projects that could be relevant for the Kyoto mechanisms and the methodologies relating to those project categories. Piloting tended to follow the bottom-up process that was the eventual model of the mechanisms, with baseline and monitoring methodologies developed by activity implementers and then submitted for approval.

On the Paris Agreement, several key issues, both at the political and technical level, have not yet been resolved in the climate change negotiations and this will affect countries' ability to fully develop plans for Article 6 implementation. However, it does not mean that countries cannot implement

pilot activities and learn lessons on how to best use and take advantage of carbon markets under Article 6. The fact that the rules and guidance for Article 6 have not yet been resolved makes the role of piloting even more critical. By supporting pilot activities, global and regional institutions such as ADB can help countries build experience and understanding relating to the practical implementation of Article 6 despite the uncertainty. Article 6 is complex, and pilots need to be diverse. Stakeholders' understanding needs to be expanded beyond what was needed for the Kyoto mechanisms, through testing different cooperative approaches, and the processes and procedures for them.

The Asia Pacific region is expected to play a critical role in the implementation of Article 6, contribute to enhanced ambition and achieving the objectives of the Paris Agreement. In this context, piloting a wide range of mitigation actions will play a critical role to enhance preparedness to participate in and take advantage of new carbon markets under the realm of Article 6 of the Paris Agreement.

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12

WHICH WAY UP?

It's been a volatile time in the world's oldest carbon market. Jahn Olsen analyses what's driving EU ETS prices and where things could end up as Phase III nears the end.

YOU CAN'T accuse the EU ETS of being boring at the moment. Prices are volatile and seemingly no longer connected to fundamentals, which is worrying industrials, utilities, traders and speculators in equal measure. It seems a near-certainty that the market will be tight in the long term, but the build-up of a cache of EUAs and shorter-term risks mean the market could remain erratic for a while.

The price of European emission allowances has had a bit of a wobble after almost 18

You can't accuse the EU ETS of being boring at the moment

months of gains and new 10-year highs. We expect volatility to be high through this year amid internal and external uncertainties. This has already been reflected in price movements. The first three months of 2019 saw prices as high as €25.31/tonne and as low as €18.80. The range of different forecasts and statements on the EU ETS underpins this year's uncertainty.

In our base case, BloombergNEF expects an average price of €25.10 for 2019, with a year-end range between €23.50 and €26. The price is expected to slowly rise to €27 in 1Q 2020 due to an increased need for fuel-switching next year. There might also be some panic buying as we near 2019 compliance as this will be the

first compliance year where the MSR has reduced auction volume. Brexit remains the biggest risk over the next few months, but the price could also be moved by an unusually mild or cold winter and supply disruptions in the gas market – particularly if gas transit through Ukraine takes a hit.

To further complicate the picture, correlations with 'traditional' indicators such as energy commodities are erratic, making it difficult to predict where prices will go next. With this in mind, it is clear that there is a need to look at factors outside of energy market fundamentals to understand what has happened, and what will happen in 2019.

THE YEAR SO FAR

Price movements this year have been triggered more by events and risks rather than fundamentals. Conversations with traders and other sources have led us to believe that the January-February dip was started by a sell-off from one or more skittish speculators who had suffered a bad start to the year. The price then recovered in February-March as buyers with a more bullish view saw the comparatively low price as an opportunity.

Carbon has been trading in the €24-30 range since the start of the summer. As expected, it has been volatile with multi-euro movements in single day – primarily due to Brexit developments or unexpected speculative sell-offs and outages in the power sector.

Figure 1: 2019 historical price and short-term EUA outlook



Source: ICE, BloombergNEF. Note: Only includes prices at the end of trading days.

(Note that BNEF does not provide investment advice on carbon or anything else. Investors should decide for themselves whether current prices discount all the relevant factors or not.)

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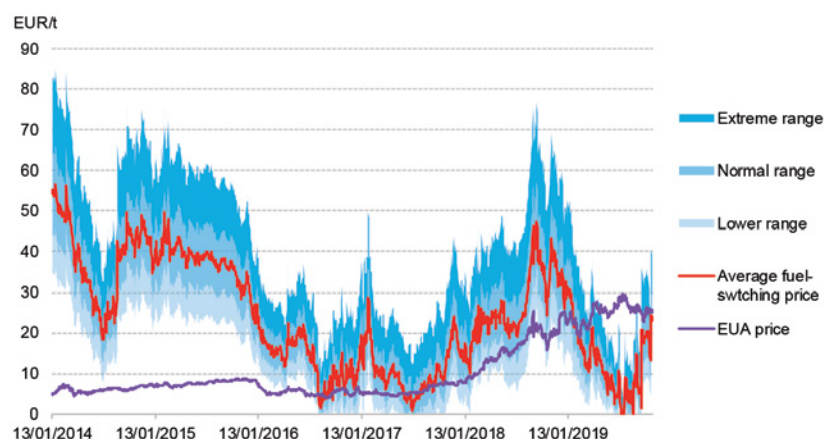
VOLATILITY

It seems almost inevitable that the price of carbon will be volatile in 2019 and 2020. The market will be short on an annual basis, but there is still enough surplus in the system for compliance. The concern is that most of those permits are held by utilities for hedging purposes and buy-and-hold financial institutions with a multi-year horizon. In addition, allowances held by compliance entities might be held by players unwilling to sell, such as nervous industrials that decide to stockpile, fearing further price increases in the future. If all over-allocated companies decide to hold on to their surpluses, short participants will have to scramble to avoid paying a fine of €100 for every tonne of CO₂e. In that case, they would likely either have to reduce their output (which for some risks carbon leakage) or enter a bidding war with other companies in the same situation. Reducing emissions without cutting output is not an option for most industrial installations in 2019. Our view is that less industrial selling could lead to higher prices and dramatically increase the probability of price spikes. EUAs could even spike to €40 or above if companies with surplus allowances decide to hold on to them – assuming no selling from speculators or utilities, or intervention from the European Commission. It is possible that the Commission would intervene by adding more supply if the price moves too much too fast. The EU wants a market with a high enough price to drive abatement, but it would be counterproductive if the price gets so high that it hurts European industry by driving production to regions with higher emissions permitted per unit produced – or even no carbon constraints.

RISKS

A no-deal Brexit remains the most immediate risk, but the date has been moved once more, to 31 January 2020. It is unclear if UK installations have to hand

Figure 2: EUA price and North-West Europe fuel-switching range



Source: BloombergNEF

in allowances to cover 2019 emissions as the new deadline is too early for the EU to enforce compliance if the UK leaves the bloc at the current target date. There are two likely Brexit scenarios for the EU ETS. If there is a no-deal Brexit, the UK will crash out of the market. In this case, companies in the country would not have to hand in allowances and there would be no additional EUA issuance or auctions taking place. This could be extremely bearish. The EU ETS usually takes a hit whenever something is seen to negatively impact the stability of the EU. There would also be a sell-off from UK utilities and industrial companies, which BloombergNEF understands have kept buying EUAs to cover their emissions, albeit with a shorter-than-normal hedging horizon. The other outcome is that the UK leaves the bloc with a deal, keeping the country in the EU ETS. In this case, UK allowances would be issued and auctioned over the first half of the year, and British companies would be obligated to surrender allowances in April 2020. The impact of the extra supply would likely be outstripped by increased hedging demand from UK utilities and positive sentiment, making this scenario slightly bullish.

There is an outside chance that UK companies will be exempt from surrendering allowances for 2019 emissions if there is a further extension in the Brexit saga.

Other factors could also impact the carbon price. We expect increasing volumes of LNG to enter the European market as

North Asian gas (JKM) is now trading at a discount to Central European gas (TTF), when discounted for shipping. Low natural gas storage led to an extremely tight 2018 for the European gas market. That has changed. A loose natural gas market and lower prices means there will be increased fuel switching in Europe at lower carbon prices. We expect this to lower emissions by around 50 Mt in 2019 almost irrespective of the carbon price, counteracting some of the impact the market stability reserve will have in the short term.

Gas storage was high as we entered withdrawal season, and we expect the price to remain low through the winter, unless the aforementioned cold weather or supply disruptions take place. That makes it likely that we will continue to see significant fuel-switching below or around €30 euros per metric tonne.

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