Carbon Markets Almanac 2016

Global Developments & Outlook

An ICIS Publication

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Foreword Carbon Markets Almanac 2016

Global emissions continue to increase, and the expected growth of the world population is not hinting at a change of course. However, the last year saw some very positive signals on limiting global emissions: China will soon roll out a national ETS, the US is discussing - with the Clean Power Plan - ultimately a national carbon market, and countries such as South Korea and New Zealand continue to strengthen their local carbon markets. In parallel, the COP21 in Paris brought the international community together to agree on tackling a truly global challenge: climate change.

In recent years, emissions trading has become the go-to measure to achieve ambitious greenhouse gas emission reductions. We at ICIS believe that a combination of smart regulation and transparent markets are key to deliver a transformation of our energy usage. In this spirit, we are publishing our third edition of the Global Carbon Markets Almanac, which is designed to provide a complete overview of trading in key carbon markets. Our analysts and journalists around the world have been supporting companies and governments for years to navigate the world of emissions trading. This publication is built on their extensive experience, data and network.

I am particularly pleased to thank our high level external authors who contributed greatly to this Almanac. I am convinced that continuing to learn from each other and share our experiences globally is key. By doing so, we will be able to improve the market mechanisms at our disposal to reduce greenhouse gas emissions and transform our energy usage, and eventually move toward a more sustainable low carbon society.

Rob Kolkman
Managing Director, ICIS

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Price management in emissions trading systems

The success of emissions trading systems has recently been determined according to its price levels: A carbon market with low prices is deemed toothless, while markets with expensive emission rights are praised as having a meaningful impact. This misperception has triggered a focus on price management, and all markets except the EU ETS have incorporated price management in its rules.

This article leaves it to others to discuss the advantages and pitfalls of price management against a fully free market, but will instead focus on the different mechanisms around the world. In almost all carbon markets globally, price management is a mix of a minimum price, and some kind of maximum price.

The minimum price

In a freely traded market, it is difficult to establish a minimum price by law, as this conflicts with basic rights of western commercial standards. So while politicians cannot control trades between third parties, they can set a price below which the regulator is not willing to sell allowances into the market during auctions. If the share of allowances that are auctioned from the cap is high enough, so that the auction volume is needed to balance the market, this minimum price in auctions effectively constitutes a floor price – even though market participants could trade below this price.

The North American carbon markets RGGI, California and Quebec all use the concept with slight variations. More than 50% of the allowances are auctioned each year, so the auction volume is certainly needed to balance the market. Every auction has its individual minimum price which is calculated based on a fixed initial floor price, and an annual increment based on a pre-defined formula (see Table 1). If not enough bids are received at or above the auction's floor price, the auction clears only partially and the allowances left over are either transferred to a reserve or completely deleted.

In China, things are a little different: In the current seven pilot carbon markets, the exchange operates the registry and handles all transactions in the market. Currently, all pilot ETSs set price limits for both exchange-traded and OTC transactions. The auctions are also conducted by the exchange, which are therefore controlling all trading activities. In the Guangdong market, the only pilot scheme which has regular auctions, the government has now established a floor price for every quarterly auction, which is 80% of weighted average price of the past 3 months (not taking into account transfer agreement trades). Besides that, the Beijing ETS is the only one that has a price control mechanism. Simply speaking, the local system administrator BJ DRC will auction its reserve if allowance prices go above CNY150 for 10 consecutive trading days; and it will buy back extra allowances from the market if the price falls below CNY20 for 10 consecutive trading days. It is so far unclear if and how the national ETS will establish a floor price, but ICIS expects that the NDRC will set a price limit and establish an allowance reserve for market adjustment.

In the EU ETS, there is no similar floor price. The daily auctions have an undisclosed minimum price which triggers the termination of the auction if the clearing price is below the minimum price; however, this is a mechanism to ensure that the auction clears in line with recent market prices.

The maximum price

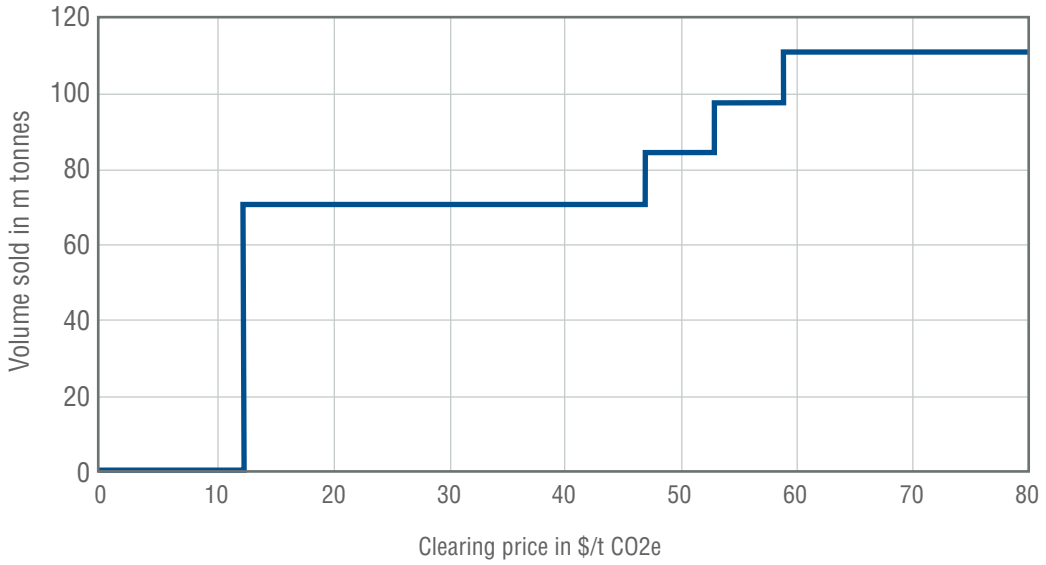
While maintaining a certain minimum price level is already difficult, maintaining a maximum price is even more so: It's in the nature of a cap-and-trade market that the cap (the total amount of available allowances) is fixed, so that the government cannot simply create allowances to boost supply and thus keep prices in range. Well, nothing is impossible in the US: RGGI allows the creation of 10m allowances annually on top of the normal cap to be sold in the auction if the clearing price exceeds a certain limit. In California & Quebec, the system is slightly different. A certain share of the annual cap is set aside – the so-called 'allowance price containment reserve' – and sold

Table 1: Floor prices in RGGI, California & Quebec

	2016 floor price	Annual increment	Leftover handling
California & Quebec	$12.73/tCO2e	5% + inflation	Either withheld for three years (advance auction) or until two consecutive auctions clear (current vintage)
RGGI	$2.10/short tCO2e	2.5%	Differs by state, but general rule is to delete any leftovers

Source: ICIS

Figure 1: Supply curve in California & Quebec emissions trading scheme auction



Source: ICIS

in the auction if certain trigger price levels are reached. These levels are tiered, so that up to one third of the volume is coming to market if the lowest tier is exceeded, a further third at the second level and the remaining at the highest tier. Figure 1 shows the supply curve in an auction in California & Quebec.

Both the EU and most of the Chinese markets currently have no price ceilings or maximum prices. However, there are provisions in some market rules (like in South Korea or also in the EU ETS) that call for action from the government if market prices exceed a pre-defined level.

Experiences with price management

The US markets are a good example to study the impact of price control: price floor and ceiling have been triggered recently in California and RGGI. The California market suffers from an oversupply of allowances. Recent auctions cleared close above or at the floor price, and several million allowances have been temporarily transferred to a reserve. Most recently, the secondary market started to trade below the floor price for more than a few days for the first time. However, the market also benefitted from the floor price: With a guaranteed increase of 5% plus inflation per year, buying allowances at the floor price is an attractive investment which has spurred the buying of non-compliance entities.

In RGGI, however, the opposite was observable in the last years: In the last two years, each year all of the additional 10m allowances were fully sold out, and the market traded significantly above the price "ceiling" of that year.

The South Korean system is currently trading above the current trigger price, which enables the government to release "emergency measures" such as injecting a market stability reserve into the market or even allowing additional offset types. However, up to now the government did not react. This shows the biggest shortfall of measures lying at the discretion of the government. They are again unpredictable and increase uncertainty rather than reduce it.

The EU continues to reject any form of price management and decided to manage the supply more effectively through its recently decided Market Stability Reserve. However, some member states such as France and the UK continue to call for a minimum price for EUAs.

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Carbon trading in China

It's not just another ETS: China introduced its pilot emission trading schemes in 2013, and will roll out its National ETS in 2017. This will be the world's biggest carbon market, twice as big as the EU ETS. Unlike the US and EU, the Chinese energy intensive industry is not operating in liberalised energy markets and dominated by large, state-owned enterprises. In addition, the different business culture in China adds to the complexity, so that a mere replication of trading experiences from other emissions trading systems would not work.

The aim of this article is to understand how the Chinese carbon market works on the ground and what are the differences compared to western carbon markets. In that context, we interviewed two experienced carbon traders including Jamie Wallace from BP, an international oil and gas company, and Qing Gu from Shenergy, a China-based energy company. The interviews were conducted in April 2016 by Jan Ahrens (Business Director Carbon Market Analytics) and Simon Chen (Analyst Chinese Carbon Markets).

ICIS: How active are you currently in Chinese emissions trading, and what's your motivation?

Jamie Wallace (BP): We are committed to building a presence in the China market to support the development of this market and to establish a presence in a market that could potentially drive global carbon pricing in the future. At present we actively trade in the Guangdong, Shanghai and Shenzhen pilot schemes, as well as invest in CCER offset projects and provide training and capacity building services to market participants and regulators.

Qing Gu (Shenergy): In the pilot phase, we have actively participated in the carbon borrowing, allowance-CCER swap, exchange traded transactions of allowance and CCERs, and over-the-counter trades. Our primary focus for now is to gain some experience of carbon asset management, to better apply it in our group in the future.

ICIS: How do you see the trading (both allowances and CCER) during the pilot periods?

Jamie Wallace (BP): It is fair to say that the trading environment in the pilot schemes has been challenging, as is to be expected with any new trading schemes as participants familiarise themselves with the rules, regulations and requirements. However, that is not to say there have not been opportunities as well such as the well-publicised deal that we transacted with Shenzhen Energy recently. We are seeing increasing interest in the carbon market from banks and financial institutions and with the range of products being expanded we would expect trading activity to increase.

Qing Gu (Shenergy): During the pilot phase, the relevant laws and regulations are still in development and are not complete, so there are vast differences among the prices of allowances and CCERs in the market. It is still unclear whether the pilot allowances can be banked to the national market, or at what exchange rate, and there is still no clear policy which kind of CCERs can be eligible for compliance in the National ETS. Under such uncertainties, the risks of buying and holding are increasing. This is also why most market participants are taking a wait-and-see approach.

ICIS: Some experts criticise the Chinese pilot systems because they are not very liquid and trading low. Why do you think this happened?

Jamie Wallace (BP): The pilot periods' schemes have been hugely successful in designing and implementing the complex infra-structure required to support carbon trading. There is a tendency from many observers to focus on liquidity as the single measure of a 'successful' carbon trading scheme; focus should also be on the underlying factors required such as robust scheme design, close to full compliance from covered entities and controls in place to prevent the types of fraudulent activity which have plagued other environmental credit markets.

Qing Gu (Shenergy): For compliance companies, as the allowances are allocated for free, and compliance is their top priority, most companies choose to hold the allowance and not to trade, in order to avoid the risk of non-compliance. On the other hand, carbon trading is a new concept for most Chinese companies, and they don't have the qualified personnel to manage these allowances effectively.

For institutional investors, even though they don't need to comply, their allowances are not for free either. So their participation in the market has a cost attached from the beginning. Of course all institutional investors participate to arbitrage, but this is just a one-sided wish in the low liquidity market, as it is hard to increase the liquidity. As everyone wants to profit, there must be someone paying for the losses.

ICIS: More companies from the EU and US are currently looking to enter the Chinese carbon markets. What would you tell them about the key difference between trading in the Chinese market and the EU ETS or US systems?

Jamie Wallace (BP): From a trading point of view then one of the key differences is the speed at which the market develops and the changes in regulation. This is a significant advantage when it comes to designing and implementing a scheme on the scale of the National ETS but can also mean that key rule changes such as eligibility of certain CCERs could mean that longer term investments will carry more regulatory risk.

Qing Gu (Shenergy): Many Chinese companies still need time to digest the idea of 'pay for emissions', which is already a widely accepted concept among EU and US companies. The Chinese carbon markets are still in its early stages and there is a lot to learn. So we welcome the participation of EU and US companies, bringing advanced management concepts and pricing mechanism to the Chinese carbon markets.

ICIS: Chinese markets start to use forwards/futures to boost liquidity. Do you think Chinese compliance companies will buy allowances through forwards/futures or will this be a playing field for speculators only?

Jamie Wallace (BP): Compliance entities can be expected to show increasing interest in use of futures and forwards as market reforms are introduced to the underlying gas, power and coal markets. This will mean that compliance entities have increasing forward price exposures that they may look to manage through such products.

Qing Gu (Shenergy): For compliance companies, futures/forwards have a higher degree of risks. It is relatively difficult for companies to determine the price movement of the emissions allowance. There are companies with professional team who can trade forwards/futures to lock in profit and allowances in advance. But the number of such companies are quite limited.

ICIS: The national ETS is about to start next year and will be the world's biggest emissions trading market. If you were the regulator, which 3 things would you change compared to the pilot schemes?

Jamie Wallace (BP): From the various conferences, workshops and seminars that we have attended with the authorities it's clear that lessons from the pilot schemes and also other ETSs are being learned and applied. It's also clear that there has been no shortage of advice for authorities on what they should be doing, so I will refrain from adding to the list!

Qing Gu (Shenergy): An auction mechanism will be introduced to the National ETS as a supplement to free allocation. I believe the purchase of some allowances will force the companies to include the auction cost in their power generation cost management, hence to better promote full-scope cost management in energy companies

Second, the Shanghai Development and Reform Commission (DRC) used grandfathering and benchmark methods to allocate allowances. The ever-stringent benchmark is very challenging for the power sector who has adopted high standards about emissions even before the introduction of Shanghai ETS.

Lastly, the offsets mechanism is also an important supplement which would affect the market supply and prices. So we hope the policies regarding the offsets market be released soon, so the market participants can make plans accordingly.

ICIS: More than any other major country, China is experiencing pollution in its booming cities. The population expects the government to react on it – how high do you see the chances that the national ETS actually starts in 2017?

Jamie Wallace (BP): At present we expect implementation of the National ETS to begin in 2017. China is clearly committed to moving towards a lower carbon-intensive future and we believe that a well-designed scheme with robust and fair allocations can play an important role in this process.

Qing Gu (Shenergy): There are a lot of tasks before the official start of the National ETS, such as the transition of pilot ETSs into the national market, the legislation of relevant regulations and rules, the design of allowance allocation methods and methodologies, the collection emissions data, and the coverage of direct and indirect emissions.

It is announced that the National ETS will start in Q3 2017, but personally I think there will be a long time of trial and practice in the beginning of the National ETS.

Authors

Jamie Wallace

Jamie is currently the Emissions Trading Manager for Asia at BP. He has been with BP for ten years and has worked in a variety of roles across oil, gas and power before joining the emissions trading team in 2009. BP's Global carbon activities include participation in carbon trading schemes in the EU, California, New Zealand, Australia and China. Prior to his current role, Jamie managed BP's exposure to the EU ETS as well as designing and delivering emissions trading services to BP's Global customer base across multiple trading schemes. Before joining BP Jamie worked at Deloitte for three years and is a qualified chartered accountant.

Qing Gu

Qing Gu has been working at the Investment Management Department of Shenergy Group Finance Limited Company since 2009 focusing on financial research and trading. Before that, he was employed by Industrial and Commercial Bank of China and Orient Securities. Qing Gu started looking at the emissions trading market since 2013 and is experienced in carbon trading, especially in the Shanghai pilot market.

Opinions expressed by Qing Gu do not represent his employer's view, but are solely his own.

The return of command-and-control

Efficiency is the key reason why governments and authorities all over the world preferred to tackle climate change by implementing cap-and-trade (or emissions trading) programmes over the more rigid command-and-control regulations. But in recent years, command-and-control have made a comeback, existing in parallel of cap-and-trade systems sometimes in a not so harmonic way.

Cap-and-trade does not pick winners

Cap-and-trade systems incentivise companies to identify the most cost-efficient way to reduce emissions and do not discriminate against nor support specific technologies. Indeed, companies fulfil their compliance obligations as they see fit. Companies can choose to implement abatement measures to reduce their compliance obligation under a certain scheme, or buy permits and continue to pollute – therefore optimising the cost-efficiency of their carbon management strategy. This should in principle help the overall economy in reaching the underlying target at the least cost.

Command-and-control is easy to set up, but can be expensive

Command-and-control mechanisms on the other hand lead to economically inefficient emission reductions as certain technologies, sectors or regions are specifically targeted with limited or no flexibility for market participants to optimise the costs of the reductions. Historically, command-and-control had been very popular amongst regulators as they promise high scrutiny over the implemented measure, and are relatively straightforward to implement, manage, and control.

Peaceful co-existence or inefficient overlap?

The political realities in all regions where a cap-and-trade system is implemented, however, are that the two kind of policies co-exist and overlap. There are two possibilities for the regulator to manage these overlaps, which comes down to the question of what the cap-and-trade system should accomplish. It can either be:

1. the main driver for abatement, or

2. the backstop for other policies to ensure that an overall emissions reduction target is reached

In the EU, the EU ETS is seen as the "cornerstone of the EU climate policy" which is in line with aim 1 "the main driver" cited above. In contrast, the California the cap-and-trade programme is considered as the backstop of several other policies.

Command–and-control is back

In the last years, especially in the EU, the return of command-and-control policies were observable, particularly in the power sector. Single member states have implemented policies which overlap with the EU ETS and, therefore, these policies have had an impact on the efficiency of the system. In California, however, the cap-and-trade system was designed as the backstop with command-and-control policies always in the picture.

As discussed above, command-and-control policies can help target specific technologies or sectors. While this approach negatively reduces the short-term efficiency of the system, it can also positively enhance the inter-temporal efficiency of the system.

Overall, cap-and-trade programmes with low price levels (like we see in all existing systems worldwide) do not incentivise long-term strategic abatement decisions in companies. One good example is Germany where old and inefficient lignite power plants produce on full capacity while very modern and efficient gas power plants are being mothballed. As potentially lock-in effects can occur due to the very long investment circle in the power market, authorities often choose to directly regulate the technologies instead of increasing the carbon price which has to be borne by all sectors included in the cap-and-trade programme.

To showcase that command-and-control measures are observable in key jurisdictions with a cap-and-trade programme, we look at the US, China and EU markets.

The overlap state of play on the ground

California – the Renewable Portfolio Standard

California's cap-and-trade programme is only one element of the comprehensive climate regulation under AB32, and is often referred to as the back-stop climate policy to take action if the other policies fail. Other smaller programmes exist to incentivise electric car purchases, improve public transportation and support GHG reduction programmes. The key complimentary measures which have a critical impact on covered emissions in the cap-and-trade system are the Renewable Portfolio Standard (RPS) and Low Carbon Fuel Standard (LCFS). This section focuses on the RPS.

California's RPS requires the state to have a certain share of electricity consumption being covered by renewable energies. The current RPS rules that 33% of the power consumed must originate from renewable sources by 2020 and 50% by 2030. For 2014, the three largest utilities, which are mainly responsible for reaching the RPS target, served 26.6% of their electricity sales with power generated from renewable

energy. In that context, renewable production will have to increase significantly over the next years for California to reach its RPS targets. This will further reduce GHG emissions in the power sector (both in-state generation and imported), which currently accounts for around 79m tonnes (based on 2014 data) or 22% of covered emissions in the broadened scope of the programme in 2015.

Overall, it is interesting to note that the complimentary mechanism, namely the RPS, has become the de-facto driver for emissions reductions. With the cap-and-trade oversupplied and the cost to comply with RPS expected to be significantly higher in the next years compared to emission rights, the cap-and-trade finds itself indeed being a backstop tool. Despite the critical impact of the RPS on present and future emissions, there are at this point no adjustments in the cap of the cap-and-trade programme to account for emissions reductions from this command-and-control mechanism.

China – coal power production standards

Last December, Chinese Prime Minister Li Keqiang announced in a State Council executive meeting that China will shut down its low efficiency coal-fired power plants to fight pollution and curb carbon emissions. In this new initiative, the coal consumption rate of existing power plants should not exceed 310g/kWh by 2020, and newly-built power plants should have a coal consumption rate of less than 300g/kWh. Power plants in Eastern and Central China are expected to meet these requirements earlier. This initiative will reduce China's yearly coal consumption by 100m tonnes, and cut its CO2 emissions by 180m tonnes per year – according to an article published by Xinhua News Agency.

China's National Standard of Energy Consumption per Unit produced of General Coal-fired Power Plant (2013 version) has set minimum requirements of coal consumption rate for power plants of different installed capacities (see Table 1).

Table 1: Coal plant efficiency standards (2013)

Pressure	Installed capacity (MW)	Coal consumption for power generation (gce/kWh_thermal)
Ultra-supercritical	1,000 600	≤288 ≤297
Supercritical	600 300	≤306 ≤319
Subcritical	600 300	≤320 ≤331
Ultra-high pressure	200,125	≤360
High pressure	100	≤375

Source: ICIS Tschach Solutions

Compared to the existing standard, this new 310g/kWh requirement is stricter than most of the current standards. Hence, the new requirement will have a greater impact on the power plants with smaller installed capacities. According to the National ETS allowance allocation draft circulated recently, the benchmark set for the power sector is only based on the current 2013 National Standard.

Besides, there are other measures like energy saving trading and Renewable Portfolio Standard being discussed at the moment. However, the prospects of both are still clouded. For example, the success of RPS will heavily depend on China's power reform and grid upgrade.

European Union – the German lignite reserve

On 3 December 2014, the German government published its Climate Action Programme 2020. The programme showed that the German 40% GHG emission reduction target until 2020 compared to 1990 levels cannot be reached without further mitigation measures within the power sector.

After some back and forth about the implementation and the economic and social effects such measures would have, the German government decided in consent with the affected power plant operators and trade unions to introduce a capacity reserve for certain lignite units. Starting in October 2016, eight units with a combined net capacity of 2.7GW are transferred gradually into the reserve until October 2020. Once in the reserve, the units will only generate power when required by the transmission system operator for securing power supply in foreseeable bottleneck situations. In return, the respective utilities receive financial compensation for providing the capacity reserve. After four years in the reserve, the units will be shutdown.

With this measure, the German government expects additional GHG reductions in the power sector of 12.5m tonnes in 2020. The progress of the emission reductions will be evaluated in 2018. In case the targeted reduction seems unachievable until 2020, the affected utilities have to make proposals for further reduction measures to reach the target.

Unlike a carbon floor price (as implemented in the UK) this measure does not apply unilaterally on all emissions from fossil power generation but targets only specific old, inflexible and inefficient lignite units. The EU ETS is technically not affected by that measure, but clearly emissions will be lower and consequently demand for EUAs will decrease when the reserve starts to operate, while supply remains unaffected. This mean that while German lignite plants emit less CO2, other plants within the EU ETS can produce more greenhouse gas.

Conclusions

As discussed above, command-and-control measures are steadily making a comeback in parallel of all key existing cap-and-trade systems worldwide. The implementation of those policies do not constitute a negative development on their own as they serve a particular target and enable certain regions within one cap-and-trade programme, e.g. single member states in the EU, to pursue energy policies in line with their national interests.

However, it has to be acknowledged that such command-and-control policies have a significant impact on the respective cap-and-trade programmes. Authorities can either account for these over-laps by adjusting the cap of the respective systems accordingly or accept that such measures are likely to only shift the emissions from one sector/region to another, as the total amount of emission rights available remains unchanged.

In the end, policy makers must clearly decide whether they want their cap-and-trade programme to be the main driver for emissions abatement or just be the back-stop of other climate policies.

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The Paris Agreement at COP21

On December 12, 2015, after almost ten years of negotiations, the 21 Conference of the Parties (COP) adopted the final text for the Paris Agreement. It was widely seen as an historic moment in international negotiation and the joint fight against climate change concluding the process that started five years ago at the COP17 in Durban. Nevertheless, the Paris Agreement is not the end of the road, but only the first step in a new area of climate negotiations.

How did we get there?

After the failed negotiations in Copenhagen in 2009, the Paris negotiations were set up to not repeat mistakes from six years earlier. Even before the COP21 in Paris started, expectations on the outcome of the negotiations were high. The main reason for the overall optimism was the intensive and very well thought through preparation of the COP. First, nearly all countries of the world had published a so-called Intended Nationally Determined Contribution (INDC) ahead of the COP, describing how they planned to reduce emissions by 2030. Despite analysts constantly mentioning that the submitted INDCs did not go far enough to actually prevent climate change, the high number of submitted INDCs already showed that the fight against climate change was high on each nation's agenda. Secondly, two key nations, China and the US, were on board: together, they account for more than 50% of global greenhouse gas emissions (GHG) emissions and represent two main opposing parties at former international climate negotiations: industrialised countries and emerging economies.

Thanks to the so-called Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP), a group established at the COP17 in Durban to prepare a draft agreement for the negotiations in Paris, the COP in Paris could start with a streamlined negotiation text of around 50 pages. This enabled negotiators to focus on the key issues in the agreement that, without any question, still existed until the final adoption of the Agreement. In the two weeks of the COP, this draft text was the central element of all negotiations, the number of pages and brackets (indicating several options for the same paragraph) became an indicator of the state of negotiations.

What is in the final Agreement?

Over the course of the negotiations in Paris, the main open issues became quickly clear. None of them were new however.

Long-term goal

Article 2 of the Paris Agreement sets the long-term goal as follows: "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change".

While the 2°C target only reiterates the overall target of the UNFCCC, the explicit mentioning of a 1.5°C limitation was continuously demanded by small island states that in the final days of the negotiations were supported by the so-called High Ambition Coalition, a group of industrialised and developing countries.

Mitigation

Article 4.2 of the Paris Agreement reads as follows 'Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve.' The main power of that sentence lies in its first two words. 'Each Party' indicates that all countries that sign the Paris Agreement have an obligation to mitigate climate change. In the history of the UNFCCC, this is a fully new concept which was unthinkable a few years ago. In the convention and the Kyoto Protocol, only industrialised countries were held responsible for their emissions and were requested to reduce them. Despite the revolutionary start of the fourth article of the Paris Agreement, the actual mitigation requirements for the parties of the Paris Agreement are vague. Parties are requested to communicate their national determined contributions (NDC) every 5 years. The NDCs are meant to be ambitious, but should reflect each party's ability or special circumstances. That way the general concept of differentiation of countries based on their development is back in the Paris Agreement.

Climate financing

The main responsibility to finance the combat against climate change is given to the developed countries. In article 9 of the Paris Agreement it says that industrialised countries are to 'take the lead' on climate finance, while others can follow them on a voluntary basis. Explicit language on the amount of climate finance was taken out of the general Paris Agreement. Decisions in the Annex however give $100bn as the minimum requirement from 2020 on.

Transparency

To make an assessment of party's progress on their NDCs and their national emissions, all parties to the Paris Agreement are required regularly to provide a national inventory of GHG emissions and an update on the implementation of their NDC. Additionally, developed countries are required to provide transparency on their progress in climate financing.

Markets in the Paris Agreement

Article 6 enables parties to use so-called 'internationally transferred mitigation outcomes' to cooperate on reaching their NDCs. This expression is widely seen as a possibility to use market mechanisms to comply with the Paris Agreement. Furthermore the article establishes a 'mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development'. Both mechanisms will need further work to be fully established.

Global stocktake

The COP is required to track collective progress of agreement implementation to achieve the purpose of the Agreement and long-term goals (2°C and 1.5°C). The official start of the Paris Agreement is set for 2023, and the stocktake should take place every 5 years after that.

What´s next?

The adoption of the final text of the Paris Agreement at the COP21 was an important first step. For it to enter into force, it will need the ratification or approval of at least 55 countries, representing at least 55% of global GHG emissions. Countries will have the opportunity to sign the Agreement between 22 April 2016 and 21 April 2017.

Several countries, including the US and China, have already indicated their intention to sign the Agreement. However, in particular for the US, that is not only a question of US President Barack Obama's willingness to sign, but also part of a significantly larger discussion on its legal ability to actually sign the Paris Agreement.

Looking forward, negotiators are already looking at the COP22 in Marrakesh at the end of 2016, when the details of the Paris Agreement will have to be agreed upon.

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The Sustainable Development Mechanism under the Paris Agreement – cornerstone of a global carbon market or dead end street?

The SDM – a centralised market mechanism in a world of decentralised government mitigation contributions — The Paris Agreement (PA) marks a sea change in the approach to international climate policy. The Kyoto Protocol was a "top down" agreement where mitigation targets of countries were subject to a host of international rules administered by the UNFCCC Secretariat. Under the PA, governments define their mitigation targets in a bottom-up fashion. The resulting "Nationally Determined Contributions" (NDCs) are very diverse and not fully comparable. While the PA envisages a strengthening of NDCs over time, and aims to have centrally agreed, common accounting rules for mitigation, it is clear that governments will not want to give up their freedom in framing their mitigation action in the way they prefer.

In that context, it came as a real surprise that the PA includes a market mechanism that is likely to be very similar to the Kyoto Protocol's Clean Development Mechanism (CDM). This mechanism "to contribute to the mitigation of greenhouse gas emissions and support sustainable development" (Article 6.4) for which the term "Sustainable Development Mechanism" (SDM) seems to become universally accepted, builds on institutions that have been developed over many years under the CDM and Joint Implementation (JI). It will be supervised by a body designated through the Conference serving as Meeting of the parties to the Paris Agreement (CMA). Here, the lessons made with the CDM Executive Board should be taken into account; the CDM Executive Board could even be designated to become the SDM Executive Board. This would also allow the use of the accumulated budget surplus of the CDM Executive Board for designing the SDM rules.

Given the requirements of Article 6.4b PA regarding authorisation of private and public entities participating in the SDM, the Designated National Authorities (DNAs) of the CDM could be asked to perform this function. The earlier this decision is taken, the better one could stem the current erosion of DNA capacities.

Paragraph 37e of the Paris Decision (PD) states that Designated Operational Entities (DOEs) will verify and certify emission reductions under the SDM. It would make a lot of sense to grant DOE status to all DOEs accredited under the CDM. The earlier this is done, the better the loss of DOE capacities could be prevented. Given the explicit statement that the experiences from the Kyoto Mechanisms shall be applied in determining SDM rules (Paragraph 37f PD), generally the SDM could build on CDM rules as far as possible. This would allow to bring in the intense work on streamlining of rules undertaken by the CDM regulators since the drying up of the CDM market in 2013.

The competitive situation of the SDM compared to the Cooperative Approaches (CAs)

Under the Kyoto Protocol, three market mechanisms competed and the final result was unexpected. While observers had predicted that direct trade of emission units between governments would dominate and the CDM would play a minor role due to its cumbersome rules, the actual outcome was the exact opposite. Will the SDM be able to compete against the bottom-up mechanisms emerging under the concept of Cooperative Approaches (CAs) under Articles 6.2 and 6.3 PA?

Most observers see CAs as bilateral market mechanisms generating "Internationally transferred mitigation outcomes" (ITMOs) without relevant international oversight. The PA is much less specific on the CAs than on the SDM; it only mentions that CAs should satisfy environmental integrity and transparency. A crucial determinant of the competitive situation will be whether governments and private sector players want to generate credits of high environmental integrity or whether a "race to the bottom" will be undertaken. In the latter situation, CAs would clearly have a comparative advantage. The example of JI shows that the mechanism, which was languishing, became very active when Ukraine and Russia used it to "launder" surplus emission units, so-called "hot air" after the Doha Conference of Parties in 2012. Within a few weeks, several hundred million JI credits were issued on the basis of fictitious project documentation.

Given that the SDM is to follow key principles of the CDM, its attractiveness will depend on whether competing mechanisms will do likewise. The SDM is to generate "real, measurable, and long-term benefits related to the mitigation of climate change" (Paragraph 37b PD) as well as the principle of additionality (Paragraph 37d).

An important question will be how the SDM can include crediting of mitigation policy instruments and sectoral targets.

If it manages this with standardised baseline and monitoring methodologies, its competitiveness could become high. The key question is whether governments are willing to accord a sufficient autonomy to the SDM Executive Board to develop such methodologies, as has been the case with the CDM in the last years. This would require a high level of trust in the UNFCCC. In this case, the SDM could become a crucial vehicle for financing of mitigation policy instrument introduction in the context of Nationally Appropriate Mitigation Actions (NAMAs). It is important to ensure that incentive structures are sufficiently attractive for emitters to achieve mitigation. The revenue from credit sales actually needs to reach those actors that make the decisions to operate or mitigate technology. If it was retained by government institutions, emitters would not react unless the government provides carrots to emitters for mitigation or wields sticks against them.

With regard to environmental integrity of the SDM, the different characteristics of NDCs play an important role when crediting policy instruments – countries with weak baselines and levels of ambition in their NDCs should not be enabled to generate more credits under the SDM than countries with stringent ones.

Preventing double claiming

As all countries under the PA will have an NDC, it is crucial to prevent double counting of emission reductions through the SDM by the seller and the buyer country (Articles 6.4c and 6.5). This is more complex than it seems. Double issuance can be prevented easily, but double claiming is more difficult to address. Ideally all national emissions inventories would be subject to international rules in order to consistently track and report units. The SDM Executive Board might be overstretched with such a task.

Who buys and sells?

The current crisis of global carbon markets is due to a lack of buyers. While a number of countries has stated that they want to use units from market mechanisms in reaching their NDCs, it remains unclear whether there is sufficient political appetite to provide significant public budgets for acquisition of units. If all countries that supported market mechanisms during the Paris Conference would actively buy credits, especially after ramping up the ambition of their NDCs, the future of the market mechanisms would be assured. On the seller side, the key question is how ambitious the NDCs of emerging economies become. Analyses of the current INDC pledges show a substantial mitigation potential that would not be required domestically. So the fear of a "supply squeeze" remains hypothetical, at least in the short term.

The future of the Paris Mechanisms

The development of detailed rules for the Kyoto Mechanisms in the Marrakech Accords took several years. Therefore, the next years will be crucial to determine whether the SDM will play a role that is comparable to the CDM in its golden period from 2005 to 2009. As CDM rules have been substantially reformed and streamlined over the hibernation period of the CDM market, they form an excellent basis for developing the SDM rulebook. Achieving a balance between environmental integrity and transaction costs is decisive. In order to achieve a smooth transition between Kyoto and Paris Mechanisms, it would be highly desirable to use the CDM as core of the SDM and to translate the CDM portfolio into the SDM. A provision on early action for the SDM could play a key role in making it competitive against the CAs and generate trust among governments and market participants.

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The Global ICAO Market-Based Measure for aviation – a status update

At the 39th ICAO General Assembly held in Montreal in the fall of 2012, the decision was taken to initiate the design of a Global Market-Based Measure (GMBM) to tackle carbon emissions from international aviation. Three and half years later, after dozens of meetings around the world, intense political debates at all levels, numerous advances and retreats, steps forwards and backwards, things are finally moving forward and the structure of the future ICAO GMBM is shaping up.

In December 2015, ICAO Secretary General Dr. Fang Liu published her proposal for an International Aviation Global Offsetting (IAGO), which replaced the strawman that had been on the table for the previous two years. In March 2016, the IAGO proposal was replaced by a draft assembly resolution text calling for a Carbon Offsetting Scheme for International Aviation (COSIA) to address any annual increase in total CO2 emissions from international aviation above the 2020 levels (carbon neutral growth).

The COSIA can be defined as a global carbon offsetting scheme which requires participants to offset their CO2 emissions above any annual increase in total CO2 emissions from international aviation above the 2020 levels by acquiring emissions permits from other participants or sources. It is important to note that only international aviation is concerned as per the IPCC definition 'flights departing from an airport of a State and arriving at an airport of another State'.

A phase-in approach

In order to accommodate Special Circumstances and Respective Capabilities (SCRC) of States, a phased implementation is contemplated.

Phase I (2021-2025):

- States that are classified as high income States in terms of gross national income (GNI) per capita in the year 2018 (as calculated by the World Bank method); or,

- States whose individual share of international aviation activities in Revenue Tonnes Kilometers (RTKs) in year 2018 is above 1% of total RTKs, or whose cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 80 % of total RTKs.

In effect, these rules imply that although they are not classified as high incomes States in terms of GNI per capita, China, Turkey, Thailand, Malaysia and India will still join the COSIA in its first phase due to the 1% RTK rule.

Phase II (2026-2035):

- States that are classified as upper medium income States in terms of GNI per capita in the year 2018 (as calculated by the World Bank method); or,

- States whose individual share of international aviation activities in RTKs in year 2018 is above 0.5 % of total RTKs, or, whose cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 95 % of total RTKs.

States which are classified as Least Developed Countries (LDCs), Small Island Developing States (SIDS) or Landlocked Developing Countries (LLDCs) would be total exempted from the COSIA unless those States meet both Phase I or both Phase II criteria above. Nevertheless, States that are not included in the COSIA are encouraged to voluntarily participate in the scheme.

The golden rule is that the same requirements shall apply to all aircraft operators on the same routes between participating States in the COSIA in order to minimise market distortion. This can be illustrated in Table 1.

100% sectoral rate

The amount of CO2 emissions required to be offset by an aircraft operator is calculated by multiplying its 2020 emissions with an annual growth rate of the international aviation sector's total emissions from 2021 compared to the 2020 levels. This means that each operator

Table 1: COSIA phase-in approach

Flights From / To	High income State	Upper medium income State	Low income State
High income State	From Phase I	From Phase II	N/a
Upper medium income State	From Phase II	From Phase II	N/a
Low income State	N/a	N/a	N/a

Source: VERIFAVIA

Table 2: 100% sectoral rate illustration		
	Operator A	Operator B
2020 Emissions	100 000 tCO2	100 000 tCO2
2021 Emissions	90 000 tCO2	110 000 tCO2
Growth 2021 vs. 2021	-10%	+10%
Sectoral growth	5%	5%
Emissions to be offset	5%	5%

Source: VERIFAVIA

would offset the same percentage of their emissions, determined by the growth in the aviation sector's total emissions above the baseline. This can be illustrated in Table 2.

Since the offsetting requirements of the COSIA are purely based on sectoral rate, there is no need for any adjustment for fast growers or early movers.

The rationale behind the 100% sectoral rate is that this will favour fast-growing airlines from the developing world, and penalise mature airlines from the developed world. In other words, it inherently and subtly integrates the CBDR issue and makes the COSIA politically acceptable to such countries as China or India.

The main criticism of the 100% sectoral approach is that there would be no incentive for individual operators to reduce their emissions as the percentage of emissions reduction will be determined by ICAO and unique for all operators worldwide.

Exemptions and new entrants

A new entrant would be exempted from the application of the COSIA scheme for five years or until the year in which its annual emissions exceed 0.1 % of total emissions in 2020, whichever occurs earlier. From the subsequent year, the new entrant is included in the scheme and treated in the same way as the other operators.

The COSIA does not apply to aircraft operators emitting less than 10,000 tCO2 emissions from international aviation per year, aircraft with less than 5,700 kg of MTOW, and humanitarian, medical and firefighting operations.

The emissions that are not covered by the scheme, as the results of phased implementation and exemptions, are not assigned as obligations of any operators included in the scheme. This means that the carbon neutral goal (CNG2020) will not be achieved in any case. Since the COSIA does not cover domestic emissions either, the proportion of worldwide aviation emissions covered by the scheme may not even exceed 50% in the first phase.

Cost safeguard and sunset clause

A cost safeguard mechanism is foreseen in order to effectively limit or cap the financial burden of operators in the COSIA scheme should the price of carbon allowances is considered to be excessive or in case of restrictions to carbon market access. As per the December proposal but not included in the March proposal, this cost safeguard could be activated if the average price of emissions units in a specific year is more than X times higher than the average price of emissions units in 2021. This would effectively jeopardise the effectiveness of the COSIA as a market-based measure.

The scheme may cease to apply if the global aspirational goals are achieved through non-MBM measures. The design elements of the COSIA apply until the end of 2035, with a periodic review every three years, and a review for any extension of the scheme beyond 2035 is undertaken by end 2032.

Monitoring, reporting and verification

It is foreseen that aircraft operators will have to go through a three-year compliance cycle, starting with the first cycle from 2021 to 2023, within which they have to reconcile their obligations under the scheme, while they report the required data to a single State authority every year.

With regards to the Monitoring, Reporting and Verification (MRV) requirements, the COSIA will follow some of the same principles as the EU MRV.

First, operators will have to prepare and submit a Monitoring Plan which shall be approved by the State in which the operator is registered.

Second, operators shall submit an annual report to the State in which it is registered using a standard reporting template. The report shall be previously verified by an independent verifier.

Finally, States compile and transmit aggregated emissions information to ICAO, which calculates the total emissions from international aviation and determine the sectoral growth.

Like in the Aviation EU ETS, simplified procedures for small operators shall be considered (tier 2 approach) based on estimated or modelled emissions.

MRV rules are being defined by the Global Market-Based Task Force (GMTF). It is expected that the complete MRV rules of the COSIA will be adopted by June 2017 for effective implementation by January 2018.

Registries and offsets

In order to facilitate the actual offsetting of carbon allowances, national or regional or group of States registries shall be developed and a consolidated central registry under the auspices of ICAO shall be established for effective implementation by 2021.

The GMTF working group on the quality of offsets still need to define an agreed Emissions Unit Criteria (EUC) to determine eligible emissions unit programmes. The Council with the support of CAEP are asked to develop EUC guidance material and to establish an EUC technical advisory body.

Although these criteria were not included in the March proposal, the December proposal considered that the programmes that generate eligible offset credits should meet a range of elements and that the programmes should deliver offset credits that represent emissions reductions, avoidance, or sequestration that meet certain criteria.

Credits generated from the CDM, aviation projects, new market mechanisms or other programmes under UNFCCC would be eligible provided that these comply with criteria such as environmental integrity, voluntary participation of jurisdictions, market access, double claiming, registry of allowance units and transparency.

Next steps

The final proposal will be presented at the ICAO High-level meeting on 11-13 May 2016 which will make recommendations to the 208th Session of the ICAO Council scheduled in May / June 2016 in preparation for the 39th Session of the ICAO Assembly on 27 September-7 October 2016.

A lot of political debate will now follow and many of the proposed design elements of the COSIA may be amended over the course of the next few months in the run up to the General Assembly. Actually, the COSIA may even have been already replaced by another scheme by the time this article is published.

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Carbon regulations and European utilities' ratings

The electricity sector is one of the largest emitters of greenhouse gases in Europe and has as such been the focus of EU policies targeting decarbonisation, including the 2020 targets and 2030 framework on climate and energy. We see an ongoing challenging operating environment for European unregulated utility companies as they remain exposed to persistent political and regulatory policy changes. Although the sector would benefit from a higher carbon price, no game changer is in sight yet given the lack of flexibility of the ETS.

European utilities and the challenges of decarbonisation policies

The European unregulated utility sector is at a crossroad. What was once a relatively stable sector dominated by large, integrated utilities is now increasingly fragmented and decentralised in markets that are dislocated. The principal catalyst for these changes is EU energy policy, including the '20-20-20' targets set in 2009 which specify among others that 20% of final energy consumption should come from renewables. To respond to those, EU member states have rolled out subsidies to promote the deployment of renewables, particularly wind and solar photovoltaic.

The consequences of the boom in renewables, combined with a reduction in electricity demand driven by the 2008-09 crisis and growing energy efficiencies, have been significant. Reserve margins (i.e., the excess of generation capacity over peak demand) have widened dramatically across Europe, displacing conventional thermal generators (hard coal and natural gas) and squeezing the profitability of utility companies. Moody's average rating for the sector fell from A2 in 2008 to Baa2 currently, primarily reflecting these trends.

The outcome of the 21st Conference of the Parties in Paris in December 2015 will reinforce, in our view, the pursuit of decarbonisation policies in the EU. The agreement to limit the impact of global warming confirms the momentum for tackling climate change, and we expect energy policies in the EU to continue to be among the main drivers of the ratings of European unregulated utilities.

Carbon prices are too low to support the ratings of European utilities

Carbon prices are important because they affect the relative economics of coal and gas generation. The price of carbon increases the cost of emissions-intensive power generation (such as coal), making cleaner technologies (such as renewables or gas) more attractive. In this regard, the success of the Emissions Trading Scheme (ETS) is questionable, with current low prices reflecting an oversupply of allowances (in excess of two billion) that was triggered primarily by the economic crisis, which led to a reduction in electricity demand, and an inflexible supply mechanism.

At around €5/tonne, current carbon prices are too low to incentivise low-carbon electricity generation and as such do not support the credit quality of European utilities, although indirectly they contribute to sustain higher CO2-emitting generation such as lignite and, in certain markets, coal-fired power plants. Given the current oversupply of allowances, and absent government interventions, we do not expect this to change materially in the medium term – we use a price estimate of €7/tonne through 2020 for the purpose of our ratings.

As a result, and instead of focusing on the level of CO2 emissions of a given utility company, Moody's rating methodology for unregulated utilities and unregulated power companies seeks to benchmark companies against each other based on their generation mix: we assess how closely aligned a generator's fleet is expected to be to its principal market by comparing its power output by fuel/technology with the output of the market overall. This specific factor represents between 10% and 15% of our total assessment.

Those generators whose fuel mix matches the merit order will typically benefit from higher load factors and a lower risk of mismatch between their cost drivers and the drivers of market prices. By contrast, a power generator whose generation fuel mix is significantly unbalanced in relation to the merit order will be at risk of capacity under-utilisation and/or more exposed to market price movements. Our assessment is prospective, and takes account of how we expect the fleet and market will evolve, including the effect of changes in environmental policies, energy efficiency legislation and other government policies.

The Market Stability Reserve (MSR) is unlikely to support carbon prices in the next few years

We estimate that the planned reform of the ETS is unlikely to reduce oversupply before the middle of the next decade. Although the main structural measure proposed is the establishment of a Market Stability Reserve (MSR) from 1 January 2019 to balance the market, we expect the surplus of allowances to remain sizeable until well into the middle of the next decade, by which time it could fall within the range of 400m to 833m, which is the equilibrium targeted by the MSR. Whilst carbon prices might start at some stage to increase gradually in anticipation of a tightening market in the long term, a step up in price in the short term would, in our view, require more aggressive EU targets for the reduction of greenhouse gas emissions, or an overhaul of the ETS mechanism.

In addition, affordability concerns voiced by a number of eastern European countries (such as Poland), which are wary of the impact a higher carbon price may have on their economies, are likely to prevent a sharp step change in the price of EU allowances over a short period. Thus, the conflict arising from the cost of carbon reduction and consumers' ability and willingness to pay is likely to stay and to continue to weigh on ratings in the sector.

Finally, the benefit of a higher carbon price over the long term is likely to wane, as the carbon intensity of power markets will diminish over time because of the increased penetration of renewable generation capacity, which (1) will continue to displace less efficient thermal plants in the merit order and (2) might become the marginal fuel in some instances (this has already happened several times in Germany and in Italy).

The carbon price would have to rise sharply to be a game changer

Given the current level of coal and gas prices, a significant rise in carbon price would be required for a shift in the merit order to occur. We estimate that, all other things being equal, the price of allowances would need to rise above €10/tonne for the most efficient CCGTs to displace coal-fired plants in the merit order; however, prices would likely need to be in excess of €25/tonne to trigger a more structural switch. The main beneficiaries of a fuel switch would include owners of large gas-fired generation capacity such as ENGIE and Gas Natural.

More generally, a higher carbon price would benefit most European utilities with power generation to the extent they can pass it on to the final consumer. This is because their overall carbon intensity is generally lower than that of the marginal fuel in their market. Markets such as Germany and the Nordics where the marginal fuel is primarily coal have greater sensitivity to the carbon price than markets such as Italy and the UK, where gas is the price-setting fuel.

The overall rating impact of a higher carbon price would depend on the two main following business characteristics of a given utility company:

- Business mix, including non-merchant generation and regulated network activities, which can mitigate swings in the profitability of conventional generation; and
- Market framework and fuel mix, hence carbon intensity.

The ability of generators and suppliers to pass through higher carbon prices to final consumers would nevertheless remain subject to some uncertainty. The sector has experienced frequent political intervention, whether to help address affordability issues, raise revenue for the government or adjust the workings of wholesale markets. Although the risk that governments look to the utility sector for contributions to balance national budgets has abated, they might be wary of utilities gaining an 'excess windfall' from a higher carbon price. Windfall taxes on allowances or carbon-free generation (e.g., hydro and nuclear) were, for example, proposed in the past by Belgium and Finland, whilst the Czech Republic implemented a levy of a 32% gift tax on free allowances in 2011-2012.

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Relevance of hedging in the rating of utility companies

In Moody's rating methodology for unregulated utilities and power companies, the agency evaluates the relative predictability of a company's year-over-year cash flow by considering, among other, the effectiveness of its hedging strategy with respect to conventional generation. This specific factor represents between 5% and 10% of our total assessment.

The greater a company's ability to achieve a high degree of earnings visibility with respect to its conventional power output over an extended period of time (which is in turn a function of the tenor and form of contracts or hedging arrangements in place as well as the company's policy regarding how hedged its cash flows will remain in future years), the higher the score under this factor. We also assess an issuer's hedging policy and practices. Some companies' level of hedging is very consistent over time, others are more opportunistic leading to greater fluctuations, and some choose to ride the markets with relatively open positions – a more risky strategy.

That said, we also recognise that hedging does not provide a sustainable and structural offset to changing market conditions – it merely buys time for companies to adapt. Our decision in February 2016 to place on negative watch ten European utility groups reflected our expectation that lower commodity and power prices would affect these groups' financial ratios in the next two to three years, once hedges roll off.

Australian climate change policy: where to from here?

Australia has stated that it will reduce GHG emissions by 26-28% by that even under the most 'generous' emission reduction methodologies, Australia's total carbon budget between today and 2050 would need to be 10 gigatonnes (Gt) or lower. Australian annual emissions currently total approximately 0.6 Gt. The sectoral emissions breakdown is presented in Table 1. The electricity sector comprises around one-third of Australia's emissions with other stationary energy and transport comprising another third.

Australia's carbon budget would be depleted by around 2033 if Australia continued to emit GHG at current levels. If the budget was exhausted more gradually but at a fixed reduction rate, Australia would be required to reduce its emissions by 4% per annum to 2050 – approximately 45% lower than today in 2030.

Achieving these types of emission reductions will be challenging under current policy settings. Since 2010, emissions trading and premium feed-in tariffs (FiT) have been introduced and abandoned while an expanded 20% Renewable Energy Target has been introduced and subsequently split into a Small Scale Renewable Energy Scheme (SRES) and Large Scale Renewable Energy Target (LRET). There is no 'cap-and-trade' price mechanism in place for internalising GHG emission externalities and no GHG emissions performance standards in place for new power station developments.

The current policy framework for reducing emissions is the Commonwealth Government 'Direct Action' policy. This policy involves a Commonwealth Government auction process to allocate $2.5 billion for emission reduction projects and a baseline setting process for major emitting facilities. Companies that emit over and above the allocated baseline are required to pay a penalty. At present, there is little chance the policy will result in penalties being paid. As an example, the electricity sector has been granted a 'sectoral' baseline whereby individual generation facility baselines are only 'activated' once the sector exceeds the maximum level of emissions of the previous five years. Some policy commentators are arguing that this policy framework will evolve into a 'baseline and credit' style emissions trading scheme. However, the Government has not committed to this at this stage.

Australia needs to consider how it will implement long-term emission reduction policies that allow for the existing capital stock to be transitioned to low/zero emissions. Australia's policy initiatives should also be focused on the strategic importance of resources – primarily coal, gas and uranium. Australia has 33%, 10% and 2% respectively of the world's uranium, coal and gas resources. Around one-quarter of Australia's goods export revenues were sourced from the sale of coal and other mineral fuels. Given the strategic importance of coal, uranium and gas exports for the Australian economy, greater consideration of appropriate and cost-effective policy mechanisms for these resource industries would appear sensible.

Much of the public policy discussion is focused on whether a carbon price (implemented through a carbon tax or emissions trading scheme) should be introduced. However, the policy dynamic appears to be structured around: a well-designed carbon price providing incentives for operational decision making (i.e. running more gas-fired and less coal-fired generation within a year); and complementary market-based policies to influence capital decision making.

There are limits to the effectiveness of carbon pricing at influencing capital decisions given the interaction between gas prices, energy markets and climate change policy. Even at historical gas prices, the

Table 1: Sectoral emissions in Australia

Sector	Emissions (Mt)	% of Australian total	% change since 2003/04
Electricity	179.4	33.1	-7.8
Non-elec stationary energy	93.1	17.2	21.4
Transport	92.1	17.0	14.8
Fugitive emissions	45.2	8.3	20.2
Industrial processes	31.7	5.8	-3.1
Agriculture	87.9	16.2	-1.8
Waste	13.2	2.4	-17.5

Source: Department of Environment (2014)

[1] *https://theconversation.com/australias-post-2020-climate-target-not-enough-to-stop-2c-warming-experts-45879*

[2] *http://www.climateinstitute.org.au/verve/_resources/Post-2020_Emission_Challenge.pdf*

carbon price required to effect the substitution of existing coal-fired generation capacity with new efficient gas turbines is around $110/tonne, given the sunk capital costs of incumbent power stations. Such a carbon price is more than four times higher than the previous Australian fixed carbon price of around $23/tonne and would result in electricity price uplifts of approximately $90/MWh – an increase of 30% on a residential bill. Barriers to exit for thermal electricity generators and an ageing power station fleet[3] are another key consideration for policy makers. Around 75% of the existing thermal (coal and gas) generation plants have passed their useful engineering life. More importantly, ca.20% is more than 40 years old.

Lower carbon prices are likely to be more politically palatable and will have the effect of influencing the operations of existing assets. It is in this context that many policy commentators expect the 'safeguard baselines' framework to expand into a 'baseline and credit' scheme. Such a policy could be linked internationally allowing companies to both buy and sell emission reductions into a global market.

Other regulatory and legislative instruments are in place which impact capital allocation decisions and could have the effect of reducing emissions over the *long-term*. The most prominent of these is the market-based Large-Scale Renewable Energy Target. Globally, such a policy is well founded – with 144 countries having support mechanisms for renewables of some type. Electricity sector decarbonisation could be achieved with such a policy over the long-term if it was coupled with a generator 'closure' policy[4]. This would effectively be an adaption of performance standards for new electricity generators (such as that proposed in the US) and closure policy (as adopted in Canada).

Generator closure policy is one of the most actively discussed aspects of Australian climate change policy at the time of writing. A proposal to introduce a market-based closure mechanism released by *Australian National University*[5] academics has created significant discussion about the use of a complementary (to a broad economy-wide carbon price) market based mechanisms to overcome barriers to exit and speed up the transition to zero-emission energy sources.

There is also some discussion around expanding the LRET policy in the long-term to include projects utilising coal and gas that achieve zero or negligible emissions. As a major exporter of coal and gas, Australia's export revenues could be significantly curtailed should new CCS-style technology not be developed and made cost-effective within a '450 ppm' decarbonised world. Importantly, CCS-technologies would not be given a 'free-ride' but would be required to compete with renewable sources. Australia may advocate for other nations to adopt such a policy through international negotiations. This may create a deeper, liquid market for CCS-style technologies which would provide potential opportunities for Australian energy exporters.

The use of international credits is also under active consideration within Australia. If the objective of policy is to structurally decarbonise the Australian economy, GHG pricing may not result in GHG mitigation in Australia. It may also do nothing to address the risks to Australian energy exports in a '450 ppm world' where significant efforts are being made to develop substitutes for coal and gas.

Australia will be reviewing its climate change policy frameworks in 2016/17. It is clear that significant decisions will need to be made about how to evolve the current policy suite to achieve the significant emission reductions committed to at COP21. At the time of writing, much of the discussion leans towards the use of: a market based mechanism, such as an evolved Direct Action baseline and credit scheme, to influence operational decision making; and complementary policy to influence long-term capital allocation.

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[3] *http://www.sciencedirect.com/science/article/pii/S0313592615000156*

[4] *http://www.sciencedirect.com/science/article/pii/S0313592615000156*

[5] *http://www.sciencedirect.com/science/article/pii/S0313592615301351*

[6] *http://onlinelibrary.wiley.com/doi/10.1111/1759-3441.12114/abstract*

How ICIS uses behaviour to forecast emission rights prices

In Autumn 2006, companies active in the EU ETS had certainty that the EU cap-and-trade market had significantly more allowances than emissions until the end of its trading period. After the end of this period in 2007, these allowances would be deleted – there was no other use. All economic theory suggests that prices would drop to the price floor but prices traded north of €10/tonne for the rest of the year, and gradually declined thereafter.

In 2012, the market was oversupplied by 2bn allowances – a full year's volume of EU ETS covered emissions. These allowances would not be deleted, but it was expected that such demand would not be needed before the fourth trading period which starts in 2021. However, companies were willing to pay as much as €12/tonne, and the annual price averaged around €9/tonne.

Apparently, the balance between emissions and available allowances is not a good indicator for prices. To understand the reasons, you have to understand the commodity 'emission right'.

Unique characteristics of emission rights

Emission allowances are a virtual good that only exists thanks to political will. They are also a production input required by a range of different companies. The design of cap-and-trade systems caters for further key characteristics:

- Emission rights have no transportation and storage costs (except for capital costs)
- Emission rights can be consumed before owned

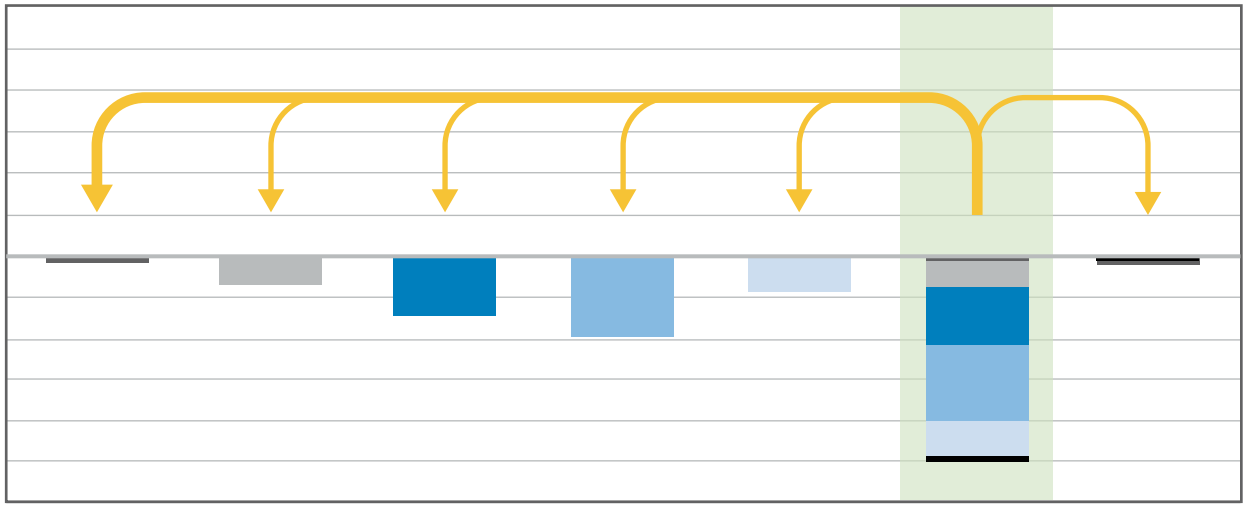
Both points suggest that the time window for purchasing allowances is very large, and actually extends beyond the date of consumption. For other commodities, a purchase long in advance of the consumption has high storage costs as a consequence, and the commodity must be procured on the day of consumption at the latest. In emissions trading, the allowance can be purchased at a time almost completely decoupled from actual emissions.

Relevant demand and supply

As we saw earlier, the difference between emissions and available allowances in any given time period is not representing demand and supply. Quite simply, the best proxy for demand and supply is: demand and supply traded in the market in any given time.

While some companies will indeed buy throughout the year in which emissions occur, others will hedge a price risk in advance. Furthermore, if companies receive excess free allocation (more allowances than emissions), they might prefer to bank their surplus to subsequent years when they expect a shortage, instead of selling the excess in the same year. So the time of emitting a tonne of greenhouse gas does not necessarily equal the time of demand for an emission right – the difference is the strategy of the individual company.

Figure 1: Distribution of a fundamental position over time



Source: ICIS Tschach Solutions

This strategy can be anything: some utilities apply very sophisticated hedging strategies that make them buy emission rights up to four years prior to the emission of the tonne of CO2. Other companies hedge in a shorter horizon, and companies that have more allowances allocated than they actually need have the tempting option to bank their surplus to subsequent years to either wait for higher prices, or to use their own allowances for compliance in the future.

The true demand and supply that drives prices in a cap-and-trade market is therefore not the fundamental data, but the traded supply and demand in the market. We call this 'Traded Positions'.

Forecast CO2 prices with the TIM

The Timing Impact Model (TIM) calculates the demand and supply entering the market at any given time period. The traded market can see a shortage of supply in a given time period, even though the market is fundamentally oversupplied – this happens if companies that require allowances are very active while companies with excess emissions rights or EUA auctions are absent.

The Timing Impact Model can explain why prices did not drop to €0 in 2006: Companies which held all the excess were reluctant to sell, while the utilities facing a short position needed to buy allowances. In 2012 however, utilities had hedged a good share of their post-2012 power production. In total, this absorbed the lion share of the fundamental surplus in the market. In addition, some companies holding excess EUAs were again rather keeping them than selling.

Thus, the TIM can explain why prices are not trading at the fundamentally justified price at all times – because the fundamentals are not driving the short-term market!

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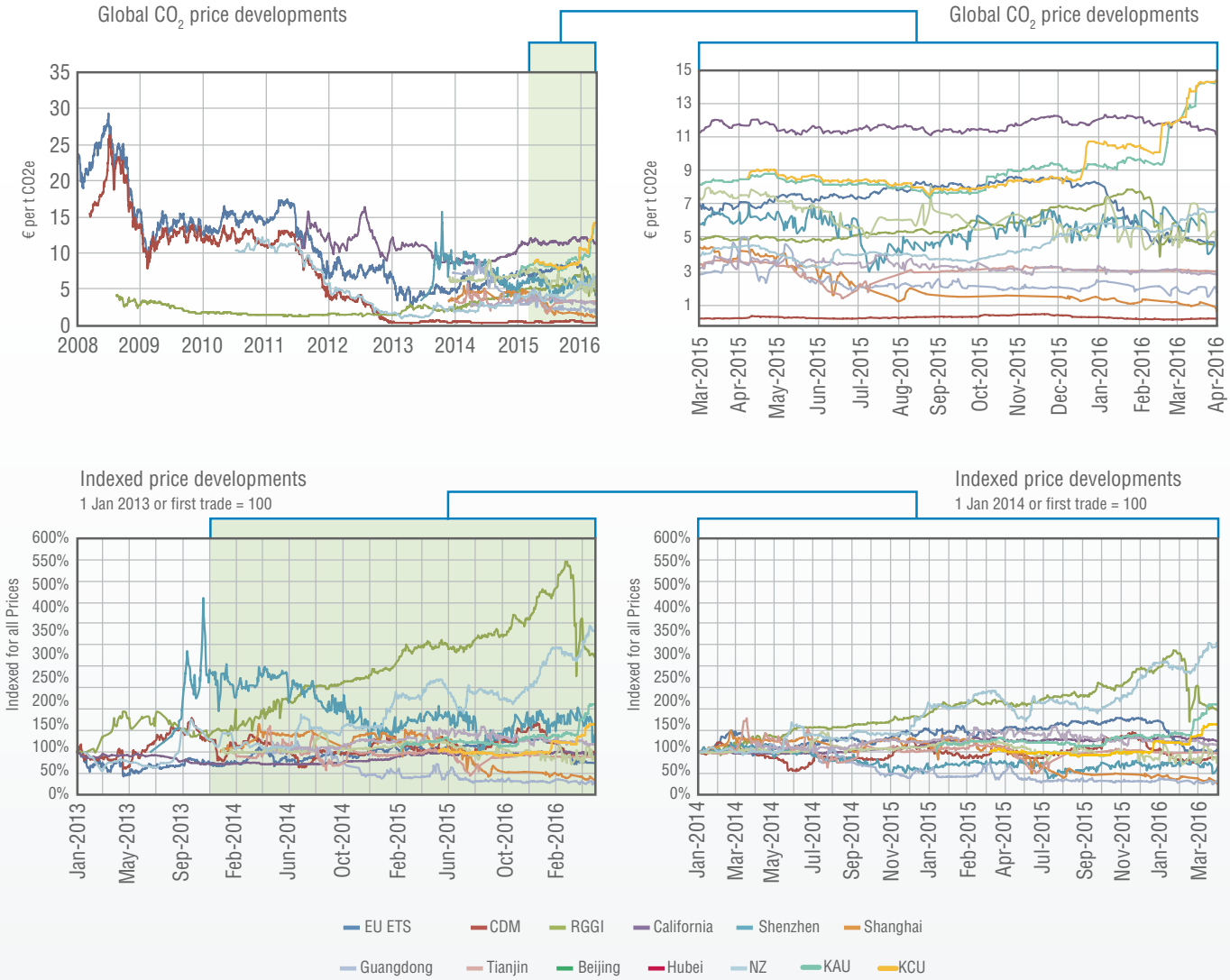
Carbon trading around the world



Source: Intercontinental Exchange, RGGI, OM Financial NZ, China Emissions Exchange

Timeline

1997 Signature Kyoto Protocol

2002 Marrakech Accords – start of CDM

2004 First CDM project registered

2005 Start of Trial EU ETS

2008 Start of Kyoto period, start of EU ETS Phase 2, Start of NZ scheme

2009 Start of RGGI

2012 Start of fixed price period in Australia

1. EU ETS

- Biggest global system
- Market Stability Reserve implemented and will start in 2019
- Big post-2020 reform currently discussed in EU institutions

2. Chinese Pilot Systems

- Seven pilot ETSs operating smoothly
- Preparation for the National ETS which is expected to start in 2017
- More details of the National ETS expected to be released in the second-half of 2016

3. South Korea

- 570 entities from 23 industries covered (new entrants included)
- Emissions cap of 1.69bn tonnes of CO2 equivalent from 2015 to 2017
- Both direct and indirect emissions covered

4. New Zealand

- Broad sectoral coverage including forestry
- One surrendered allowance satisfies two tCO2 liability

5. Kazakhstan

- System with only small trading activity
- Huge reserve for government
- Suspended until 2018

6. WCI

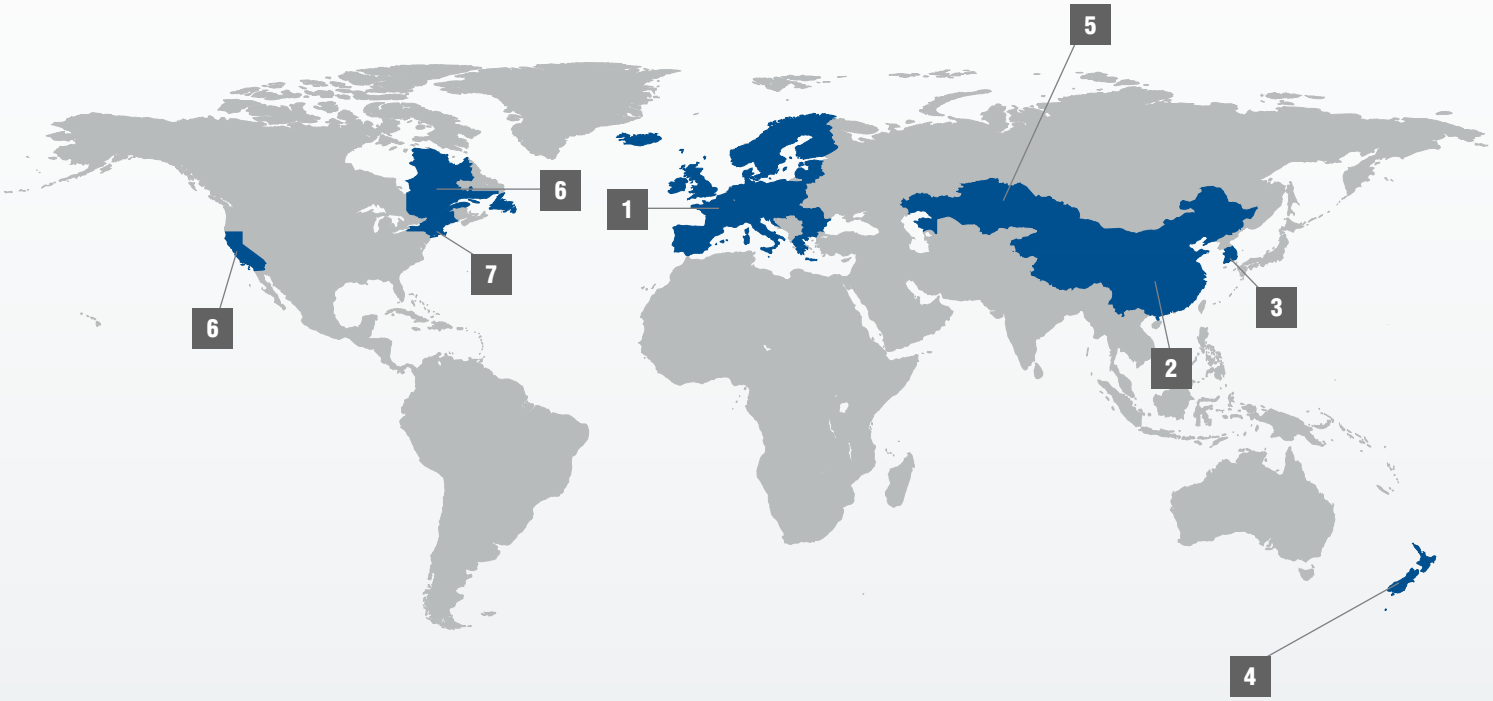
- System with the widest scope
- Highest global carbon price
- Linkage between California and Quebec

7. RGGI

- Only power sector
- Have seen a massive price increase after a reform in 2013
- Potential for expansion

CDM

- Global offset mechanism
- More offsets than demand
- Governed by UN



2013
Start of California & Quebec scheme, Start of trial schemes in China, Start of Kazak scheme, Start of EU ETS Phase 3, start of Kyoto II

2014
Implementation of new Model Rule in RGGI, Linking between California and Quebec, start of back-loading in the EU ETS, Repeal of the Australian Carbon Pricing Mechanism

2015
Start of South Korean scheme, COP15 in Paris, Clean Power Plan in the US

2016
National Scheme in China expected to start in the second-half of 2016

2017
Start of China's National Scheme, Planned start of ETS in Ontario

EU Emissions Trading System – EU ETS

In 2005, the EU launched its Emissions Trading System (EU ETS) as the cornerstone of the EU's policy to combat climate change.

The EU ETS was designed from scratch as a multi-national and multi-sector system– with all EU member states participating. In 2015 more than 11,000 stationary installations in 31 countries[1] participated in the scheme. Covered by the EU ETS are carbon dioxide (CO2) emissions from power and heat generation, energy-intensive industry production and commercial airlines, nitrous oxide (N2O) and perfluorocarbons (PFCs).

Table 1: Overview

Quick facts	
Regulator	European Commission and National Emission Trading Authorities
Covered entities/sectors	Entities: Over 11,000 stationary installations + airlines Sectors: Power and heat generation, energy-intensive industry (oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals), civil aviation
Compliance periods	• Phase 1: 2005-07 • Phase 2: 2008-12 • Phase 3: 2013-20 • Phase 4: 2021-30
Reduction target ETS	-21% in 2020 (2005 baseline); -43% in 2030 (2005 baseline)
Reduction target country	-20% in 2020 (1990 baseline); -40% in 2030 (1990 baseline)
Plans post-2020	In theory, the current regulation has no pre-defined end point, therefore the system goes on as currently regulated after 2020. However, in line with the European Council conclusions from October 2014, the European Commission proposed in July 2015 a legislative proposal for a reform of the scheme post-2020. The key points are: • The cap would be adjusted to reach -43% reduction in 2030 compared to 2005 levels • Free allocation would be continued based on benchmarks and historical activity levels • A breathing New Entrants Reserve (NER) would account for reduced and increased production activities • An Innovation Fund to support innovation projects including breakthrough industrial projects, renewable energy and CCS would be created • A Modernisation Fund would be established in order to support the modernisation of energy systems for low income member states with GDP/capita below 60% of the EU average
Covered emissions	Approx. 1,872m tonnes CO2e are covered in 2015
Cap 2015 (stationary)	2.027m allowances (theoretical), 1,523m (practical)
Auctions 2015	649m (633m stationary + 16m aviation)
Banking/Borrowing	Both allowed unlimited
Offsets	CERs and ERUs allowed for compliance, but subject to quantitative and qualitative restrictions
Penalties	€100 for each tonne of CO2e emitted for which no allowances have been surrendered. Furthermore, the payment does not release the operator from the obligation to surrender the respective allowance in the following year.

[1] *Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom*

Fundamentals													
[m tonnes]	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Covered emissions	2,120	1,880	1,939	1,904	1,952	1,963	1,868	1,872					
Theoretical cap (stationary installations)	2,003	2,053	2,090	2,112	2,143	2,104	2,066	2,027	1,988	1,950	1,911	1,873	1,834
Free Allocation*	1,959	1,975	1,999	2,039	2,090	1,006	959	923	890	859	828	795	747
Auctions**	44	78	91	73	53	857	609	649	767	953	957	770	867
Offset use***	83	82	137	255	504	133	256	8	8	9	9	14	26
Average price****	22.39	13.21	14.47	13.42	7.50	4.50	5.96	7.69					

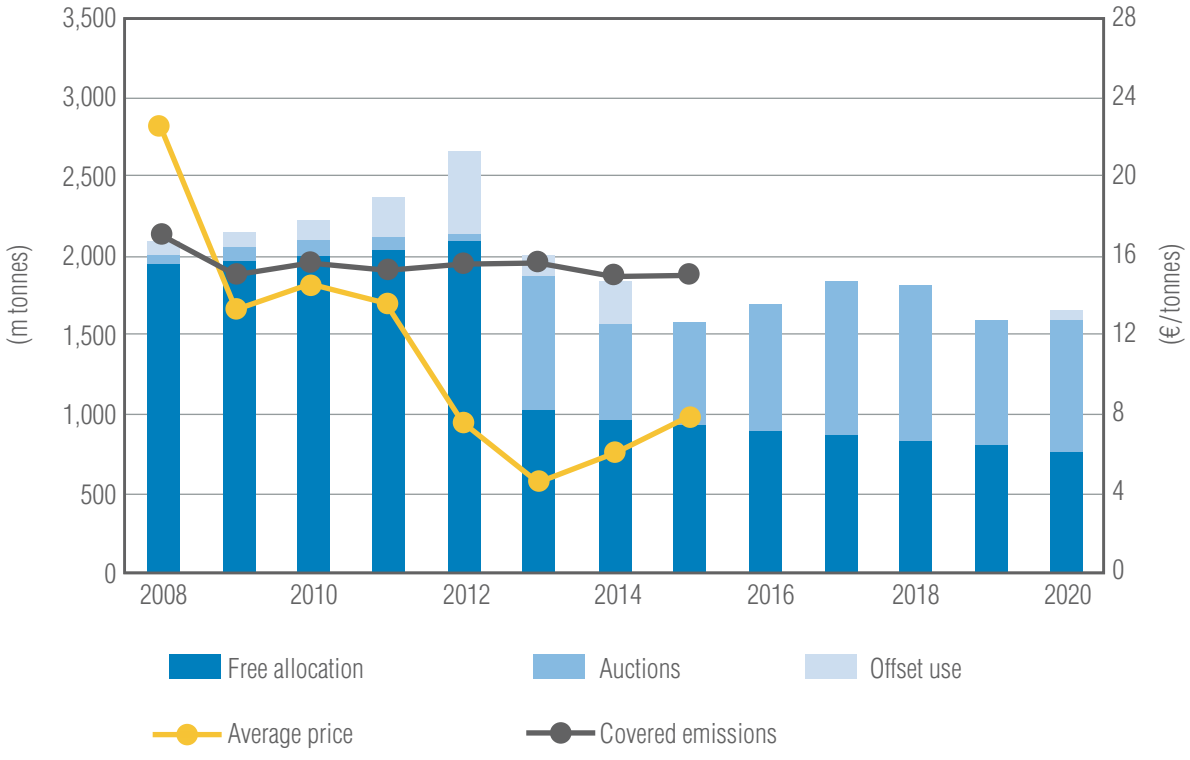
** Currently published free allocation volumes (incl. transitional free allocation volumes for power producers in Eastern Europe), the final volumes are subject to the verified emissions of every year*

*** Current ICIS Tschach Solutions expectations for auction volumes (including the MSR)*

**** Current ICIS Tschach Solutions expectations*

***** respective December contract*

Figure 1: Fundamentals



Source: European Commission, Intercontinental Exchange (ICE)

System setup

On 31 October 2003, the basic EU legislation regulating the EU ETS, Directive 2003/87/EC, was formally passed.

The system is organised in trading periods and currently we can distinguish between four phases:

1. Phase One or 'Pilot Phase' (2005-07): The first trading period was intended to serve as a trial period and was characterised by large uncertainties regarding fundamental features.

2. Phase Two or 'Kyoto Phase' (2008-12): The end of the second trading period coexisted with the first commitment period of the Kyoto Protocol. Therefore, the second trading period was designed to reach the EU-wide Kyoto emission reduction target.

3. Phase Three (2013-20): The system underwent significant legislative changes and is set to reach -21% emission reductions in 2020 compared to 2005 levels.

4. Phase Four (2021-30): The target for the fourth trading period envisaged by head of states is -43% in 2030 compared to 2005 levels. Structural reforms – including rules for free allocation, etc. – are currently under discussion.

With the start of the third trading period in 2013, significant legislative changes came into effect which were altering the setup of the system drastically. The descriptions below refer to the setup of the system in the third trading period.

The cap in the EU ETS is set by a top-down approach as of the third trading period. This means that the Commission sets a harmonised EU-wide cap covering all stationary installations in 28 member states and the three linked EEA-EFTA states (Iceland, Liechtenstein and Norway). This cap is decreasing by -1.74% (of the average total quantity of allowances issued annually in 2008-2012) per annum until 2020. In addition the Commission is determining a second cap for the aviation sector.

The default method of allocating allowances to market participants changed from the second to the third trading period from free allocation via grandfathering to auctioning.

In general, 88% of the auction volumes are distributed to member states on the basis of their 2005 emissions. From the left-over of the auction volumes, 10% is shared between the least wealthy EU member states and 2% function as a Kyoto bonus. The EU holds common auctions for all allowances of the 28 member states, but gave countries the possibility to opt-out of the common auctions and conduct their own auctions with their respective auctioning share. Three member states have made use of this opt-out option: Germany, Poland and the UK. The 2015 weekly auction calendar was as follows:

Weekday	Country	Period
Monday	Common EU	Weekly
Tuesday	Common EU Poland	Weekly 2 auctions
Wednesday	UK Poland	Bi-Weekly 5 auctions
Thursday	Common EU	Weekly
Friday	Germany	Weekly

As of the third trading period, the amount of allowances granted free of charge to industrial installations is based on a benchmark system. Power producers on the other hand do not receive free allocation except for some utilities from member states which have requested to temporarily allocate allowances for free to their power sector.

The benchmarks used to determine the industrial free allocation are calculated on a product basis (to the extent feasible) by using the average emissions of the best performing 10% of installations within the EU. With this approach, the EU wants to make sure that free allocation is granted only to the extent of the best practices to produce a certain product in the EU.

On top of free allocation, a part of the cap is put into a reserve – the New Entrants Reserve (NER). This reserve is ultimately built up by 5% of the annual EU-wide cap and is earmarked for new installations which have not applied for free allocation in the beginning of the trading period.

System history

Prices for EU ETS carbon allowances (also known as EUAs), have experienced severe fluctuations during the existence of the system.

Phase 1

In the first trading period, prices increased steadily from January 2005 (€8) to April 2006 (€31) as it was widely expected that the system would be short. However, in April 2006 prices collapsed to under €10 within a few days. This price collapse was closely linked to the first emissions disclosure by member states in April 2006. This data showed that the market was not, as expected, short, but in fact long. Banking was not allowed in the first trading period and many would argue that the price for allowances only eligible in the first trading period (TP1 allowances) should have been €0. However, the price development from April 2006 until the end of 2006 proved otherwise. Although no shortage was expected until end of the first trading period, prices recovered to around

Figure 2: Price development in the EU ETS

Source: Intercontinental Exchange (ICE)

€20 at the end of May 2006 and kept above €15 until October 2006. Afterwards, prices declined to a few cents and stayed in these low regions until end of the first trading period (December 2007).

Phase 2

As banking was allowed from the second trading period onwards, prices of TP1 allowances (Dec-07 futures) and prices for allowances eligible in the second period and later (Dec-08 and later delivery futures) disconnected from mid-2006 onwards. As mentioned above, prices for TP1 allowances slumped steadily from mid-2006 onwards while TP2 allowances held their ground above €15 until the end of the first trading period, and then even increased to above €30 until July 2008. However, prices then declined over a few months to under €10 in February 2009, although banking was now allowed. This development can be mainly ascribed to the downturn of the EU economy. The recession reduced not only the output of energy-intensive industry sectors, but also the power demand across Europe. Both developments reduced emissions and thus lowered the need for abatement to meet the EU ETS cap. The recession not only knocked down the emissions forecast for 2009, but all forecasts for the consecutive years in the second trading period. After prices fell below €10 in February 2009 before recovering to around €17, they kept floating in the range between €13 and €18 until July 2011. From July 2011 until January 2012 prices decreased further to under €7 due to the ongoing troubled economic outlook in the EU and the euro crisis.

In 2012, prices stayed in the region between €7 and €10 before declining to under €4 in January 2013. This steep decline was mainly caused by the change of allocation methodology from the second to the third trading period. As the standard allocation methodology was changed from free allocation (some surplus was banked, not entering the market) to mostly auctioning (all auctions enter the market) a much higher share of the surplus was actually entering the market.

Phase 3

Throughout 2013, prices were mainly driven by political developments around back-loading. Voting days in Parliamentarian committees and the European Parliament's plenary, meetings of the European Council as well as the slightest comments from member state officials triggered significant daily price fluctuations and increased volatility.

The price developments in 2014 were characterised by significant volatility. During the legislative finalisation of back-loading in January and February 2014, the price increased significantly from around €4.80 at the beginning of the year to €7.20 at the end of February. This price increase was quite surprising as Q1 2014 saw the highest ever auction supply entering the market in the history of the EU ETS.

However, after this rally, the price development reversed and the benchmark contract slumped to under €4.50 end of March. The rest of 2014 was then dominated by a steady price increase to around €7.30 end of 2014.

State of play

The EU ETS is one of the most liquid commodity markets in Europe with an average daily traded volume in the secondary market of around 11m EUAs in 2015 (for the most liquid contract, EUA Future December 2015 delivery, on the Intercontinental Exchange).

In 2015, the European carbon price continued their steady increase from 2014. The start of the year, however, saw some volatility around the final negotiations of the Market Stability Reserve (MSR) between the European Parliament and the Council of the EU.

As of Q2, prices then more or less increased gradually and reached €8.30/tCO2e (December 2016 contract) end of the year.

Prices were mainly driven by compliance trading during the year with low trading volumes and low volatility. From the policy side, no further price driving discussions took place as the institutions only started to work on the post-2020 proposal towards the end of the year.

The market development in 2016 proved once more that carbon can be volatile. The year started with a very high trading volume in the December 2016 contract and rapid price declines. Starting at around €8.30/tCO2e, prices slumped by over €2/tCO2e in January to around€6.00/tCO2e. February saw no consolidation, but prices declined further to €4.70/tCo2e in the middle of the month. Since mid-February prices traded between €4.70/tCO2e and €5.40/tCO2e until editorial close of this publication (April 2016).

Outlook

For the EU ETS, the next big step will be the implementation of the MSR which will be active for the first time in 2019. This reserve will automatically adjust auction volumes based on the cumulative over-supply of the system roughly a year before.

After the head of states of the EU member states outlined the strategy for the EU energy policy from 2020-2030 in October 2014, the European Commission was tasked to cast this strategy in a legislative mold. In July 2015 the Commission presented the respective legislative proposal to the co-legislators, the European Parliament and the European Council.

The discussions around the post-2020 scheme will most likely set the agenda for the EU ETS in the next months if not years.

More details about this reform can be found in our Spotlight article on the EU ETS.

Further resources:

- EU Commission – EU ETS section of DG Climate Action
  http://ec.europa.eu/clima/policies/ets/index_en.htm

- EU Commission – Registry, European Union Transaction Log
  http://ec.europa.eu/environment/ets/

- EU Commission – Conclusions on 2030 Climate & Energy Policy Framework
  http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145356.pdf

- EU Commission – Post-2020 legislative proposal
  http://eur-lex.europa.eu/resource.html?uri=cellar:a556e9fb-5153-11e5-9f5a-01aa75ed71a1.0014.02/DOC_1&format=PDF

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The post-2020 EU ETS structural reform

In October 2014, the European Council provided the European Commission with guidance to implement a long-term structural reform of the European Emissions Trading System (EU ETS) in Phase 4 (2021-2030). Nine months later in July 2015, the European Commission submitted its EU ETS reform legislative proposal.

The proposal will have to be approved by the European Parliament and Council of the EU to come into force. The process is expected to take around two years with a potential legislative conclusion at the end of 2017.

The road to a reformed EU ETS

For years, the EU ETS has struggled with a supply and demand imbalance problem. As of 2016, the system had a surplus of carbon allowances of around 1.5bn tonnes. To tackle the issue, the European Commission put forward short and long-term solutions in recent years.

First, back-loading came into force in 2014 with the postponement of 900m auction volumes from the years 2014, 2015, and 2016.

Second, the Market Stability Reserve (MSR) was approved in fall 2015. Starting in 2019, the MSR will adjust annual auction volumes according to historic surplus levels.

Finally in July 2015, the European Commission released its long-term plan with a legislative proposal to reform the EU ETS after 2020.

Overall, the post-2020 Commission proposal orbits around three key elements including a change in the linear reduction factor, a more targeted free allocation approach, and new funds to support modernisation and innovation in the energy arena.

From 1.74% to 2.2% Linear Reduction Factor

The EU aims to reduce its carbon emissions by at least 40% by 2030 compared to 1990. To reach this target, the EU ETS-covered sectors will have to reduce their emissions by -43% compared to 2005 while the non-ETS sectors will take on -30% target. In that context, the Commission proposal envisages an increase of the annual cap reduction, the Linear Reduction Factor (LRF), to 2.2% from 1.74%. This 2.2% LRF is expected to deliver 556m additional tonnes of emission reductions compared to a 1.74% scenario.

Paris does not change anything, for now…

After the Paris Agreement, all eyes were on the EU to see if it would increase its 2030 emissions reduction target in light of the Paris Agreement´s aspirational goal of 1.5°C.

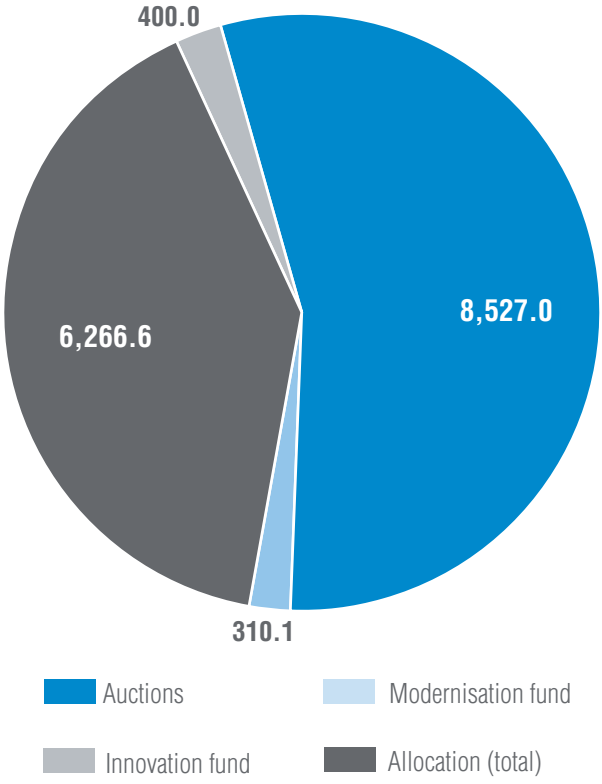
In its impact assessment of COP21, the European Commission stated that more analysis is needed on the policy implications of 1.5°C. Furthermore, collective ambition will have to be assessed after the international facilitative dialogue in 2018. In that context, except if we were to see a significant push by both EU co-legislators to discuss a change of the EU target in the post-2020 negotiations, the post-2020 LRF is unlikely to be changed before 2018.

Cap composition of Phase 4

In its October 2014 conclusions, the EU Council stated that the share of allowances to be auctioned in Phase 4 should not be reduced compared to Phase 3. In that context, the Commission proposed a cap composition with 57% auctions and 43% free allocation.

The auction share would consist of 55% auctions and 2% modernisation fund. The free allocation share would include 40.4% for the industrial cap and heat producers. The other 2.6%, or 400m EUAs would supply the innovation fund.

Figure 1: Cap composition in Phase 4



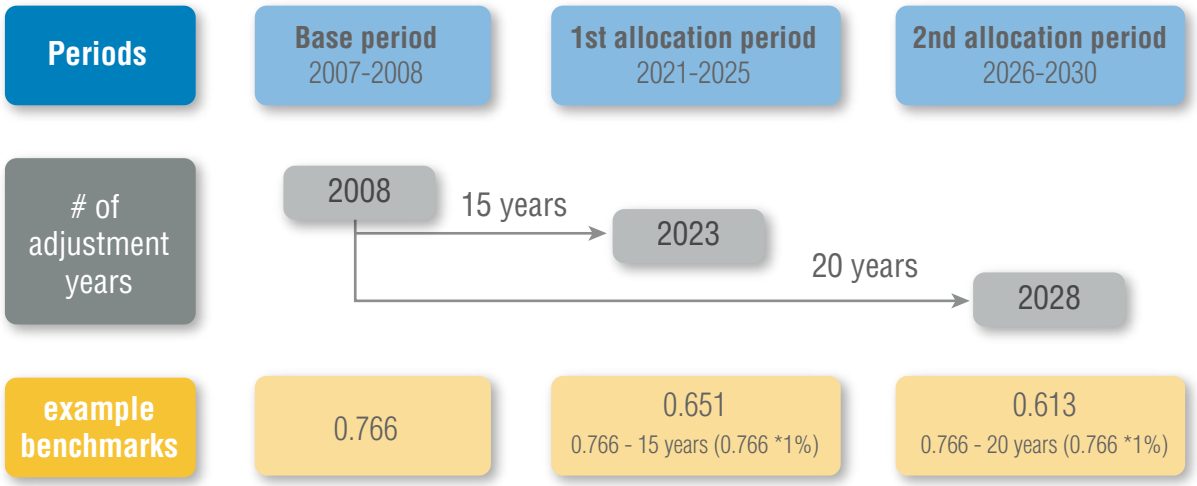
Source: ICIS Tschach Solutions

[1] *http://data.consilium.europa.eu/doc/document/ST-169-2014-INIT/en/pdf*

[2] *http://eur-lex.europa.eu/resource.html?uri=cellar:a556e9fb-5153-11e5-9f5a-01aa75ed71a1.0014.02/DOC_1&format=PDF*

[3] *https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-110-EN-F1-1.PDF*

Figure 2: Proposed benchmark calculation for Phase 4 (2021-2030)



Finally, the New Entrants Reserve (NER) would not be part of the cap but would be sourced from allowances from Phase 3 as well as future left-over free allocation generated during Phase 4.

A more targeted free allocation approach

Overall, the Commission aims to retain broad principles of the free allocation system based on benchmarks and historic activity levels. However, the post-2020 Proposal makes several proposals to amend the free allocation parameters to have a more targeted system.

First, the Commission Proposal envisages shorter free allocation periods of five years with reduced time lags between production baseline and actual production. In that context, Phase 4 (2021-2030) would include two free allocation periods, 2021-2025 and 2026-2030. The production baseline for the first and second free allocation period would be 2013-2017 and 2018-2022 respectively. Second, the Proposal includes a provision for annually decreasing product benchmarks with a default 1% annual decrease and alternative rates for under and over performers.

Third, the Commission proposes to change the threshold determining the carbon leakage exposure of a sector. It is estimated that the new threshold would see around 150 sectors dropping from the carbon leakage list in Phase 3 to around 50 sectors. However, around 93% of industrial emissions would still be on the list compared to around 97% in Phase 3.

Finally, the post-2020 Proposal aims to compensate under-allocation due to production increases with the possibility to receive more carbon allowances. This contrasts with Phase 3 where installations only see their free allocation level adjusted (downward) if their production level decrease.

New funds for energy innovation and modernisation

To support the transition towards a low carbon economy, the European Commission proposes the implementation of two new funds financed with carbon allowances.

The first fund, the 400m innovation fund, will aim at supporting low carbon innovation projects in the field of renewable energy, CCS, and energy efficiency. It is unclear how the allowances will be monetised but it is very likely that the same methods as for the NER 300 programme are used.

The second fund, the 310m modernisation fund, will aim at supporting low income EU member states with the modernisation of their energy systems. The allowances will be auctioned as part of the regular auction schedule.

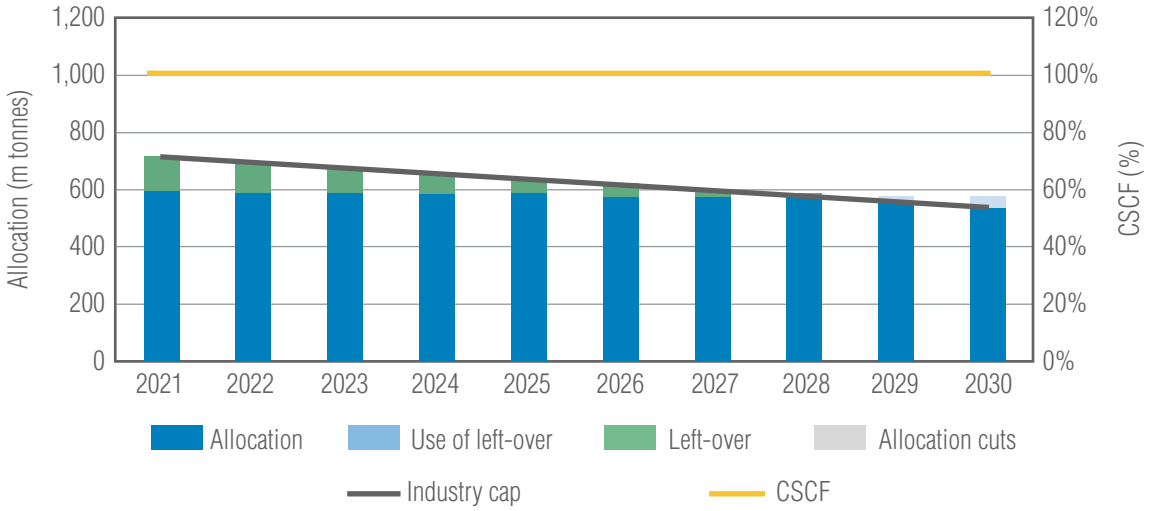
The Cross-Sectoral-Correction-Factor – to be triggered or not triggered?

In Phase 3, the volume of allowances to be distributed to industrials is cut every year by the Cross-Sectoral-Correction-Factor (CSCF). The reason is that the preliminary free allocation – in other words the volume of free allocation which installations should normally receive based on their historic activity level and benchmarks – is above the industry cap.

For Phase 4, the Commission Proposal aims to decrease the likelihood of the CSCF being triggered. According to our analysis of the Commission Proposal, the CSCF will not be triggered during Phase 4.

The main factors behind this is the decreasing benchmarks and new production baselines with the latter being based on years after the economic crisis. Another critical factor behind the non-triggering of the CSCF is the new proposed provision related to do CSCF. This

Figure 3: CSCF not triggered during Phase 4



Source: ICIS Tschach Solutions

provision states that any surplus ('left-over' in Figure 3) created by preliminary allocation volumes ('allocation' in Figure 3) being lower than the industry cap could be banked and used in future years to fill any shortage and avoid the triggering of the CSCF.

The legislative road to reform EU ETS

To become law, the post-2020 legislation will have to be approved under the ordinary legislative procedure, formerly known as the co-decision procedure. In that context, the Proposal will have to be approved by the two EU co-legislators, namely the European Parliament and the European Council. At the time of writing, the post-2020 legislative Proposal has started to be discussed by both institutions.

In the European Parliament, the file would be led by the Environmental Committee (ENVI) but some elements of the file would fall under shared responsibility with the Industry Committee (ITRE). At the time of writing, both ENVI and ITRE have had their first respective exchange of views on the Commission Proposal. In the Council, the post-2020 file had been discussed by the Environmental Council of the EU and on a regular basis by the Working Party on the Environment, its technical working body. The legislative process is expected to take at least two years with a potential conclusion by the end of 2017.

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China

Since the start of the Shenzhen Pilot Emissions Trading Scheme (ETS) in June 2013, the seven pilot schemes in China have experienced two or three years of emissions trading. During this period, the pilots have witnessed significant price movement, improved their system design accordingly, where market participants have been educated about the concept of carbon trading.

State of play

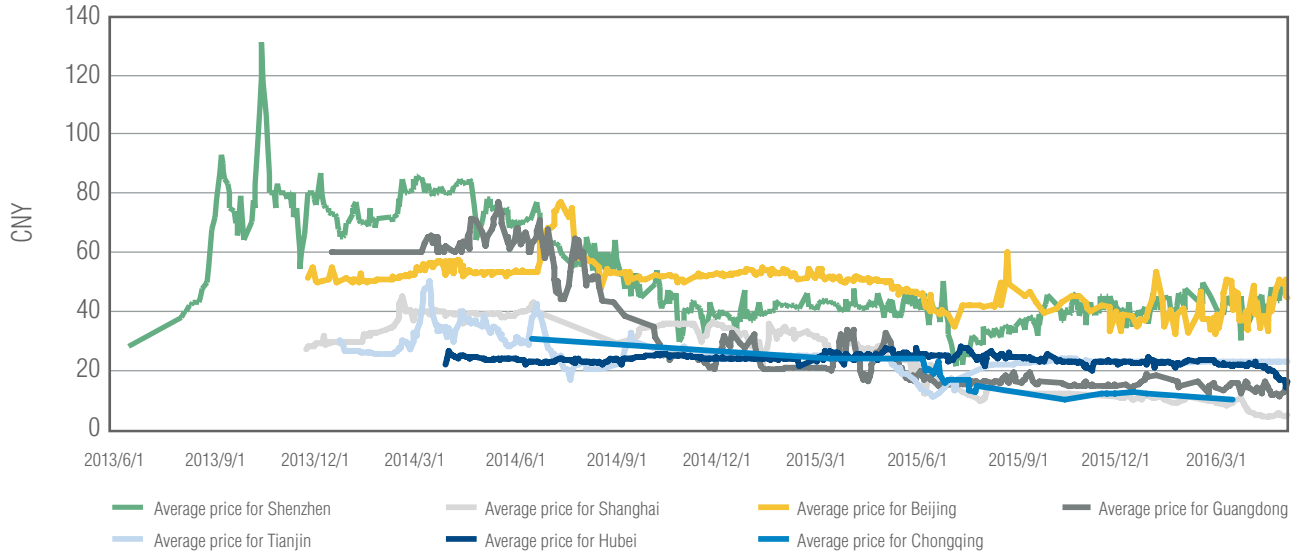
As pilot schemes, the seven ETSs in China exhibit unique characteristics. The market has been described as volatile, illiquid, and uncertain. This cannot be simply attributed to poor market design. It's the premature market, inexperienced participants, and the uncertain national policies combined that contribute to the current state of the market. Imperfect as they are, the pilots do manage to educate participants on the market, test out different market designs, while some even try to constantly improve the policies and rules to accommodate different situations.

In the beginning of these pilots, almost all of them have witnessed different degrees of price surge. The most dramatic rise occurred in Shenzhen. It commenced trading at around ¥30/tonne in June 2013 and the price surged above ¥100/tonne four months later. The price surge is not uncommon in other ETSs abroad like the EU ETS, which has also experienced significant price rise in its early stages. In China, this could be partially attributed to market information uncertainty. At the early start of the Chinese pilot carbon markets, market participants were not clear about the overall position of the market. The long companies were reluctant to sell while some short players were eager to buy to cover their short positions. This short supply-demand mismatch resulted in the temporary price increase.

In general, after several months of trading, the players got to know the market better, and the price came back to its normal level. In some pilots, the price movement also exhibited some seasonal traits. In their first compliance period, Shanghai (June 2014), Beijing (July 2014) and Hubei (July 2015) saw the allowance prices increase between 30% and 60% respectively as compared to the carbon price at the start date. Carbon prices then quickly fell right after the compliance deadlines. This seasonality is the result of compliance companies' passive trading behaviour. However, as compliance companies became more proficient in carbon trading, as well as learned their lessons from covering their short positions at high carbon prices, we have observed that companies started to trade early and more proactively, causing the seasonal fluctuations to become less prominent in the later years.

Starting in the second half of 2015, a declining trend could be observed in many pilots. Some pilots even recorded its lowest price in history. For example, Shanghai ETS experienced six consecutive days of price drop, starting from ¥10.80 on 25 March 2016, declining all the way down to early April's record low of ¥5.40. This is only 20% of the opening price of its start date on 26 November 2013. The price drop in various pilots cannot be purely attributed to over allocation. Admittedly, over allocation leads to an excess supply of allowance,

Figure 1 Price movement of Chinese carbon markets



Sources: China Emissions Exchange (Shenzhen), Shanghai Environment and Energy Exchange, China Beijing Environment Exchange, China Emissions Exchange (Guangzhou), Tianjin Climate Exchange, China Hubei Emission Exchange, Chongqing Carbon Emissions Trading Center

Table 1: Traded prices and volumes						
Pilot ETS	**Start Date**	**Traded Volume (m tonnes)**	**Turnover (m Yuan)**	**Average Price (Yuan/tonne)**	**First Day Opening Price (Yuan/tonne)**	**Closing Price 31 Mar 2016 (Yuan/tonne)**
Shenzhen	18 Jun 2013	10.9	409.6	37.57	29	40.50
Shanghai	26 Nov 2013	4.0	121.9	30.79	27/26/25	6.70
Beijing	28 Nov 2013	6.0	128.3	51.52	50.02	33.94
Guangdong	19 Dec 2013	10.0	210.8	21.12	60.17	14.23
Tianjin	26 Dec 2013	2.1	36.2	17.93	27.94	23.13
Hubei	2 Apr 2014	25.0	607.4	24.33	21	21.62
Chongqing	19 Jun 2014	0.3	7.0	23.33	30.74	10.00

Source: ICIS Tschach Solutions, as of 31 March 2016

putting downward pressure on the carbon prices. However, what's more important in understanding the reason for the price decline in the Chinese pilot markets is the lack of confidence in the pilot allowance due to the uncertainty of the transition from pilots to National ETS. With no or mixed information on whether pilot allowances can be banked to National ETS, it is understandable that very few buyers enter into the markets.

Besides the price volatility, low liquidity is also a frequently quoted problem in the pilot markets. Other than the over allocation factor mentioned above, which leaves very little demand in the market, another reason behind the low liquidity is the trading behaviour of the market participants. Chinese companies generally close their positions late. A number of short companies only cover their short positions once right before the compliance deadline. There can be different reasons for this inactive trading behaviour. Some companies simply don't know or care to know about carbon trading. This is especially true for long companies with excess allowances. For those who do want to trade, a spot market doesn't provide too many hedging tools for companies to manage their risks. Companies' internal structure sometimes can also be a problem. We know some traders at big companies have to go through a cumbersome internal approval process every time they want to trade. However, we have seen some improvement in these aspects. As the National ETS is drawing nearer, more and more companies are putting great emphasis on carbon trading and building their own carbon management team. Hence we believe the trading behaviour of participants will improve over time, and less seasonality will be observed in later carbon prices.

At the same time, pilot ETSs have sometimes changed their policies to adjust to different market situations. This could be a little tricky for the market participants as the policy lacks consistency. An example is the Tianjin ETS' sudden imposition of offsets usage restrictions before the compliance deadline, which upset many companies' plan for using CCER for compliance. However, if well communicated, a change of policy can be a good trial in the pilot scheme, testing the reaction of market participants towards various rules and educating them, as well as providing a valuable lesson for the National ETS. For instance, the auction rules in Guangdong ETS have changed significantly. The floor prices have been modified from a fixed ¥60 in 2013, to a progressively increasing ¥25-¥40 in 2014, and to no floor price set in 2015 (but with a floating reserve price). This change has reduced the financial pressure on compliance companies, encouraged more companies to participate in the auctions and to participate early. It has also resulted in the price correction, shifting the allowance prices to a level more representative of the market.

Outlook

With the National ETS scheduled to start in a year's time, the most frequently asked question regarding the pilot ETSs is their future in the context of the National ETS. At this time, there has been no official policy announced regarding the transition from pilot to the national market. However, several developments in the past couple of months have shed some light on where the pilot markets will be going.

Firstly, as most pilots are designed for the trading period of 2013-2015, there is a one year gap between the original end date of the pilot ETSs and the actual start date of the National ETS. As more and more ETSs announce the extension of the pilot for one more year, we can be more confident that the gap will be covered. Some pilots like Beijing also expanded its coverage to enroll more sectors. Hence, there is a high possibility that small emitters will continue to be enrolled in the pilots even after the start of the National ETS. That is to say that some pilots will co-exist with the National ETS after 2017.

Secondly, in the extension year, many pilots have introduced or will introduce more trading products into the market. In March 2016, China Emissions Exchange (Guangzhou) announced the first forward trade signed in Guangdong ETS. Hubei and Shanghai ETSs will also introduce exchange-traded forward contract in Q2 and Q3 2016. The futures alike forward contract will provide more choices for the market participants to hedge their risks. It is also a good test for the National ETS, since regulators want to introduce derivatives into the market in the post-2020 market.

Thirdly, it is still unclear whether the pilot allowances are bankable in the National ETS. Beijing and Tianjin ETS have announced that their pilot allowances will be valid within the pilot even after the start of the National ETS. The transition of allowance to the National ETS still depends on the final decision from the market designer – the National Development and Reform Commission (NDRC). Possible scenarios include:

- Void all pilot allowances – allowance prices will then fall to zero at the end of the pilot phase
- Exchange pilot allowances to national allowances – allowance prices will be dependent on the "exchange rate"
- Bank all pilot allowances – allowance prices of different pilots should converge

However, considering the complexity of designing the world's largest ETS, the transition policy might not be on top of the NDRC's agenda. Therefore, uncertainties loom for the future of the pilot ETSs.

Further resources:

National Development and Reform Commission
http://www.ndrc.gov.cn/

The State Council
http://www.gov.cn/

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China's National ETS

Covering three to four billion tonnes of emissions annually, China's National Emissions Trading Scheme (National ETS) will soon take over EU ETS to become the world's largest scheme once it starts.

China has said on numerous occasions that it is determined to curb carbon emissions through the cap-and-trade system. In its Intended Nationally Determined Contribution (INDC), China has proposed to peak carbon dioxide emissions around 2030 or sooner and to establish a national carbon trading system, which is in line with the Party's Third Plenum's decision, where the government decided to let market mechanism play a decisive role in resource allocation. In the recently released 13th Five Year Plan (FYP), a national trading scheme is on top of its agenda to reduce emissions. The leadership has also reaffirmed that the National ETS will start in 2017. President Xi Jinping declared in the US-Sino Joint Presidential Statement on Climate Change that China plans to start its national emissions trading system in 2017. The programme would cover key industry sectors such as iron and steel, power generation, chemicals, building materials, paper-making, and nonferrous metals. The National Development and Reform Commission (NDRC), the central regulator of the upcoming National ETS, has developed a concrete timeline for the next steps in building the National ETS.

Key factors in the development of the National ETS

Currently, the National ETS is still in the preparation phase, and the NDRC is coordinating with different stakeholders in designing an efficient and effective carbon market. If everything runs smoothly, the National ETS will commence in the second half of 2017. Based on the estimation of NDRC, the spot market alone will be valued at ¥1.2bn- 8bn per year. The market size will be much larger, reaching ¥60bn- 400bn annually, when derivatives like futures and options are introduced into the market in the post-2020 Phase II.

Table 1: China's National ETS overview

China's National ETS overview	
Roadmap	Preparation phase (2014-2016): legislation, MRV, setting of allowance allocation methods Phase I (2017-2020): trial stage; test all key market factors Phase II (post-2020): high-speed operation stage; ETS should play a key role in emissions reduction, lower emissions threshold, tightened allowances allocation
Regulator	National Development and Reform Commission
Registry	National Registry System (incl. creation, transfer and cancellation of carbon allowances and offsets)
Exchanges	Target to have a total of 7 – 10 exchanges; the existing 7 pilot exchanges might possibly remain
Emissions coverage	3 – 4bn tonnes of emissions from 8 main sectors: Power, Steel, Non-ferrous metals, Building Materials, Chemical, Petrochemical, Paper and Aviation. Compliance companies already enrolled in the Chinese pilot scheme may be included regardless of whether they are from the listed sectors. Possible inclusion of additional sectors in later phases.
Geographic coverage	All provinces in Mainland China
Emissions threshold	≥26,000 tonnes emissions annually
Allowances allocation	Will adopt free allocation and auctions; NDRC sets caps for each enrolled province and the local DRCs will allocate allowances to the compliance companies. Detailed allowances allocation mechanism not yet announced.
Offset	Chinese Certified Emissions Reduction (CCER)
Penalty	Not announced; possible 3 to 5 times the yearly average price
Linkage	NDRC will explore the possibility of linking the National ETS with other ETSs around the world at an appropriate time in the future.

Note: The information provided in Table 1 are gathered through various documents, announcements and speeches released by the NDRC.

Cap setting and coverage

Although NDRC has not officially announced the exact coverage of the National ETS, it did mention in several occasions that the first phase of the National ETS should cover between 3bn to 4bn tonnes of emissions annually. This makes up approximately 30% to 40% of China's annual emissions, which would put the programme in line with the seven pilots that cover between 33% and 60% of their respective region's total emissions.

Legislation

From the experience of the pilot schemes, legislation is the groundwork of a trading scheme. The market works better in pilots with higher level legislation (local congress legislation, as compared to local DRC regulations). Hence, for the National ETS to function smoothly, and for the companies to participate actively, NDRC needs the endorsement of a higher level legislation other than the rules issued from the NDRC itself. Currently, NDRC has submitted Regulations on Carbon Trading Management for review to the State Council. It will finally come into effect as a State Council regulation, which could pose greater pressure on companies to complete their compliance obligations.

Allowance allocation

Allowance allocation lies at the heart of the design of an emissions trading scheme. It determines the fundamental supply and demand of a carbon market, and can affect the participants' trading behaviour and the price movement. A good allocation method will reward more efficient installations, encourage emissions reductions practices, and can adapt to different economic situations. Over allocation is a repeating theme in the pilot ETSs, and significantly contributes to the price collapse in some pilot cities.

When designing the allocation method for the National ETS, NDRC is trying to avoid the problems and mistakes occurred in the pilot schemes. Based on the information we have gathered, the allocation method for the National ETS is an improvement from the plans adopted in the pilots and also takes into consideration the possible economic slowdown in the following years of tackling overcapacity and industrial upgrading.

More specifically, there will be two types allowance allocation, namely benchmarking and grandfathering based on historical carbon intensity. Most sectors (including power, cement and chemicals) might be using benchmarking, while some sectors (including steel, cogeneration plants and aviation) use historical carbon intensity.

Based on the draft allocation plan, the designer could set very strict benchmarks, indicating their ambition to avoid over allocation and boost trading. The grandfathering based on historical carbon intensity, where allowance is calculated from the actual production, is different from the traditional grandfathering (based on historical production) previously adopted in EU ETS, reducing the risk of a possible huge allowance surplus resulting from any economic slowdown.

Free allocation vs. auction

During the first phase of the National ETS, we expect the NDRC to rely much more on free allocation as compared to auctions. This is to provide the carrot before the stick – to get the compliance companies to buy into the National ETS at an early stage. In addition, China's power market is not fully liberalised at the moment, which would make passing through carbon costs impossible. Hence, a high auction percentage at an early stage will also add too much pressure on the largest emitting sector. We expect that 100% of the allowances will be allocated for free to compliance companies in 2017 (i.e. no auction in the first year) and the auction percentage to increase gradually (but still at a low level) in the following years until 2020.

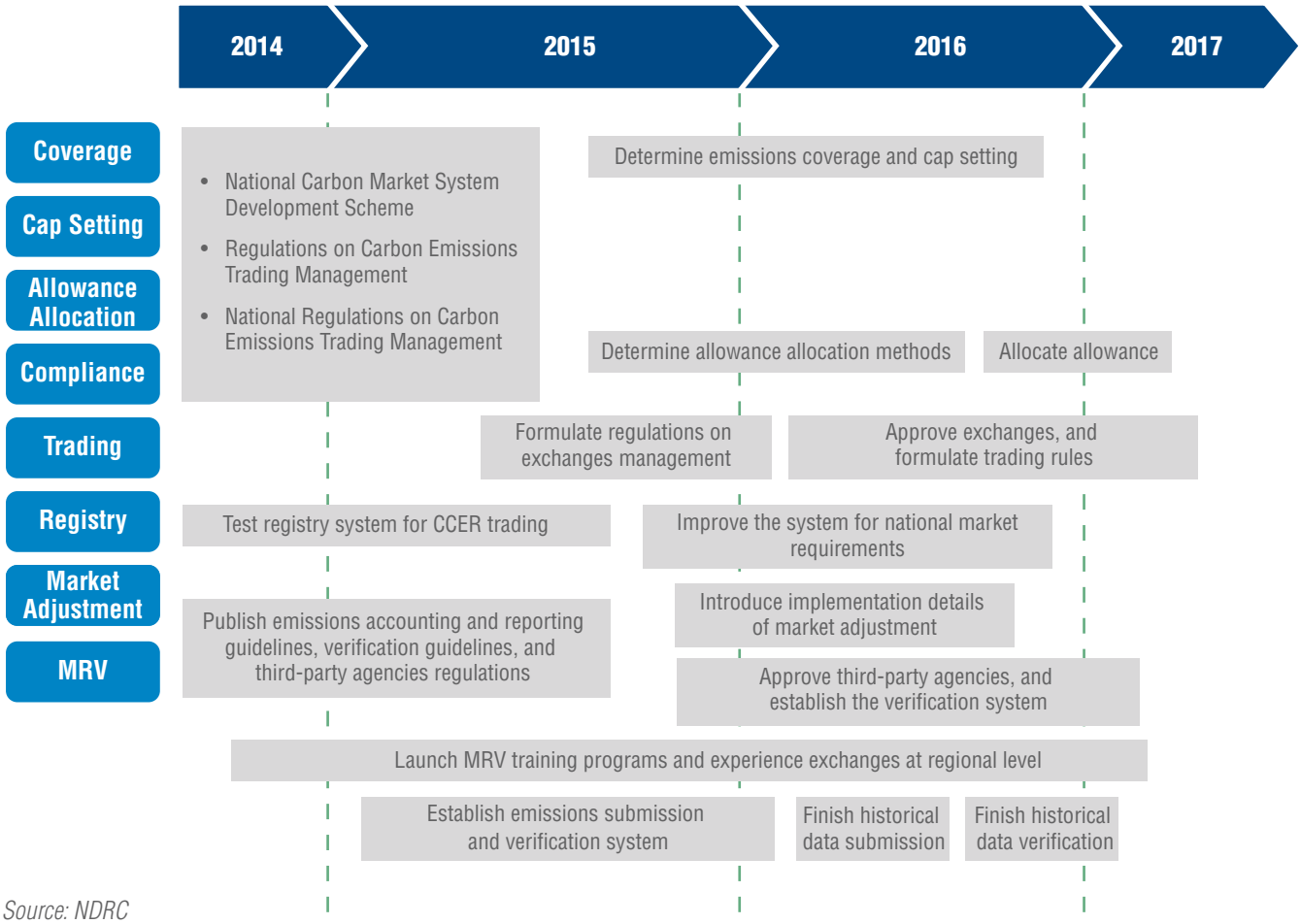
Use of offsets

The allowable offsets for the National ETS will be CCERs. There is no rule announced yet on the limits and restriction of offset usage. We expect the allowable offsets limit for the National scheme to be in the similar range of the pilot scheme (5%-10%). Despite the maximum offset limit, we expect that the use of offsets will be relatively weak in the early years of Phase I. This is primarily due to companies' passive trading behaviour results from either lack of trading experience or illiquidity in the allowance market.

Timeline

NDRC released its designed workplan for the National ETS in June 2015, in which the National ETS was originally set to start in 2016. Considering the size of the market and the complexity of the work involved, it is fair to postpone the National ETS for one more year, when the market design would be more thorough and the regulators and participants would be more ready for a carbon market covering more than 10,000 companies. The NDRC consults with stakeholders and its think tank in every step of the market design, but it is not that transparent to the public in its progress, especially when some tasks are still underway and incomplete. The NDRC has so far only officially announced the eight sectors enrolled in the National ETS. Based on the information we have gathered, most tasks in Figure 1 are somewhat delayed. There is no definite date on which certain policies will be

Figure 1: Workplan for National ETS



Source: NDRC

announced. But based on China's determination to start the National ETS in the second half of 2017, considering the importance of different tasks, we offer several estimations on the possible timeline for the key tasks:

- Historical data to be submitted by end of Q2 2016
- Historical data to be verified by end of 2016
- Allowance allocation plan to be released in late Q3 or early Q4 2016
- Allowance to be allocated in end 2016 or early 2017
- State Council regulations to be released in end 2016
- Exchanges to be approved in H1 2017
- CCER eligibility rules and limits to be released in H1 2017
- Transition plan from pilots to National ETS to be announced in H1 2017

Prepare early, prepare well

Compliance companies

Based on the draft allocation plan, we can draw a rough picture of the market participants' possible positions in the National ETS. The benchmarks for the power sector could be more stringent than most pilots. Hence, the power sector could be short during the national scheme. For the industry sectors, the benchmarks are based on the average energy efficiency of a particular sector. Ceteris paribus, there is a high tendency that installations with above average energy efficiency to have the best chance to grow, while those with the lowest energy efficiency are the most likely to be closed or reduce production. Hence, we expect the industry, as a whole, to be long over time.

Companies with short positions are often exposed to price risks (i.e. they face the risk of potentially high carbon prices when they need to cover their short positions nearing compliance date, which could result in a potential big loss for the companies during compliance). For companies with excess allowances, they don't face a risk of non-compliance. But without proper management, it could face a decline in the value of their carbon assets. So in both cases, companies should act early and manage their carbon allowances properly.

In the current stage, we have observed that in many big companies, especially those from the power sector, emissions trading and compliance have been added to the company's agenda. Some proactive ones have already established their own carbon management companies to manage their carbon assets in a centralised manner. However, for the small emitters and for those in the non-pilot regions, their progress is still in the early stages. Capacity building and data collection are their current priority. It is understandable considering the lack of clarity of policies and their lack of experience from the pilot phase. As is shown in the pilot markets, Chinese companies tend to cover their short positions late. This is partly due to the lack of derivatives (i.e. futures, options) in the market and the overall long positions for most companies. However, we expect some companies to take positions once the allocation plan is out and companies know their shortage/surplus. In the later stage, more and more companies, in particular those with short positions, will understand and learn the need of hedging and hence begin to hedge their open positions early on as they progress.

Carbon management companies

These are the most active players in the pilot markets. They come in different roles, such as brokers, traders, CCER developers, aggregators and so on. Investing in the pilots as they are, their bigger ambition lies in the more promising National ETS. As the allowance allocation plan is still in design, it is common practice for these companies to invest in the CCER markets. But it is not without risks, because it is still unclear how the NDRC will set the eligibility rules to restrict the usage of CCERs. Lacking derivatives, the market does not provide too many options for these companies to hedge their risks. A diversification of portfolio or investing in high value projects would be considered the common choice of risk management.

Foreign investors

As the world's largest carbon market, undoubtedly the National ETS has attracted the attention of major players around the world. It is still unclear how the foreign companies can participate in the National ETS. The general attitude from the regulator is that it welcomes the participation of foreign companies, who will bring more knowledge and experience to the market.

Currently, foreign investors can invest in the offsets market or the pilot markets like their local counterparts, but the policy uncertainties have dampened the enthusiasm of many. Only a few who have strong confidence in the scheme have taken actions. Based on the experience from the pilot schemes, investors prefer markets with clearer rules, more transparency and stability. We have reasons to believe that once the legislation is in place, we would see more active involvement of foreign players in the Chinese market.

Conclusion

With the National ETS to officially commence in a little more than a year, people within and outside the Chinese carbon market are eyeing the world's biggest market, exploring possibilities and seeking opportunities. Despite its enormous size, the market is still premature and NDRC has not released many details on the market design. However, with more and more information available, we are able to sketch out the outline of the National ETS. It might be too early to take actions now, but an increasing number of companies are preparing themselves for the upcoming ETS, learning from their lessons in the pilots and making them ready to jump into the billions Yuan market, once the conditions are ripe.

Further resources:

National Development and Reform Commission
http://www.ndrc.gov.cn/

The State Council
http://www.gov.cn/

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China Certified Emissions Reduction (CCER)

China Certified Emissions Reduction (CCER), acting as an offset credit mechanism in China carbon markets, is designed to offer entities a cheaper compliance option and also could be seen as a subsidy tool for low carbon technologies. China's National Development and Reform Commission (NDRC) is in charge of the project registration and CCER issuance. There is a CCER National Registry System responsible to hold, transfer, track and cancel CCERs.

The CCER market ought to be a supplementary market. Nevertheless, the CCER market has stolen much more of the spotlight than we expected since:

- The holding cost is low compared to emissions allowances, especially when investing in the primary CCER market
- Most institutional investors, who originate from CDM companies, do not have any commodity trading experience but are familiar with offset markets
- The market expects more speculating space on CCER than pilot allowances when transferring to the National scheme

There are certain conditions for an eligible CCER project. NDRC requires that all CCER projects should start construction after 16 February 2005 in China. In addition, one of the conditions below must be satisfied:

1. Projects that adopt the methodologies recorded in NDRC (**Category 1** projects)
1. Projects approved by the NDRC but not registered with the UNFCCC as CDM projects (**Category 2** projects)
1. Projects approved by the NDRC with emissions reduction produced prior to registration with the UNFCCC as CDM projects (**Category 3** or pre-CDM projects)
1. Registered with the UNFCCC as CDM projects but without issuance (**Category 4** projects)

Before spot CCER can actually go to the market, a project must go through the following two processes: project registration and issuance. The project registration process consists of four key stages including public consultation, validation, request for registration and approval (or withdrawal/rejection). After successfully registering as a CCER project, there are another four steps to issue CCERs, which are monitoring report publishing, verification, request for issuance and issuance (or rejection).

CCER pipeline breakdown

As of 2 April 2016, there are a total of 1,398 validated projects in the pipeline, among which 631 are approved as CCER projects. Out of all the approved CCER projects, 360 have started the issuance process and 152 have successfully been issued credits. So far, the total number of issued CCERs is approximately 48.3m tonnes.

When looking at the whole pipeline by scope (see Figures 1 & 2), it is apparent that wind projects account for more than one third of all projects, followed by solar, methane recovery, hydro and biomass. However, due to the low generated output of solar plants, issued solar CCERs are of limited quantity, though solar has a considerable share in the total projects. Hydro CCERs have the biggest volume among the issued credits, mainly due to: 1) the large number of projects; and 2) most of them are large-scale pre-CDM projects. Although CCERs from natural gas and manufacturing industries projects together account for approximately 22%, those CCERs will become valueless because of double-counting in the near future since the CCER projects would be within emissions boundaries under the National ETS.

According to our CCER database, the breakdown for the projects and issued CCERs by category are shown in Figures 3 and 4.

Three quarters of the pipeline consists of the Category 1 projects, while pre-CDM projects account for about 17%. In the early stage of the CCER market, we observed a fair amount of pre-CDM project applications as it is both time and cost efficient, based on the existing CDM projects, to develop those projects. Nevertheless, with more stringent restrictions on the use of CCER by pilot schemes, a limited number of new Category 3 projects has entered. Meanwhile, Category 1 project applications have been increasing.

Out of 48.3m issued CCERs, the majority are pre-CDM CCERs. But given the one-off issuance from the pre-CDM projects and the probable constraints on pre-CDM CCERs in the future, we expect the share of Category 3 CCERs to drastically drop and to see more issuances from Category 1 & 2 projects.

So far, it has been quite silent for both Category 4 project application and issuance. Category 4 projects must first be deregistered with the CDM Executive Board (CDM EB) before applying as a CCER project in China. Although a general procedure for the voluntary deregistration from the CDM has been effective since 1 April 2015, the domestic 'receiving mechanism' has not been in place, which essentially rules out Category 4 projects from the CCER market.

Figure 1: Total number of all projects by scope

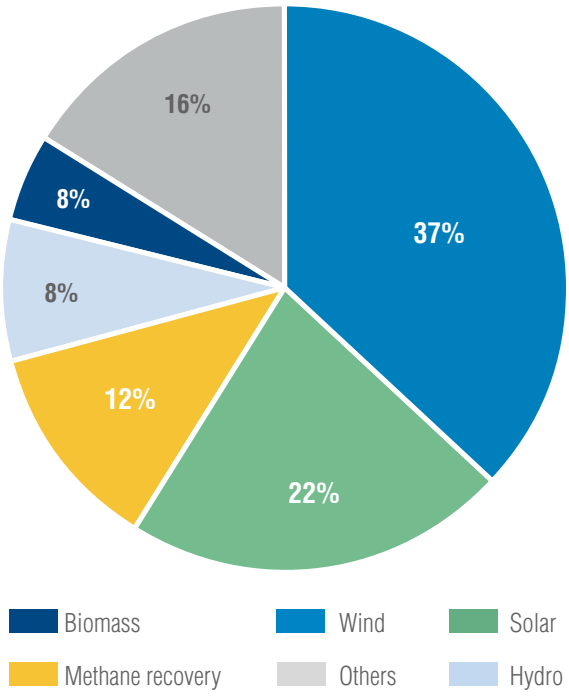


Figure 2: Total number of issued CCERs by scope (m tonnes)

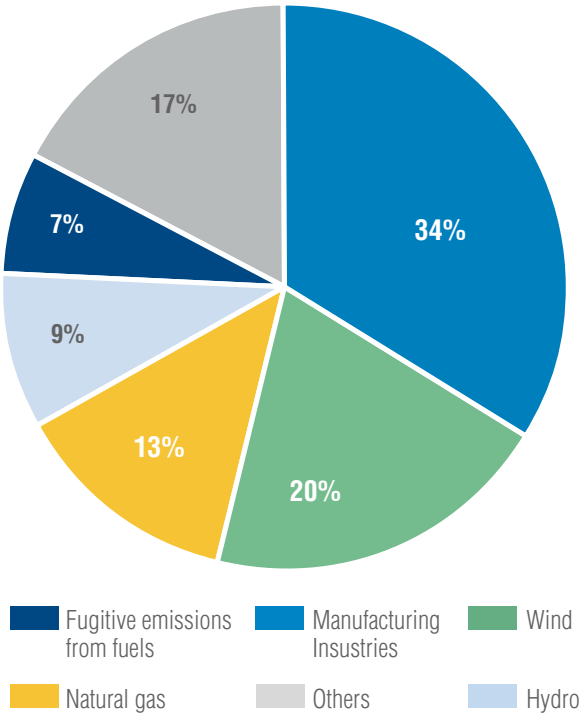


Figure 3: Total number of all projects by category

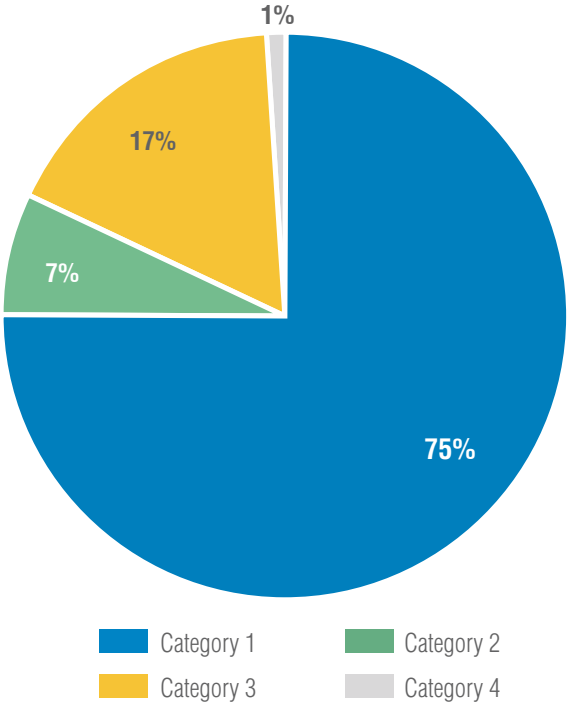
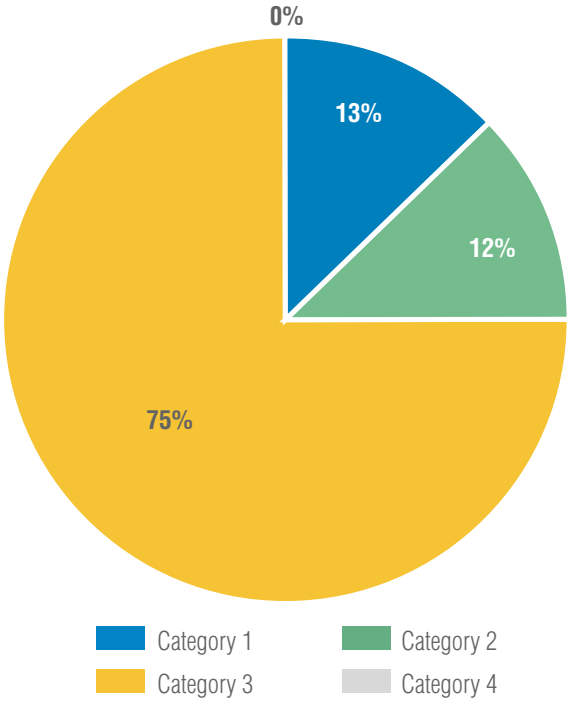


Figure 4: Total number of issued CCERs by category (m tonnes)



Source: ICIS Tschach Solutions

Limits on the use of CCERs

Table 1 shows the restrictions on the use of CCERs for compliance in each pilot scheme.

Currently, each pilot ETS has its exclusive CCER usage policy for compliance, which is one of the leading causes for distinct CCER prices across seven pilot markets. Apart from the released restrictions on CCERs, Hubei DRC also uses its executive power to further cap the total volume of CCERs used by compliance companies in order to maintain the emissions allowance price.

Supply and demand for 2015 compliance

Based on ICIS' CCER database, our understanding of compliance companies' trading behaviours and information gathered from the market, we estimate the supply and demand dynamics in all seven pilot ETSs for 2015 compliance, shown in Table 2.

According to Table 2, it is obvious that there is an oversupply of CCERs in every pilot scheme. The main reasons why CCER demand is so limited include:

- Most compliance companies in pilot ETSs are comfortably long; limited shortage exists
- Some short companies are unwilling to surrender CCERs, even though they are much cheaper than allowances, due to their small shortage, the narrowing CCER – allowances spread, and the cumbersome internal approval and purchase process
- Potential regulation risks such as Tianjin banning pre-CDM CCER in the last minute in 2015
- Very low liquidity for pilot allowances prevents some long companies from swapping CCERs to extra allowances
- Along with the falling prices of most pilot allowances, we expect the CCER prices to stay bearish. Despite severe oversupply, it does not mean that the CCER prices would drop to zero due to:
- CCER aggregators will not sell below the development or procurement cost
- Under the downward pressure on most pilot allowances, aggregators may prefer carrying spot CCERs, especially Categories 1 & 2, over to the National ETS, though there still might be eligibility risks by then

Table 1: Limits on the use of CCER				
ETS	**Allowable offsets limit**	**Geographical limit**	**Time limit**	**others**
Shenzhen	10% of emissions	Projects should originate from: 1) Meizhou, Heyuan, Zhanjiang, and Shanwei; Xinjiang, Tibet, Qinghai, Ningxia, Inner Mongolia, Gansu, Shaanxi, Anhui, Jiangxi, Hunan, Sichuan, Guizhou, Guangxi, Yunnan, Fujian and Hainan; Baotou and Huaian (for wind, solar, municipal solid waste(MSW) projects). 2) Shenzhen, Baotou and Huaian (for rural biogas, biomass, transport, ocean carbon storage projects). 3) No geographic restrictions (for carbon sink, agriculture projects).	None	1. Eligible project scopes include: 1) renewable and new energy including wind, solar, municipal solid waste, rural household biogas, and biomass; 2) clean transportation; 3) ocean carbon storage; 4) carbon sink; 5) agriculture. 2. CCER projects invested and developed by local Shenzhen companies can be used for compliance regardless of the scope or geographic restrictions (except for facilities enrolled in Shenzhen ETS).
Guangdong	10% of emissions	>70% to originate from Guangdong	None	1. Primarily from carbon dioxide (CO2) and methane (CH4) emissions reduction projects; the two greenhouse gas (GHG) emissions reduction should constitute to more than 50% of the project's GHG emissions reduction. 2. CCERs from hydro , waste energy recovery and projects that involve coal, oil or natural gas (excluding coalbed methane) to provide power generation and/or heating, will not be allowed. 3. Category 3 (pre-CDM) CCERs will not be allowed.
Beijing	5% of allowances	>50% to originate from Beijing	Emissions reduction generated after 1 January 2013	1. Emission reductions from HFCs, PFCs, N2O, SF6, hydro related projects are not allowed. 2. The facilities enrolled in the Beijing ETS are not allowed.
Shanghai	5% of allowances	None	Projects should start after 1 January 2013	Emissions reduction originating from the facilities enrolled in Shanghai ETS will not be allowed to be used for compliance in Shanghai ETS.
Tianjin	10% of emissions	None	Projects should start after 1 January 2013	1. Emissions reduction originating from the facilities enrolled by seven pilot ETSs will not be allowed to be used for compliance in Tianjin ETS; 2. Only emissions reduction originating from carbon dioxide (CO2) projects can be used for compliance in Tianjin ETS; 3. Hydro CCERs are not allowed for compliance in Tianjin ETS
Hubei	10% of allowances	100% to originate from Hubei	None	1. For already issued CCERs, all issued CCERs will be able to be used for compliance; for pre-issued CCERs (but project has been approved as CCER project), 60% of the emissions reduction can be used for compliance(1/1/2013 – 31/5/2015). 2. CCERs from large or medium hydro projects will not be allowed. 3. Usable CCERs should originate from Hubei, not including the facilities enrolled in Hubei ETS. 4. CCERs from outside Hubei can be used only when they are, 1) from provinces which have signed carbon market cooperation agreement with Hubei; 2) CCERs issued by the NDRC; and 3) companies can only use up to 50,000 of such CCERs per year.
Chongqing	8% of emissions	None	Projects should start after 31 December 2010, besides forestry project	None

Source: ICIS Tschach Solutions

Table 2: Supply and demand for 2015 compliance

	Shenzhen	Guangdong	Beijing	Shanghai	Tianjin	Hubei	Chongqing
Total issuance before H1 2016 (estimated)	7.0 – 13.5m	11.0 – 32.0m	5.4 – 16.6m	6.6 – 18.0m	5.4 – 16.6m	2.0 – 8.0m	20.0 – 35.4m
Surrendered CCERs for 2014 compliance (estimated)	0.9m	0.4m	0.06m	0.5m	0.3m	0.6m	0m
CCERs available for 2015 compliance (estimated)	6.1 – 12.6m	10.6 – 31.6m	5.3 – 16.5m	6.1 – 17.5m	5.2 – 16.4m	1.4 – 7.4m	20.0 – 35.4m
CCER used for 2015 compliance (estimated)	0.6m	0.9m	0.2m	0.1m	0.6m	0.7m	0m

Estimated issuance are based on issued volumes or MR volumes (if the final approved MR has not been published)

Note: There will be some double-counting when calculating the CCERs available for 2015 compliance as some projects are eligible in several markets.

CCERs in the transition phase

There is only one year ahead of the National ETS commencement and the CCER market is currently going through a crucial transition period. NDRC is developing a CCER management approach for the National ETS in which more stringent restrictions on CCER development and usage are expected. We actually welcome the potential tight limits on CCERs since it would be beneficial to both the offset and allowance markets' stability, especially at the National ETS's early stage where the market is expected to be highly oversupplied and vulnerable.

During this transition phase, challenges and risks exist. CCER aggregators and developers who already have built large CCER portfolios might face significant regulation risks due to the clouded CCER policy for the National ETS at this point, and the possible regulation variations in the future. Under such an uncertain situation, a 'golden national CCER contract' which secures the offset eligibility in the National ETS with a higher price could help the buyers to reduce possible regulation risks since the sellers would take all the eligibility risks. CCER price transparency would be another challenge, especially for the end users, i.e., compliance companies. We expect most of the effective CCER transactions to occur via OTC (bilateral transfer agreement transactions) at the beginning of the National ETS just like the transactions in the pilot phase, making it hard to find the fair CCER prices. A feasible solution is to refer to a third-party price assessment, though such assessed price providers are quite limited.

In spite of the uncertainties and risks, we do have faith in the national CCER market. The success of a carbon market is never about designing a perfect scheme at first, but about a quick launch and the ability to keep making improvements. Unlike the EU Commission heavily constrained by the EU co-legislators, NDRC has more scope for further easing policy and making adjustments. After all, it is a market covering 3-4bn tonnes of emissions, which suggests there will be remarkable demand for offsets, and it will not be wise to doubt China's determination to curb its GHG emissions and improve the environment.

Further resources:

China Certified Emission Reduction Exchange Info-Platform
http://cdm.ccchina.gov.cn/ccer.aspx

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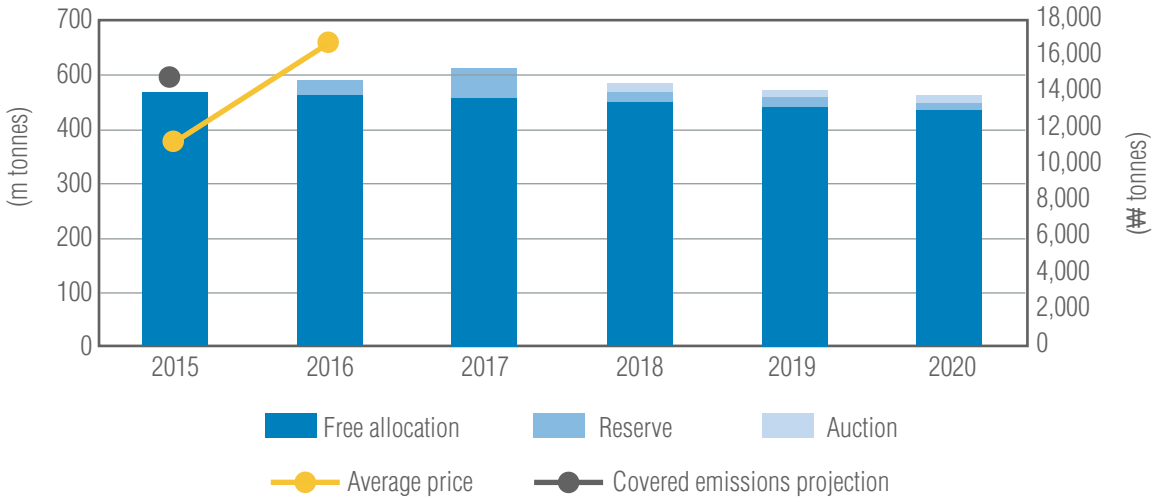
Emissions Trading System – South Korea ETS

In January 2015, the Korea ETS was launched with the aim to keep the national GHG emissions 30% below the 2020 business-as-usual (BAU) emissions by 2020. However, following the adoption of a new global climate agreement within the COP21 in December 2015, the underlying national emissions reduction target of the Korea ETS was revised in February 2016 to 37% below 2030 BAU emissions by 2030 (but not effective yet).

Currently the Korea ETS covers both direct and indirect emissions of around 570 companies, including new entrants, within 23 sectors. Along with CO2 emissions, emissions of other GHGs (namely CH4, N2O, HF6, HFCs and PFCs) also need be covered with carbon allowances under the scheme.

Quick facts	
Incumbent regulator	The Korean Ministry of Environment
Succeeding regulator	The Korean Ministry of Strategy and Finance
Trading unit (equivalent to 1 tonne CO2e)	• Korean Allowance Unit (KAU) • Korean Credit Unit (KCU) • Korean Offset Credit (KOC)
Covered entities/sectors0	• 570 entities and installations (44 new entrants added) • 23 sectors (power & energy, steel, nonferrous metal, petrochemical, oil refinery, ceramic & glass, cement, automotive, buildings, telecommunication, food & beverage, machinery, mining, paper, timber, semiconductor, display, electronics, shipbuilding, textile, aviation, waste and waterworks)
Compliance periods (CP)	• CP1: 2015-2017 • CP2: 2018-2020 • CP3: 2021-2025
Reduction target ETS	• Different emissions reduction targets apply to each compliance sector (indirect emissions double-counted) • 2020 ETS emissions cap is expected to be in the range of 533m tonnes CO2e to 560m tonnes CO2e, unless the existing sectoral emissions reduction targets and BAU emissions until 2020 are revised
Reduction target country	• Currently, the national emissions reduction target is set as 30% below 2020 BAU emissions by 2020, but the target would soon be replaced with 37% below 2030 BAU emissions by 2030.
Plans post-2020	• Participation of financial services sector and other non-compliance entities is scheduled to be allowed from 2021 (CP3 and beyond) • The use of emissions reduction from overseas offset projects is also scheduled to be allowed from 2021 (CP3 and beyond)
Covered emissions	• 567m tonnes CO2e in 2012 • 573m tonnes CO2e in 2013 • 581m tonnes CO2e in 2014
Cap (available allowances)	1,687m tonnes CO2e between 2015 and 2017 (CP1), including both indirect emissions and reserves
Auctions	During the CP1, the volume of allowances equivalent to the ETS emissions cap less reserve was allocated to ETS covered entities free of charge (100% free allocation). Nevertheless, 14m KAUs of market stability reserve are expected to be auctioned via Korea Exchange (KRX) (the reserve volume subject to a downward revision due to the recent regulation amendment).
Banking/Borrowing	No limits apply to banking, while only up to 10% of historical emissions are allowed to be covered with borrowed allowances from the next compliance year (borrowing only allowed within the same compliance period)
Offsets	10% of historical emissions are allowed to be covered with offset credits. The use of overseas offset credits is only allowed from 2021, but no more than 5% of historical emissions is expected to be covered with such credits.
Penalties	Three times the yearly historical price of allowances, but less than ₩100,000

Fundamentals



- Covered emissions projection is based on the low power consumption scenario.
- Yearly reserve distribution volume does not factor in the draft regulation amendment that scraps the current cap on early action reserve.
- Cap, free allocation, reserve and auction volume for the period between 2018 and 2020 are inferred based on the Grandfathering Method (GF) and ICIS Tschach Solutions emissions projection for the period between 2014 and 2016. The same allocation method for CP1 allocation is assumed for CP2 allocation.
- Despite the existence of carbon leakage within Korea ETS, 97% of free allocation for the entire covered industries is assumed. Reserve volume from 2018 to 2020 is assumed to be 3% of the total emissions cap.
- Average price in the graph refers to the weighted average of both KAU and KCU clearing prices until 10 March 2016 (OTC information not considered).

Source: ICIS

System setup

Since the initial legislation of The Basic Act on Low Carbon and Green Growth and its Decree on 14 April 2010, further regulatory papers and guidelines have been issued outlining the system design of the Korea ETS. The system comprises two initial compliance periods with three compliance years each until 2020 followed by a third compliance period of five years thereafter. Details of each period are as follows:

1. First Compliance Period or 'CP1' (2015-2017): 100% of initial allocation was made free of charge to covered entities. For the majority of covered sectors, the Grandfathering Method (GF) was adopted for the allocation, while Benchmarking (BM) was limitedly used for domestic aviation, oil refineries and cement industries. During the CP1, the eligible offset credits under the Korea ETS are limited to the emissions reduction made within local offset projects.

2. Second Compliance Period or 'CP2' (2018-2020): 97% of free allocation. The remaining 3% of allowances are auctioned via the KRX. The allocation method for CP2 would be finalised before the publication of the CP2 Allocation Plan. When it comes to the coverage of offset credits, the use of overseas offset credits is still not expected to be allowed, given that neither the current regulation nor the draft amendment permits the use of non-Korean offset credits until 2020.

3. Third Compliance Period or 'CP3' (2021-2025): The coverage of free allocation is expected to be lower than 90% of the emissions cap. According to the current regulation, the participation of non-covered entities in the ETS and the use of overseas offset credits are scheduled to be allowed from 2021.

Despite few changes within the system setup through regulation amendments, many distinct elements of the scheme would still continue to remain effective. Amongst all, market stability measures and indirect emissions accounting practice are explained in detail below.

During the CP1, if the latest three-month average carbon allowance price exceeds ₩10,000, the government could intervene in the market through market stability measures. The measure gives following options to the government:

- auctioning market stability reserve (14.3m KAUs retained);
- approving the emissions reduction of HFC-23 and adipic acid N2O CDM projects (31.7m CERs expected to remain unused);
- introducing an allowance price cap;
- adjusting allowance borrowing limits;
- adjusting limits on the use of offset credits; and
- placing allowance holding limits.

As briefly mentioned in the quick facts table, indirect emissions are double-counted under the Korea ETS. For instance, if entity A within the electronics sector consumes electricity generated by power plant B, the emissions arising from the power consumption of entity A are counted twice and have to be covered with allowances separately by both entity A and power plant B. For this reason, even nuclear and hydro generation entities are covered by the ETS and have a compliance obligation for their indirect emissions from using electricity.

System history

Until 15 December 2015, 4.4m units of allowances changed hands both on the KRX and on the OTC basis. Amongst the total volume of allowances traded, most allowances were cleared over the counter (3.3m KOCs), while only a quarter of the total trading volume were cleared on the KRX (0.3m KAUs and 0.8m KCUs). Additionally, 0.5m KCUs were further traded on the KRX in the following three months until 10 March 2016.

Since the initial listing of carbon allowances and offset credits on the KRX, the KRX quoted price of both allowances has soared until 10 March 2016 without any drop, carbon allowances up by 114% (from ₩7,860 to ₩16,800) and offset credits by 88% (from ₩9,600 to ₩18,000). Especially, market allowance prices began surging since Q4 2015, after a long-run sluggish price development with a low trading volume almost for half a year.

Along with the aforementioned market development, some important policy developments have also been observed in the meantime. Key developments are summarised as follows in a chronological order:

- In March 2015, the emissions cost compensation for ETS-covered upstream utilities was confirmed to be made, while details of the compensation scheme have yet been finalised.
- In June 2015, the post-2020 national emissions reduction target was finalised as 37% below 2030 BAU emissions by 2030 (stipulated within the Intended Nationally Determined Contributions document submitted to the UNFCCC).
- In December 2015, it was confirmed that the VAT would not be imposed on the sales of carbon allowances (KAUs) and offset credits (KCUs and KOCs) between 2016 and 2017 (VAT on allowance sales has been eligible for a full refund though).
- In February 2016, a draft amendment of two key Presidential Decrees was disclosed. Key changes brought about by the amendment are as follows:
  - Ministry of Strategy and Finance would replace the Ministry of Environment as the chief ETS regulator.
  - Current underlying national emissions reduction target of the Korea ETS, 30% below 2020 BAU emissions by 2020, would be overwritten by the new target, 37% below 2030 BAU emissions by 2030.
  - Current limit on the early action reserve retention volume (less than 3% of CP1 emissions cap) would be scrapped.

State of play

The continued upward allowance price momentum seems attributable to the residual demand for allowances (estimated to be above 8m tonnes CO2e by the end of Q4 2015) entering the market to meet the supply, while entities with an expected allowance surplus are likely to bank the surplus due to the following uncertainties:

- If power and energy sector compliance entities get fully compensated for their spending on allowance procurement, the allowance price could surge.
- Because the sectoral allowance allocation method has not been finalised for the CP2 and beyond, ETS covered entities would not be able to estimate their future fundamental balance, whether to expect shortage or surplus.

Meanwhile, ETS-covered entities that expect an allowance shortage for their 2015 compliance seem to have an allowance shortfall for following years. Especially upstream utilities with baseload generators are likely to expect a growing allowance shortage, because both emissions cap and free allocation coverage shrink, while the yearly emissions do not seem to fall accordingly. In this regard, companies with an expected allowance shortage are likely to prefer buying allowances to borrowing.

Despite the continuing bullish allowance price momentum that has already satisfied the market stability measure precondition (latest three-month average carbon allowance price above ₩10,000) from the Q4 2015, no government intervention has been made yet.

Outlook

In 2016, some uncertainties in the market are expected to be cleared off through the publication of the 2030 Roadmap and the finalisation of upstream utility emissions costs compensation scheme, all scheduled in 2016.

Until the amended regulation takes effect, underlying sectoral emissions reduction targets and BAU emissions estimates of the Korea ETS refer to values defined in the 2020 Roadmap published in 2014. However, if the current pre-2020 emissions reduction targets or BAU emissions are overwritten by significantly different values defined in the 2030 Roadmap, there could be a possible adjustment in the allocation volume through the revision of the Allocation Plan. This uncertainty surrounding possible adjustments in the allocation volume would be eliminated once the new roadmap is published.

In addition, the coverage of power and energy sector emissions cost compensation scheme has not been finalised. While power producers are compensated for their emissions costs on an hourly basis (equivalent to the emissions cost of a marginal generator) under the liberalised wholesale power market, upstream utilities are compensated for their emissions costs on a yearly basis in Korea after the carbon allowance surrender deadline. The unknown compensation coverage has given rise to a growing market uncertainty and is expected to deter companies with a projected allowance surplus from selling their allowances. The finalisation of details of the scheme in 2016 would eliminate the uncertainty concerned.

Unless any surprises appear within the 2030 Roadmap, or CERs issued to adipic acid N2O and HFC-23 projects become eligible for the KOC conversion under the market stability measure, the market allowance price is not expected to decrease.

Further resources:

- The Korean Ministry of Environment
  http://www.me.go.kr/

- Greenhouse Gas Inventory & Research Centre of Korea
  http://www.gir.go.kr/

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Korean offset market development

Under the Korea ETS, compliance entities are allowed to surrender offset credits (Korean Credit Units (KCUs)) for up to 10% of their compliance obligation. Until 2020, however, the use of emissions reduction made within the overseas offset projects is not permitted for ETS compliance. Instead, companies first need to get Korean Offset Credits (KOCs) issued to the abatement within either local CDM projects or local non-CDM offset projects, and convert KOCs to KCUs for compliance purposes.

Despite the current limit on the use of offset credits, there have been notable developments in the offset market. Trades of offset credits accounted for over 90% of the annual trading volume (4.1m units amongst 4.4m units including OTC trading volume until mid-December 2015); the cumulative offset credit issuance volume reached 7.1m KOCs by mid-December 2015.

From project validation to KOC issuance

For an issuance of local offset credits (KOCs), underlying offset projects of local emissions reduction need be validated under the Korean offset scheme. Once an approval on the emissions reduction is made by the Emissions Verification Committee, KOCs are first issued. Both ETS-covered entities and non-covered entities are allowed to get KOCs issued and trade them, but only compliance entities are able to convert KOCs into KCUs, trade KCUs and surrender them for compliance.

Eligibility

In the meantime, it is important to note that the emission reduction or its underlying offset project needs to satisfy the following requirements to get KOCs issued (assuming no changes in the current regulation):

- Until 2020, only emissions reduction from local offset projects is eligible for a KOC conversion.
  - Up to 10% of compliance entities' historical emissions could be covered with offset credits under the Korea ETS (no overseas offset credits allowed until 2020).
- From 2021 onwards, up to 5% of compliance entities' historical emissions may be covered by an overseas emissions reduction, while the overall limit on the use of offset credits remains unchanged (up to 10% of historical emissions).
- Monitoring periods of emissions reduction need to start after 14 April 2010, or embed a period starting later than 14 April 2010 (limitedly applied during the first compliance period of the Korea ETS (CP1), 2015-2017).
  - From the CP2 (2018-2020), however, the validation is only limitedly made to those projects that started after 14 April 2010.
- Emissions reductions from HFC-23 and adipic acid N2O abatement projects are not eligible for KOC conversion. However, KOC issuance could be limitedly allowed during the CP1, if the market stability measure allows for it.
  - Around 30m CERs issued to HFC-23 and adipic acid N2O projects are expected to be left unused in global registries.
  - Up to around 30m CERs could be further issued to the projects concerned until June 2018.
- For emissions reduction within renewable energy projects, KOCs are not issued if Renewable Energy Certificates (RECs) were issued during the monitoring period of the reduction concerned.
- KOCs are issued for the emissions reduction if the monitoring period does not embed a Renewable Energy Certificate (REC) issuance history.
  - RECs have been issued to project holders under the Renewable Portfolio Standard (RPS) and to the Korean government under the Feed-in Tariff (FIT) since January 2012.

Project validation and KOC approval

So far, most of offset credits (KOCs) are known to have been issued to emission reductions within local CDM projects. A similar outcome is expected throughout the CP1 (2015-2017) given that 65% of national emissions are already covered by the Korea ETS, and that up to 22m eligible CERs are expected to be further supplied to the scheme in the form of KOCs or KCUs after the conversion.

In order to convert CERs into KOCs, the underlying project of CERs needs to be validated under the Korean offset scheme. Once the application is made for a project with validation and due documentation, including proof of CER holdings on the online offset registry, the Korea Environment Corporation (KECO) and the Emissions Verification Committee review the project based on similar criteria to those applying to CDM project validation.

After the underlying CDM project is validated under the Korean offset scheme, the CERs need be voluntarily cancelled under either the UNFCCC or other registries (i.e. New Zealand registry). The Emissions Verification Committee reviews the submitted documents (similar to the ones submitted to the UNFCCC previously) and makes the KOC issuance decision.

The KOC issuance to abatements within local non-CDM offset projects has similar requirements as above, but offset methodology review and more detailed documentation for each process is required.

Offset fundamentals

Since January 2015, over 10m Korean CERs have been voluntarily cancelled under the New Zealand and UNFCCC registries for KOC conversion. Amongst historically issued Korean CERs, the volume of CERs that is eligible for the KOC conversion and has not been used under other regional schemes is projected to be around 15m CERs.

In addition to 5m Korean CERs that are expected to remain unused in other regional schemes, up to 22m CERs (KOC convertible) are likely to be issued until June 2018 and possibly enter the Korea ETS for CP1 compliance.

KOCs are also expected to be issued to local non-CDM offset projects over time, but the issuance volume during CP1 is expected to be marginal compared to the volume issued to voluntarily cancelled Korean CERs.

Further resources:

- The Korean Ministry of Environment
  http://www.me.go.kr/

- Greenhouse Gas Inventory & Research Centre of Korea
  http://www.gir.go.kr/

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New Zealand Emissions Trading System

The New Zealand Emissions Trading Scheme (NZ ETS) represents the primary tool of the New Zealand government to manage climate change. Its stated purpose is to assist New Zealand in meeting its international obligations and to reduce New Zealand's net emissions to below 'business as usual' levels.

Quick facts	
Regulator	Environmental Protection Agency
Covered entities/sectors	Forestry, transport fuels, electricity production, industrial processes, synthetic gasses, waste, agriculture (reporting only)
Compliance periods	No phases – but had progressive sector inclusion: 1 Jan 2008 – Forestry 1 July 2010 – Transport fuel, electricity generation, industrial processes 1 Jan 2013 – Waste and synthetic gases 1 Jan 2015 – International units ineligible
Reduction target ETS	No specific ETS target
Reduction target country	30% below 2005 levels by 2030 (equal to 11% below 1990 levels)
Covered emissions	30m tonnes in 2014 (not considering one-for-two rule)
Cap (available allowances)	No cap
Auctions	Currently under review for post 2018
Banking/Borrowing	Unlimited banking, no borrowing
Offsets	International units no longer eligible for emissions after 1 Jan 2015
Penalties	NZ $30 (NZ $60 if convicted of knowingly failing to comply)

System setup

In the lead up to last year's Paris Climate Change conference, the New Zealand government pledged to reduce greenhouse gas emissions to 30% below 2005 levels by 2030. This is equivalent to 11% below 1990 levels and more than doubles the original target of 5% below 1990 levels. Adjustments to the NZ ETS by the New Zealand government to reflect this new ambition are anticipated in 2016.

New Zealand's emissions profile is dominated by the agricultural sector which accounts for nearly half of total national emissions. Natural abatement comes from New Zealand's forestry sector, which generates carbon units in the NZ ETS (NZUs) but must also surrender units when forests are harvested. The only other supply of NZUs is from the New Zealand government via free allocations, a purchase at the legislated ceiling price of NZ $25 or auctioning. Notably, the ability for the government to auction NZUs was legislated following the 2012 ETS review, however the government has yet to carry out an NZU auction or indeed detail how an auction would be run.

The NZ ETS also has a number of unique features designed to ease the financial burden of compliance. Firstly, the agricultural sector is indefinitely exempt from NZU surrender obligations. This is consistent with ETS schemes in other international jurisdictions but is of particular significance in NZ given the high proportion of national emissions which derive from the agricultural sector.

Secondly, businesses involved in emissions-intensive trade-exposed sectors are supported by the government via free allocation of NZUs to help preserve their international competitiveness.

Finally, a 'one-for-two' rule was implemented, where (non-forestry) emitters are required to surrender only 1 NZU for every 2 tonnes of reported emissions. This final measure, established at inception of the scheme in 2010, remains active currently despite the original intention that it be a transitional measure.

State of play

To date, the NZ ETS has been deemed successful in terms of helping New Zealand meet its target obligations during the first commitment period of the Kyoto Protocol. However, given the high level of Kyoto units imported and surrendered in the final years of this first commitment period, it is more complex to assess its success in achieving the second objective of reducing emissions below 'business as usual' levels. The key debate is whether the NZ ETS can truly motivate a level of transformative change when the cost of compliance has

been so low. The New Zealand government has publicly posed this question, expressing concerns and acknowledging that the NZ ETS has not impacted the investment decisions or behaviours of some market participants.

Structurally, the long-term supply of NZUs is another issue facing the scheme. Simplistically, the forecast number of NZUs issued annually by the government to foresters for abatement or via transitional free-allocation to emitters is less than the amount forecast to be required to satisfy annual compliance demand. In the last surrender period for compliance year 2014, 29.8m carbon units (including international) were surrendered but only 17.9m NZUs were earned or allocated[1]. To this point, this NZU imbalance has not represented a significant issue due to the eligibility of cheaper international units which have been used to satisfy the compliance obligations of emitters.

However, the 31 May 2016 surrender deadline for 2015 emissions will mark the end of the first compliance year where ETS participants are unable to surrender international units. This change is the direct result of New Zealand's 2012 decision to opt-out of a binding limit for the second commitment period of the Kyoto Protocol and to instead pursue a pledge under the UN Framework for the period 2013-2020. Looking ahead, this means international units will not again be eligible in the NZ ETS until at least 2020 when the second commitment period ends.

This represents a significant change in the behavioural character of the NZ ETS. It effectively moves the scheme from being strongly internationally linked – with no restrictions on the quantum of international units that could be surrendered by emitters (there were restrictions on certain types of units) – to one that is now essentially a closed domestic scheme subject only to internal supply/demand metrics, with NZUs as the sole unit eligible for surrender.

The significance of this shift is best highlighted by the fact that, since the beginning of the scheme in 2010, 90% of units surrendered to meet ETS obligations were not NZUs. However, this pattern of surrender of international units has consequently also resulted in a large bank of NZUs being accumulated. Based on annual NZ ETS reports, it is estimated that 140m NZUs reside in private registries as of 1 July 2015.

Government projections show this bank is theoretically sufficient to meet demand until at least 2020, even in the event of removal of the one-for-two rule[2]. But a different supply question emerges in practice. While this large bank of NZUs exists, it remains unclear how much of this supply will be made available to the market and at what price. With the supply predominantly held by forestry sector players who may require NZUs for potential future harvest liabilities or deforestation strategies, whether the price level is sufficiently high as to induce a behaviour change is difficult to ascertain. What is clear is that the market will need new sources of supply by 2020 at the latest.

As part of its ongoing commitment to ensure the NZ ETS remains effective, the New Zealand government is currently undertaking a review of the NZ ETS in an attempt to address the above concerns. The review is split into two parts targeting 'priority issues' and 'other matters'. The priority issues relate to the adoption of full surrender obligations, namely the removal of the one-for-two rule and possible adjustment of the NZ $25 price cap. The other matters deal with the supply of NZUs, in particular the phasing out of free allocations, use of international units (both post-2020), auctioning and price stability issues.

The government has clearly stated that the agricultural exemption will not be considered in the current review. Auctioning however is included in the current ETS review with the government seeking input on whether auctioning should be commenced, timing and what the stated objective of an auctioning mechanism should be in light of the current supply concentration.

Market participants have naturally factored in these potential changes over the past year and NZU buying activity has increased. As a result, the price of NZUs has pushed up strongly and currently sits above NZ $11 at the time of writing, having risen from NZ $5 in mid-2015 and a sub NZ $2 low in early 2013.

Outlook

The short and medium-term outlook for the NZ ETS hinges firmly on the outcome of the current review. With many key design features on the review agenda, the implications will likely be significant. NZ ETS participants will need to remain firmly attuned to the review process to ensure sufficient warning of any changes to come into effect.

In terms of market expectation, there is a general consensus that the one-for-two rule will be phased out. Climate Change Minister Paula Bennett has clearly telegraphed intention in this regard commenting that it is more a case of 'when and how' than 'if' at an energy conference in March 2016.

Details of the execution of this phase out and transition to full obligation are not as easy to identify. A quick transition would better achieve the government's goal of reducing the overhang of banked NZUs but any resulting sharp price escalation could be disruptive and costly to ETS participants if the banked supply were slow to emerge. However, transitioning too slowly could see NZU prices fall or remain stagnant, failing to encourage the desired transformative change to business-as-usual practice. The government is cognisant of this balance with the ETS review explicitly seeking guidance from the market on implementation timeframe and speed of transition. Lowering the price ceiling of NZ $25 is another possibility to help limit price volatility.

Pivotal to the market outlook for the years 2017-2020 will be clarification on auctioning. The review paper earmarks a post-2018 date but, in order for market participants to forecast the implications for liquidity and price, detail will be required on the government's stated intent/objective of auctioning, the consequent volumes and timing as well as how the abatement deficit created will be managed.

For the longer post-2020 horizon, the New Zealand government believes access to international units will again be very important for meeting their 2030 reduction target and consequently also includes this for discussion as part of the current scheme review. Relinking the NZ ETS to international markets would help address long-term supply issues, prevent emissions leakage to other jurisdictions and help keep trade-exposed New Zealand businesses on equal footing with their international competitors.

The review raises questions related to restrictions on international units based on type, source location and volume. There are lessons from earlier NZ ETS linkages, particularly in terms of the difficulty of foreseeing future changes in international schemes to maintain alignment. For example, given the comparative size of the NZ ETS, the banning of certain types of units in other jurisdictions can create distortions in the NZ ETS if the New Zealand government does not react quickly to mirror the change.

Further resources:

[1] Environmental Protection Authority (2015) '2014 Annual NZ ETS Report'. Available: **http://www.epa.govt.nz/e-m-t/reports/ets_reports/annual/Pages/default.aspx**

[2] Ministry for the Environment (2015) 'New Zealand Emissions Trading Scheme Review 2015/16 Discussion Document and call for written submissions' Available at: **http://www.mfe.govt.nz/publications/climate- change/new-zealand-emissions-trading-scheme-review-2015-16-discussion-document**

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Kazakhstan

In 2013, Kazakhstan became the first Asian country to start a national Emissions Trading Scheme (ETS). With the scheme, the country wants to stop the significant increase of its GHG emissions in its recent past. Over the last years, the CO2 emissions per capita increased to 15.2m tonnes/year[1], which is nearly twice the per capita emissions of the United Kingdom and 10 times the emissions of their neighbouring country Kyrgyzstan. The GHG emissions growth in Kazakhstan is mainly driven by its oil and gas industry. The country is very rich in natural resources; it ranks 11/14[2] on the list of countries with the most proven reserves on crude oil and natural gas.

Quick facts	
Regulator	Ministry of Energy
Covered entities/sectors	Power, production of coal, oil and gas, industry
Compliance periods	Phase I: 2013
	Phase II: 2014-2015
	Phase III: 2016-2020
Reduction target ETS	7% below 1990 levels by 2020
Reduction target country	15% below 1992 levels by 2020
Plans post-2020	25% reduction by 2050
Covered emissions	CO2
Cap (available allowances)	147m tonnes +20.6m tonnes reserve per year
Auctions	100% allocation
Banking/Borrowing	Not allowed between first and second trading phase
Offsets	Only domestic offsets
Penalties	€40 per missing allowance

The ETS started in 2013 with a Pilot Phase, in which there was no penalty for non-compliance. It was announced to start in 2016; however, according to recent news, the ETS was suspended until 2018 following heavy opposition from the industry.

System setup

The ETS in Kazakhstan is set up for three compliance periods. The first one-year compliance period in 2013 served as a pilot phase. With the second phase 2014-2015, actual trading started; however, many rules are still undecided on or not in place yet. The third compliance phase was planned to start in 2016 and go through 2020.

During the first two compliance periods, the Kazakh ETS includes the CO2 emissions of three sectors: power production, coal, oil and gas production and other industry. Within these sectors, all installations with expected annual CO2 emissions of more than 20,000 tonnes have a compliance obligation. This leads to around 170 compliance companies in the current setup.

The cap for 2013 is set at 2010 levels and expected allocation volumes are shown in Table 1. For the second and third phases of the ETS, allocation volumes have been published as shown in Table 1. They indicate a significant increase in allocation volumes for 2014 and a 1.5% decrease for 2015. Notably, in the second phase, there were additional

[1] *The World Bank http://data.worldbank.org/indicator/EN.ATM.CO2E PC?order=wbapi_data_value_2010+wbapi_data_value+wbapi_data_value-last&sort=desc*

[2] *CIA World Factbook https://www.cia.gov/library/publications/the-world-factbook/rankorder/2253rank.html?countryname=Kazakhstan&countrycode=kz&regionCode=cas&rank=14#kz*

Table 1: Allocation volumes			
	2013	2014	2015
Number of operators	178	159	159
Free allocations	147.2	154.1	151.8
Additional allocations		7.2	6.8
Reserve allowances	20.6	18.0	20.5
Potential market size	167.8	179.3	179.1

Source: Registry of carbon units, Kazakhstan

allocations made to around 20 of the 159 compliance companies over the second phase. In total, those additional allocation volumes accounted for around 14m allowances and were likely sourced from the reserve. The rest of the considerably large reserve serves as a new entrant's reserve and can be sold by the government at the exchange.

Borrowing is currently not allowed. Banking between different compliance phases is under discussion but not implemented yet. Only domestic offsets are allowed. The current regulation does not include an offset limit.

System history

The ETS is part of an overall plan of the Kazakh government to implement a 'green economy' in Kazakhstan. It was first mentioned in an amendment to the 'Ecological Code of the Republic of Kazakhstan' in 2011, which set the framework for all climate legislation.

The details of the ETS were agreed to in 2012. Additionally, the Ministry of Environment started developing the infrastructure required, like a registry for the emissions quotas and a monitoring, reporting and verification system. The organisation 'ZhasylDamu' serves as the operating entity of the ETS.

In the emissions reporting for 2013 on 1 April 2014, 33 companies reported an overall deficit of 2.7m tonnes, 31 companies reported a surplus of in total 14.9m tonnes. This leaves the market at the end of the first phase with an oversupply of 12.2m tonnes.

Generally, the Kazakh ETS saw irregular trading activity on the Caspian Commodity Exchange. The first trade took place on 28 March 2014, when around 32,000 allowances were sold to compliance entities at a price of 455 Tenge (at this time around €2.2). Since then, trading activity on the Caspian Commodity Exchange shows sporadic trading with significant price changes even within one day. The main times of trading were shortly before the compliance dates in April 2014 and 2015 and then again in summer 2015, where trading picked up significantly. Trading prices ranged from 50 Tenge to 1650 Tenge (€0.12 to €4.26) within August 2015, and since then no trading was reported.

Outlook

Despite the ETS in force officially for three years, the Kazakh ETS still does not seem to be a well working market. Many details of the system are still under discussion and only very limited data is published. A recent news report said the Kazakh ETS was suspended until 2018. However, there was no official announcement made from the government side. This leaves the current status of the Kazakh ETS unclear.

Kazakhstan's economy is suffering with the currently low oil and gas prices. With a large share of their GDP depending on these commodities, their overall economic outlook for the next years is getting more pessimistic. While low economic output is likely to reduce emissions in Kazakhstan, a political willingness to increase the burden on the industry via an extensive carbon pricing is unlikely.

Further resources:

Caspian Commodity Exchange: **http://www.tbc.kz/#**

ZhasylDamu – Implementing Agency of the Ministry of Environmental Protection – **http://zhasyldamu.kz/en/**

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California cap-and-trade programme

California's cap-and-trade programme was established under Assembly Bill (AB) 32, the state's comprehensive legislation, to reduce state-wide greenhouse gas emissions to 1990 levels by 2020. Covered entities must meet an annual emissions cap by surrendering allowances for every tonne of CO2 equivalent (CO2e) emitted. The cap declines by approximately 3% each year beginning in 2013 with the target goal of 334.2m tonnes CO2e by 2020. Although the first auction for California Carbon Allowances (CCAs) was held in November of 2012, the programme officially came into effect on 1 January 2013. At the beginning of 2014, the California and Quebec (see Quebec article) programmes officially linked. Starting in 2015, California broadened the scope of its programme, making it, globally, the scheme that covers the widest range of sectors.

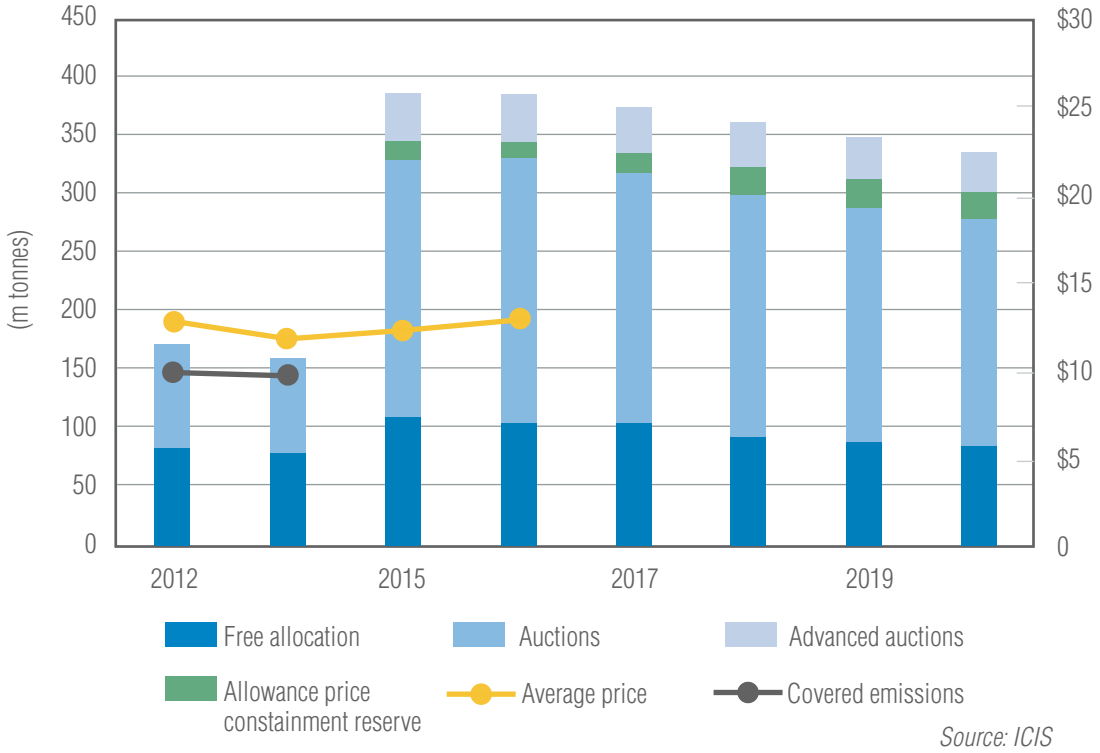
Quick facts	
Regulator	California Air Resources Board (CARB or ARB)
Covered entities/sectors	Emitters of at least 25,000m tonnes CO2e/year
	2013-2020: electricity generators (including imports) and industry
	2015-2020: transportation fuel and natural gas distributors added
Compliance periods	CP1: 2013-2014 CP2: 2015-2017 CP3: 2018-2020
Reduction target -ETS	California: 388.9m tonnes CO2e by 2020
Reduction target - State	California: Reduce to 1990 levels by 2020
Plans post-2020	No binding targets yet, but long term plan to reduce California emissions to 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050 has been discussed
Covered emissions	146.1m in 2014, 348.4m expected in 2015
Cap	382.4m for 2016
Auctions	Quarterly single round, sealed bid, uniform price auctions in February, May, August and November, jointly held with Quebec
Banking/borrowing	Banking: Yes Borrowing: Within compliance period
Offsets	Yes; limit to 8% of total compliance obligation
Penalties for non-compliance	Four times the amount of allowances that were not surrendered

System setup

Learning from the Regional Greenhouse Gas Initiative (RGGI) and the EU ETS, California's regulator, the Air Resources Board, worked together with stakeholders to design a cap-and-trade programme that incorporates elements that are both proven to work and innovative. Officially commencing in 2013, California's cap-and-trade programme began by including only industrial sources and electricity generators that emit more than 25,000 tonnes CO2e per year. The California programme entered its second phase in 2015 and extended compliance obligations to transportation fuel and natural gas suppliers, effectively doubling the size of the programme in compliance period 2.

Emissions allowances are distributed through a mix of free allocation and quarterly auctions. Electricity generators receive heavy free allocations, but are required to consign the full allocation (if they are investor-owned) to the quarterly auctions. Industrials covered in the programme receive hefty allocations in accordance to their leakage risk. In the first compliance period (CP1), free allocations accounted for nearly 90% of covered emissions. Additionally, natural gas suppliers received free allocations but are required to consign an increasing portion to auctions each year. The proportion of freely allocated allowances to covered emissions drastically reduced with the addition of the transportation fuel sector entering the programme in 2015, as they have not and will not be issued any free allocations through 2020.

Figure 1: Fundamentals



Source: ICIS

The majority of allowances that are not distributed freely may be purchased through the quarterly auctions or in the secondary market. Quarterly auctions are conducted in a single round, sealed bid, uniform price format with no bids sold lower than the auction reserve price (aka the floor price). The floor price currently stands at $12.73 and increases annually at 5% plus inflation. Allowances available at auction that are not consigned by utilities are owned by the state. Not only does the state auction off the current vintage, 10% of allowances with a vintage three years in the future are also available. Through Q4 2015, quarterly auctions have become a large source of revenue, raising more than 3.5bn dollars for the state to redistribute through the Greenhouse Gas Reduction Fund (GGRF). Lastly, additional volumes may enter the market through reserve sales if the auction price is high enough to trigger the Allowance Price Containment Reserve (APCR) ($45.20 to trigger Tier 1/ $56.21 for Tier 3 in 2015).

California's cap-and-trade programme has both annual and triennial compliance surrender deadlines. This means during the compliance period, covered entities must surrender 30% of the previous year's compliance obligation by 1 November of each year. The remaining portion of an entity's obligation is due in November following the final year of the compliance period. Allowances do not expire until they are surrendered for compliance, voluntarily retired, or are retired by an external trading system linked to California.

Additionally, offset credits can also be surrendered for up to 8% of an entity's total compliance obligation. For perspective, offsets were surrendered for 4.5% of total compliance period 1 obligations. Qualified offset protocols include ozone depleting substances, livestock, urban forests, US forests, mine methane capture, and rice cultivation (new in 2015). All projects must come from within the continental United States.

System history

AB 32, also known as the Global Warming Solutions Act of 2006, commits to reduce California's GHG emissions to 1990 levels by 2020. The ARB is responsible for developing its scoping plan, and California's cap-and-trade programme is one of its key measures. The development of this programme included a multi-year stakeholder process and consideration of potential impacts on communities. Projected to contribute 23% of the state's total emissions reduction by 2020, the cap is set in place to act as an insurance mechanism to reduce emissions when complementary policies fail to do so.

California has been working with British Columbia, Ontario, Manitoba and Quebec through the Western Climate Initiative (WCI) to take cooperative actions to address climate change and implement a joint strategy to reduce greenhouse gas emissions. Central to the comprehensive strategy is a cap-and-trade system; although at this time, California and Quebec are the only two jurisdictions to have

officially adopted these recommendations. However, Ontario released draft regulation for a cap-and-trade programme that closely mirrors California and Quebec's in early 2016. However, to date, the only linkage is with Quebec, where, as of 1 January 2014, this linkage allows regulated entities to buy and trade compliance instruments (including offsets) across jurisdictions. The linkage reached a milestone when it held the first joint auction in November 2014.

In the first year of the program, uncertainty associated with the beginning of compliance obligations affected the auction clearing price. Through 2013, the clearing price was in the $10 to $14 range, showing relative volatility. However, in 2014 as the general market sentiment shifted towards oversupply in the long term, the price hovered modestly above the price floor. As CP1 came to a close, the price of CCAs jumped slightly, which may be attributed to fuel suppliers engaging in the market ahead of their scheduled compliance start date and the uncertainty associated with a new compliance period. However, throughout 2015, oversupply kept the price near the floor, before dropping to the floor and even below the floor (secondary market) in Q1 2016.

State of play

Under the broadened scope, beginning in 2015, the programme has more than doubled in size with the inclusion of transportation and natural gas fuel suppliers, increasing the annual cap from 159.7m in 2014 to 394.5m in 2015. After the November compliance date in 2015, the market gained clear evidence that the first compliance period was oversupplied by more than 50m allowances. Although data is not yet available, market participants are also generally under the impression that 2015 is heavily oversupplied.

Heading into 2016 and the first auction of the year, market sentiment towards the oversupply again prevailed. For the first time in California's history, supply in the auction exceeded demand. The auction failed to sell out both vintage 2016 allowances and vintage 2019 allowances. The v16s will be withheld until two consecutive auctions clear, while the v19s will not re-enter the market until they are sold at a current vintage auction in 2019. Lastly, bearish sentiment in the market caused the price of allowances on the secondary market to fall substantially below the floor price in February 2016 for the first time.

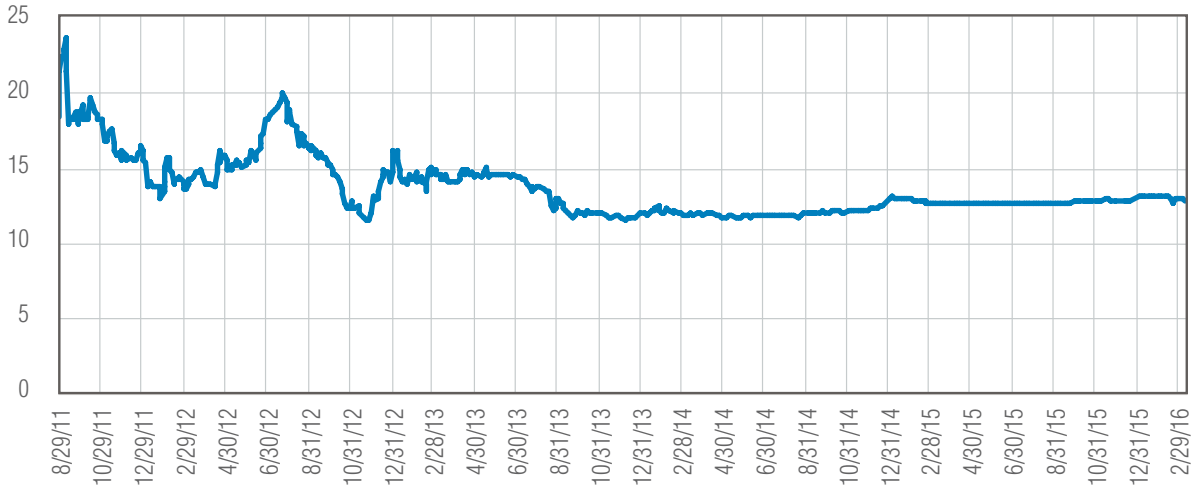
Another large question being contested is how the offset market will develop. Offsets will play an important role both physically, in terms of producing measurable reductions, and financially, in terms of reduced cost. However, the availability of supply, limited use (8% only), and risk profile has made it challenging for the offset market to develop.

Outlook

Throughout the last two years, the market has developed the expectation that CCA prices will trail the auction floor price. The first auction of 2016 sold roughly 95% of available allowances at the floor price. Despite the mid-term expectation that the market is oversupplied, we may see short term volatility driven by policy changes.

There were several important advancements for policy-related topics in 2015. Foremost, in April 2015 Governor Brown announced that the state will strive to hit a 2030 GHG target of 40% below 1990 levels. The target was undertaken in the legislature; however, this prominent bill failed to pass through the second house. It is likely it will be contended again in 2016. In contrast, a bill that adopts a 50% renewable energy by 2030 target for the state was passed, although it was amended in the final days of the legislative session to remove the piece

Figure 2: Price of CCAs based on December delivery for current year



Source: ICIS

that would have established a goal to cut petroleum usage in half in the transportation sector. While market participants are currently awaiting a decision about how AB32 will progress post-2020, the future of the cap-and-trade programme is also likely to be affected by the US EPA's Clean Power Plan.

The EPA's Clean Power Plan was finalised at the beginning of August 2015. Since then, California has been working on developing a compliance plan. Initial analysis conducted by the state at the end of 2015 indicated that California is on track to comply using its current suite of energy policies. Furthermore, the state only foresees relatively minor amendments being necessary to include the cap-and-trade programme into its overall compliance plan.

Further resources:

- AB 32 Global Warming Solutions Act
  http://www.arb.ca.gov/cc/ab32/ab32.htm

- Cap-and-Trade Programme
  http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm

- Western Climate Initiative
  http://www.wci-inc.org/

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California's cap-and-trade programme post-2020

Assembly Bill 32 (AB32) requires California to reduce its greenhouse gas emissions to 1990 levels by 2020, a reduction of approximately 15% below the 'business as usual' emissions scenario. Pursuant to AB32, California's regulator, the Air Resources Board (ARB), must adopt regulations/policies to achieve the maximum technologically feasible and cost-effective greenhouse gas (GHG) emission reductions, giving reason for California to adopt its cap-and-trade programme. However, at this time, the requirements and targets set by AB32 only continue through 2020. After this date, there is no comprehensive legislation that requires California to go beyond its 2020 goal. This means that, as of now, California's programme will end with AB32 in 2020.

Although these targets have not been approved by the state legislature, California has discussed 2030 and 2050 GHG emissions reduction goals. In April 2015, Governor Brown issued an Executive Order declaring that California will aim to reduce its emissions to 40% below 1990 levels by 2030. This would put the state on track to reach its mid-century target of 80% below 1990 levels by 2050. It is important to note that at this time no definitive plans have been made. However, extending the cap-and-trade programme out to 2030 has been discussed by both the ARB and by stakeholders in great depth. Recently, the ARB held a workshop reiterating its intention to extend the cap-and-trade programme through at least 2030. At this meeting, the ARB also presented different options to consider when setting the cap, which will be discussed in the following section.

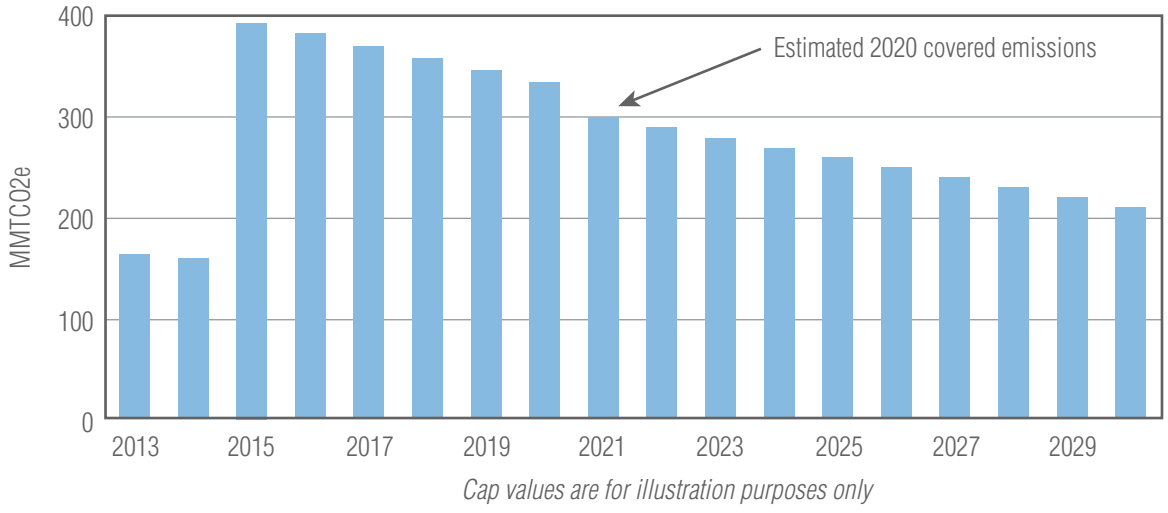
A post-2020 cap

On March 29, the ARB presented two different cap setting options that they are looking into for the post-2020 programme. The first of the two would entail setting a cap that declines linearly between current 2020 and expected 2030 cap levels. Option 2 is similar in that it reduces linearly but instead would set the cap for 2021 based on estimated 2020 covered emissions (see Figure 1). Depending on the ARB's projections the adjustment to the cap could be either upwards or downwards.

Setting a cap based on the most recent forecast of emissions may allow California to adjust for potential over- or undersupply. However, structuring a cap on projections, in itself, can be tricky and increase uncertainty for market participants prior to it being finalised. The ARB has not released draft cap numbers, but they have noted that they expect the 2030 cap to be between 203m and 216m if structured around the 40% below target mentioned previously.

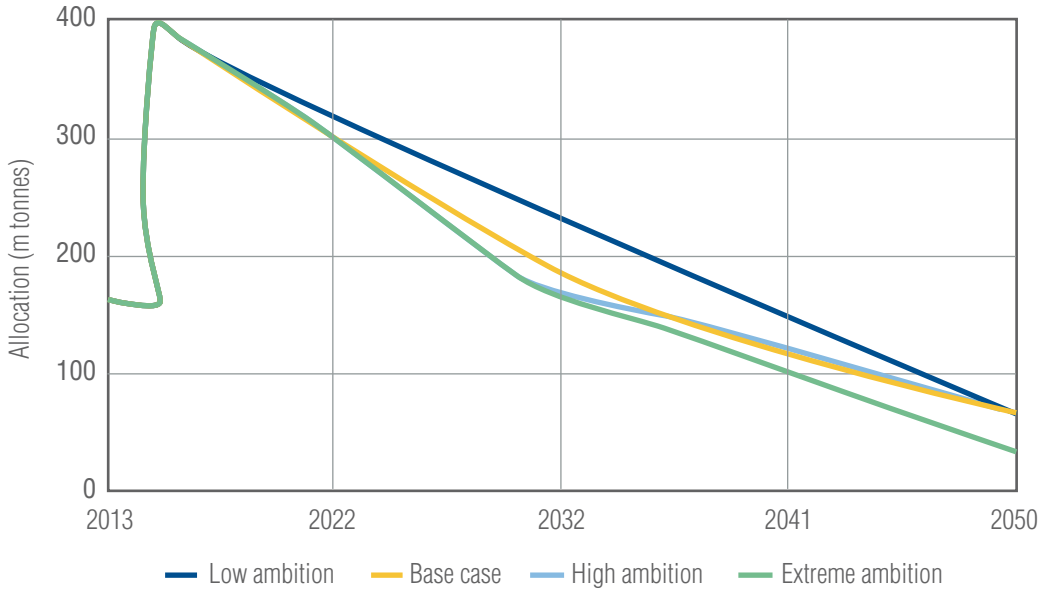
ICIS has modelled potential caps for the programme post-2020, where the few we believe as mostly likely to take shape are shown in Figure 2. The orange line demonstrates an annual cap that reflects the 40% below 1990 levels by 2030 target (cap=200m in 2030), where an annual percent reduction is carried out through 2050 to hit the mid-century target as well. We believe the ARB will choose to set a similar cap if they are able to get the 2030 target approved in the legislature or work around them. If the ARB is unable to do so or gets major pushback from stakeholders, we believe they could set annual caps that match the blue line (cap=245m in 2030). This line represents a straight line reduction post-2020 to meet the 2050 target. This scenario is lower in terms of ambition that the previous one.

Figure 1: Cap setting option 2



Source: ARB

Figure 2: ICIS potential cap scenarios post-2020



Source: ICIS

An even more ambitious 2030 cap?

Although we find it extremely unlikely, it is possible that the ARB will set a cap-and-trade target for 2030 that goes beyond expectations of what will be required to reach the 40% target. In Figure 2, we created two more ambitious pathways for the state to reach an equally ambitious or more ambitious mid-century goal. There are multiple rationales for setting a more stringent interim target for the 'high ambition case', which are as follows:

1. It may compensate for any oversupply in the market through 2020,

2. If the BAU case for non-covered sectors increases dramatically and the ARB seeks to get more emissions reductions from sectors covered in the cap-and-trade programme, or

3. A related programme is taken offline so the state seeks to strengthen the cap-and-trade programme.

Alternatively, as exhibited in the 'extreme ambition case' it is possible a more stringent 2050 target could be set (i.e. 90% below 1990 levels by 2050). In the 'Under 2 MoU', an agreement that California is a part of with other international jurisdictions, the state commits itself to reducing emissions to 80-95% below 1990 levels by 2050.

Additionally, there is currently no definite word on how other design features will be structured in California's cap-and-trade programme post-2020, although the ARB provided stakeholders with some insight into this topic at the March 2016 meeting. Ambitious programme design features are expected in the post-2020 programme, where we assume both price containment measures as well as allocations will be set in a way that keeps the programme ambitious, but protects consumers. The ARB noted that allocation methodologies will likely remain the same, where annual allocations will decrease with the cap (cap adjustment factor) but still be given at levels that are in accordance to their leakage risk. Furthermore, while price containment measures (Allowance Price Containment Reserve) protect against sustained extreme price levels, they also increase the programme's ambition by reducing yearly supply entering the market. We believe the ARB will continue to increase the annual percentage that is added to this reserve for this reason (in 2020 this is 7% of the annual cap).

Clean Power Plan

Not only will California utilise its ambitious 2030 target and its role as a leader in climate policy as core reasons for extending its cap-and-trade programme the state plans to use the programme as a means of complying with the Clean Power Plan (CPP), a rule under the federal Clean Air Act that aims to reduce emissions from the power sector nationally. In brief, the CPP requires states to develop and implement plans to reduce their emissions between 2022 and 2030 based on what best suits their power sector.

California is looking into a 'state measures approach' that would allow the usage of its nearly 'economy-wide' cap-and-trade programme. Since the CPP rule was finalised in August 2015, the state has been discussing and addressing at workshops what potential amendments

may be needed for the programme to be Clean Power Plan eligible. In the most recent workshop held in February 2016, the ARB stated that besides extending the programme through 2030, major amendments to the general structure of the system are not expected. The most crucial amendments include: aligning compliance periods, adjusting reporting requirements, and creating a backstop measure if California entities diverge from their emissions reductions pathway significantly. The ARB believes the usage of offsets will be approved by the US Environmental Protection Agency (EPA).

Conclusion

As California looks to design its post-2020 cap-and-trade programme, they will have to take the result of the pre-2020 programme into consideration and decide if they want to make changes moving forward in the near future. Because the system is extremely likely to be over-supplied through 2020, California may account for this by reducing post-2020 supply. This means that if California wishes to push for real emissions reductions, it may need to undertake an ambitious programme design. As part of a 2016 amendment rulemaking process California is exploring its options post-2020. This suggests over the course of the next year, California plans to move forward with expanding and designing its programme, giving stakeholders more certainty on the future of the programme more than 4 years in advance.

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Quebec Cap-and-Trade Programme

Quebec's cap-and-trade programme officially launched on 1 January 2013. This programme intends to help the Canadian province reach its ambitious greenhouse gas emission reduction goal of 20% below 1990 levels by 2020. By setting a steep cap on emissions that declines from 63.2m in 2016 to 50.9m tonnes of CO2 equivalent (CO2e) in 2020, Quebec will take on the challenge of having a nearly economy-wide cap-and-trade programme with the most ambitious target in North America.

Quick facts	
Regulator	Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (Ministry of Sustainable Development, Environment and the Fight Against Climate Change)
Covered Entities/Sectors	Emitters of at least 25,000m tonnes CO22e/year 2013-20: Electricity generators (including imports) and industry 2015-20: Transportation fuel and natural gas distributors added
Compliance Periods	CP1: 2013 – 2014 CP2: 2015 – 2017 CP3: 2018 – 2020
Reduction Target- ETS	54.7m tonnes CO2e by 2020
Reduction Target- Province	Approximately 20% below 1990 levels by 2020
Plans post-2020	To reduce GHG emissions to 37.5% below 1990 levels by 2030
Covered emissions	18.2m tonnes (2014)
Cap (available allowances in millions)	63.2m tonnes for 2016
Auctions	Quarterly single round, sealed bid, uniform price auctions in February, May, August and November, jointly held with California
Banking/Borrowing	Banking: yes Borrowing: no
Offsets	Yes; Limit to 8% of total compliance obligation
Penalties for non-compliance	Varies

A year after the programme's commencement, Quebec officially linked with California as part of the Western Climate Initiative (WCI). Quebec's linkage with California has proven to be durable through successful joint auctions and its expansion to include fuel suppliers into the programme at the beginning of 2015.

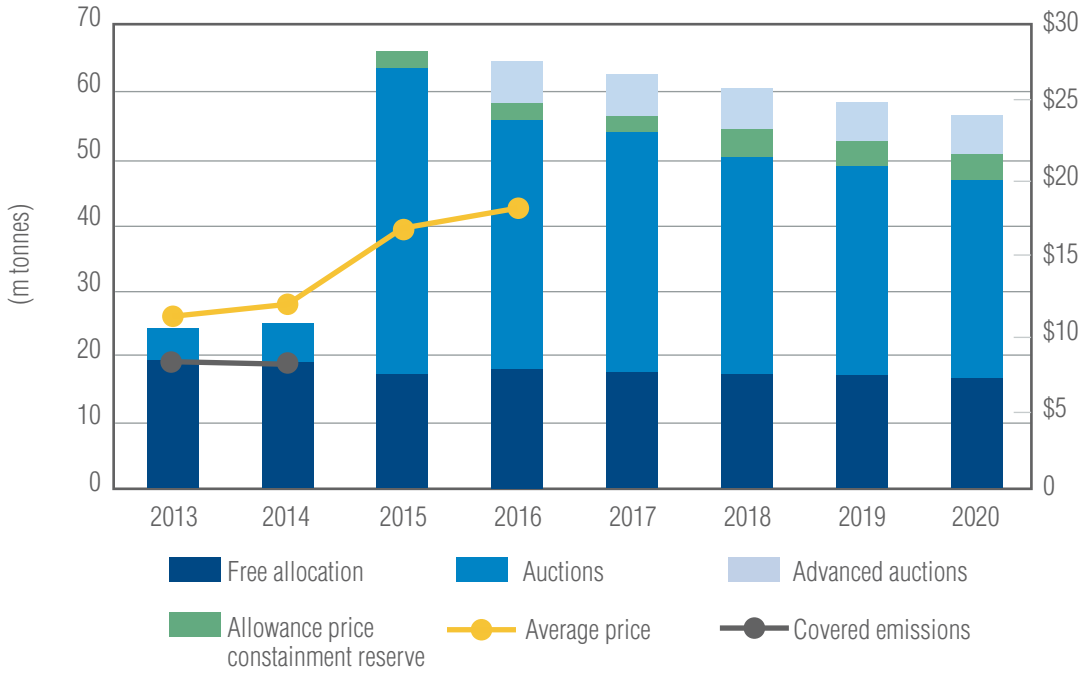
System setup

In 2012, Quebec announced a climate action plan that will aid the province in reducing emissions to 20% below 1990s levels by 2020. The cap-and-trade programme, as part of this plan, officially commenced on 1 January 2013. Similar to California, power producers and industrial entities that produced more than 25,000 CO2e annually held mandatory compliance obligations in the first compliance period. Starting in 2015, compliance obligations extended to transportation fuel and residential/commercial gas suppliers. The full programme covers approximately 85% of Quebec's total GHG emissions.

Because both Quebec and California adopted the recommendations of the Western Climate Initiative (WCI), their programmes are structured similarly. Like in California, an entity must surrender one greenhouse gas (GHG) emission unit issued for the current or previous budget year for every tonne of CO2e emitted. Entities can use carbon allowances and offsets issued by either Quebec or California. The linkage between the two jurisdictions as of 1 January 2014 has made their compliance instruments fully fungible. Furthermore, allowances are released into the market through free allocations given by the province and quarterly auctions conducted jointly between the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC) and the Air Resources Board (ARB or CARB), California's regulator.

Allowances are freely allocated to aluminium, lime, cement, chemical, petroleum refining, and other sectors that are subject to international competition. In the first compliance period, free allocations were based

Figure 1: Fundamentals



Source: ICIS

on historical emission levels and adjusted for production output, giving most entities free allocations that covered 80-100% of their emissions. This percentage is expected to stay high for the time being. Additionally, early reduction credits were given to emitters covered in the first compliance period who were able to verify reductions between 2008 and 2012. However, over time free allocations to industry will decline at a rate of 1-2% annually. Like in California, the transportation fuel sector does not receive any free allowances through 2020. For perspective, allocations account for roughly one third of the supply entering the market in 2016.

Allowances that are not freely allocated are province-owned and released via the quarterly auctions held jointly with California. Like California, allowances with the current year vintage and the three-year ahead vintage are auctioned. For perspective, roughly two-thirds of allowances in 2016 will enter the market through auctions. The auction floor price or auction reserve price is set at $12.82 CAD for 2016 and increases annually at 5% plus inflation. However, in all cases of joint auctions, the minimum bid price will be the higher price between the Quebec and California minimum prices on auction day based on the latest exchange rate.

Offset credits can also account for up to 8% of an entity's total compliance obligation. Currently, there are three domestic protocols from eligible projects that destroy methane from manure storage facilities, capture gas from landfill sites and destroy ozone depleting substances. Dissimilar to California, there is no buyer liability. Instead, the Ministry has an 'environmental integrity account' (buffer pool) that holds 3% of issued offset credits that will replace any offset credits that are invalidated. Lastly, whether an entity seeks to surrender emissions units/allowances or offsets, 100% of their total compliance period obligation must be surrendered by November 1 of the year following the end of the compliance period (no annual compliance deadlines like in California).

System history

In June 2012, Quebec announced its 2013-2020 Climate Change Action Plan that gave grounds to establish its landmark cap-and-trade programme. The remainder of the year was used as a transitional phase for companies to familiarise themselves with the requirements of the programme, before officially commencing in 2013.

After joining the WCI in 2008, Quebec has been working with British Columbia, Ontario, Manitoba and California to take cooperative actions to address climate change and implement a joint strategy to reduce greenhouse gas emissions, which includes a cap-and-trade programme. Although at this time, California and Quebec are the only two jurisdictions to have adopted these recommendations. As of 1 January 2014, Quebec's linkage with California's cap-and-trade programme allows regulated entities to buy and trade allowances across jurisdictions.

Before joint auctions were held in November 2014, the MDDELCC held four solo auctions beginning in December 2013. With approximately 80 covered electricity generators and industrial entities that were given large free allocations, all auctions but one in the first compliance period failed to sell out and all settled at the floor price. This surprised some market participants since the competitive California-Quebec joint auctions substantially increased the cost of allowances for Quebec entities.

State of play

After a successful first compliance period, the joint California-Quebec programme seems to be off to a healthy start. Quebec, as well as California, has managed to handle the transition to the second compliance period where the scope of the programme has been significantly broadened. The full programme has more than doubled in size with the inclusion of fuel suppliers in 2015. Because the transportation fuel sector will not be given free allocations, they have the largest short position in both California and Quebec. Now in 2016, the market has shown some stability with only a short period of price volatility. The most notable was when the price on the secondary market dropped substantially below the current year's floor price. Furthermore, the joint auction failed to sell out all available allowances for the first time, although this was not uncommon in Quebec-only auctions in the past. In general, the market may just now be finally feeling the effects of a significant oversupply from the previous years.

In terms of the offset market, Quebec has only approved three protocols and has set strict location limitations (projects from two protocols can only come from within the borders of Quebec and the third only from within Canada) for eligible projects. Despite the restrictions, Quebec issued its first offset credits in July of 2015. Through 2015, the province has issued less than .2m credits in total, from 3 of 8 listed projects. In comparison to California, drastically less offset potential is expected. It is believed that the current regulation will hinder Quebec's offset market development.

Outlook

Through 2020, Quebec is looking to reduce their emissions to 20% below 1990 levels. This goal is regarded as extremely ambitious considering over 90% of Quebec's electricity comes from renewable sources, primarily hydropower. Additionally, the majority of industrial emissions come from metal production, notably aluminium companies. Because a large amount of energy is required in these processes, there is believed to be minimal reduction opportunities from industrials as well. Therefore, most of Quebec's emissions reductions must come from the transportation sector, primarily cars and trucks, which is a sector that has been growing in recent years. As a result of limited abatement and offset potential, it is believed that Quebec will be a net buyer of California compliance instruments in the long term. However, because the Quebec market is modest in size, their impact on the joint carbon market is expected to be small.

Despite Quebec's small size, the province has substantial influence. Consistent discussions between Quebec and Ontario led to the province of Ontario designing a cap-and-trade that closely mirrors Quebec's (and California's) in structure, making it so Ontario could potentially link with the two jurisdictions in the near future. Lastly, in September 2015, Quebec announced its goal to reduce GHG emissions to 37.5% below 1990 levels by 2030. Although nothing definitive has been said, we believe Quebec will use this target to help structure a post-2020 cap-and-trade programme.

Further resources:

- Western Climate Initiative:
  http://www.wci-inc.org/

- MDDELC
  http://www.mddelcc.gouv.qc.ca/

- Regulation
  http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q_2/Q2R46_1_A.HTM

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Regional Greenhouse Gas Initiative (RGGI)

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative of nine states in the US northeast (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont) to reduce their greenhouse gas (GHG) emissions in the power sector.

Quick facts	
Regulator	Regional Greenhouse Gas Initiative (RGGI) and different regulators in each state
Covered entities/sectors	Electricity generation from fossil-fuelled power plants greater than 25 MW
Compliance periods	CP1: 1 Jan 2009 – 31 Dec 2011 CP2: 1 Jan 2012 – 31 Dec 2014 CP3: 1 Jan 2015 – 31 Dec 2017
Reduction target ETS	2.5% Reduction each year between 2015 and 2020
Reduction target country	n.a.
Plans post-2020	n.a.
Covered emissions	86m short tonnes (2014)
Cap (available allowances)	91m tonnes (2014)
Auctions	100%
Banking/Borrowing	Unlimited banking allowed, borrowing not allowed
Offsets	Credits domestic offsets from RGGI protocols Limit 3.3% of the reported emissions
Penalties	Fine equal to three times the allowance price

Over the last few years, RGGI has gone through structural changes. After emissions declined in 2009, RGGI allowances were trading at the price floor for two consecutive years. RGGI has seen increasing market activity and prices over the last years after an update to the regulation and its design, including a massive reduction of the cap. However, the full impact of the updated Model Rule remains to be seen, but is expected in the next three years.

System setup

RGGI is a unique emission trading scheme (ETS) in many ways. The programme is set up through a memorandum of understanding (MOU) as a combination of nine individual ETSs that are linked with each other. Each participating state has its own regulation based on the Model Rule provided by RGGI. This setup allows new states to join the programme relatively easily.

RGGI is organised in control periods of three years, and in the past, covered entities had to cover all of their emissions at the end of each period. Starting in 2015, Interim Control Periods were added. Similar to California, compliance companies are now required to surrender half of their compliance obligation for each year in March of the following year.

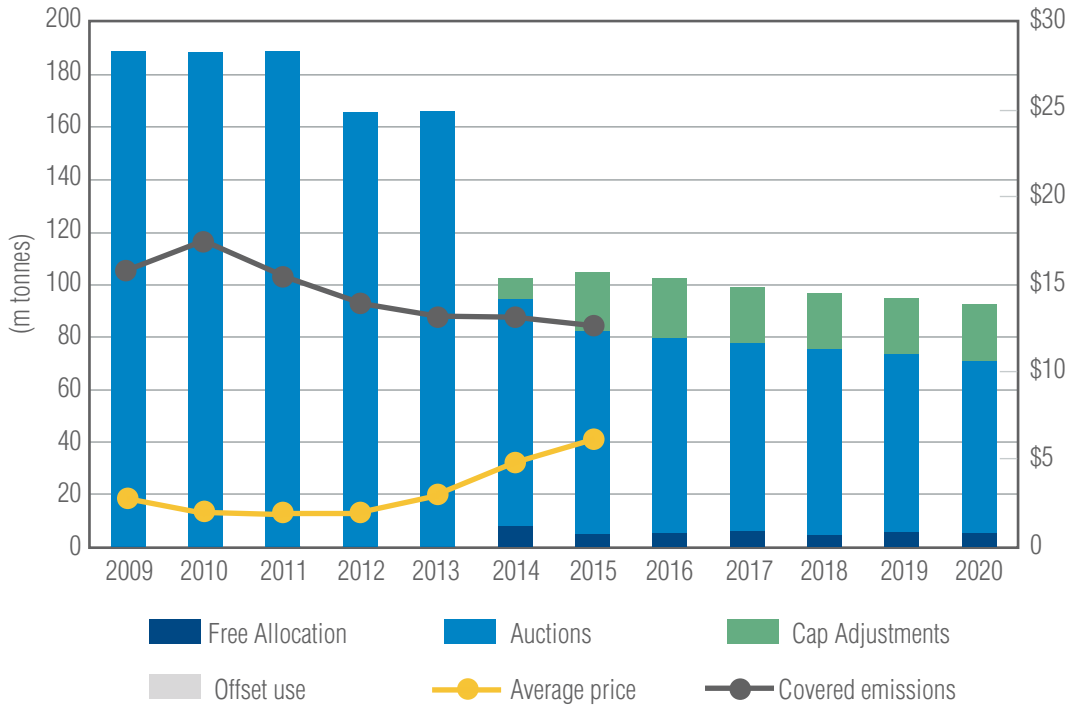
RGGI's coverage is small. The programme only covers emissions from fossil-fueled power plants greater than 25MW. The majority of allowances are sold via quarterly auctions held by RGGI. For each year, a minimum reserve price is set for the auctions, increasing by 2.5% each year. In 2016, the reserve price is set at $2.10.

Only a small amount of allowances are allocated to compliance companies directly, the corresponding rules are set by each state individually. States also have the possibility to hold their own auctions, but no state has used this option to date.

Unlimited banking in RGGI is allowed, while borrowing from later control periods is not permitted. The Model Rule allows offset project development within the US. Compliance companies can use offsets for up to 3.3% of their compliance obligation. At this time, no offsets for RGGI have been issued.

In 2014, RGGI established a Cost Containment Reserve (CCR) as a market stabilisation mechanism, which would increase the volume available at auctions if a certain trigger price is reached. In 2014, the volume of the CCR was 5m and was fully depleted in the first auction

Figure 1: Fundamentals



Source: ICIS

at a price of $4. For each year following 2014, the CCR consists of 10m allowances that will enter the market if the auction clearing price reaches $6, $8 or $10 in 2015, 2016, and 2017 respectively. After that, the CCR trigger price will increase by 2.5% yearly, slowing down the annual increase significantly.

The proceeds from RGGI auctions go to the states individually and are mainly used for investments in energy efficiency and renewable energies.

System history

The first version of a Model Rule for RGGI was published in December 2005 after the governors of seven states signed the MOU that guides the programme. It took three years of negotiations within and between states before RGGI started in 2009. At that time, 10 states were part of RGGI: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. New Jersey withdrew from the MOU at the end of 2011, which removed the state at the start of the second control period in 2012.

The first two advance auctions took place in September and December 2008, and all allowances were sold at a price of $3.07 and $3.39 respectively. After that, prices in RGGI decreased continuously, and from mid-2010 on, RGGI was trading at the floor price just below $1.90. The price drop can be mainly attributed to a significant decrease in emissions due to a fuel switching from coal to natural gas. This fuel switch became possible when fracking in the US reduced prices for natural gas. Within three years, emissions in the RGGI states declined from 155m short tonnes to 87m short tonnes per year.

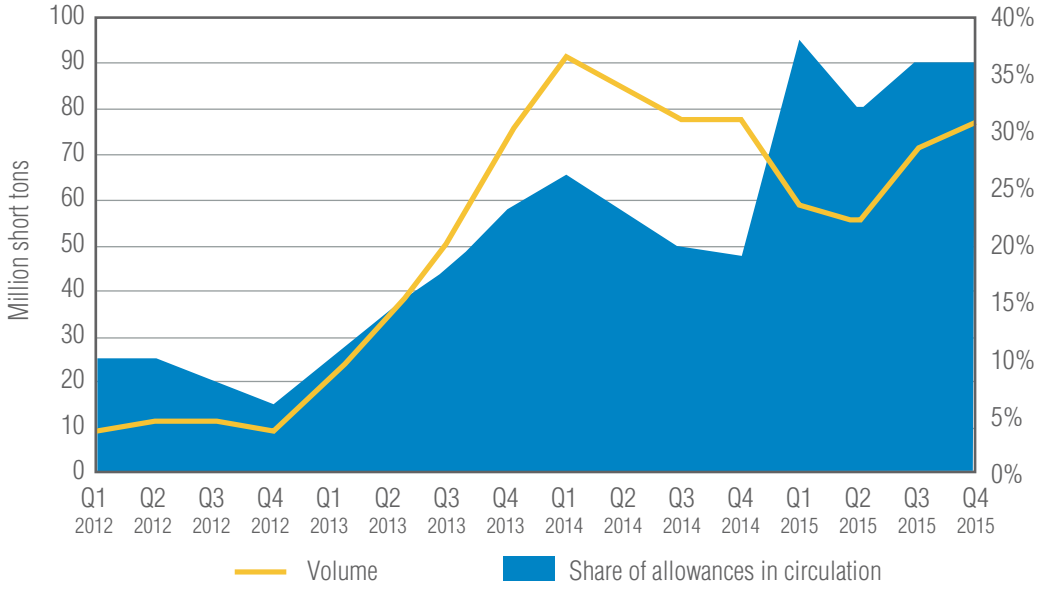
In the MOU, the RGGI states agree to update the Model Rule regularly. The first review took place in 2012 and resulted in two major changes: simplification of many rules and the reduction of the cap.

The reduction of the cap and thus the auction volumes throughout the next few years was done in two separate steps. The first step was to set the overall cap at 91m in 2014. The cap would then decrease by 2.5% every year through 2020. Secondly, as a reaction to a high number of banked volumes from the first two control periods, RGGI introduced two adjustments to its auction volumes, namely the First and Second Control Period Interim Adjustment for Banked Allowances (FCPIABA and SCPIABA). These adjustments will reduce the yearly auction volumes from 2015 forward by 21.9m annually.

State of play

Following the implementation of the updated Model Rule, the activity in RGGI increased significantly. All auctions since March 2013 settled above the minimum price, and prices have been rising steadily. Over the course of the last three years, prices have increased from around $2 at the beginning of 2013 to more than $8 at the end of 2015. The bullish sentiment was supported by the significant reduction of auction volumes through 2020, the steep increase of the Cost Containment Reserve Price in the first years and the discussions on the Clean Power Plan (CPP) (see the Spotlight Article). In February 2016, after the announcement of a temporary halt of the CPP implementation, RGGI prices dropped by around $4 within a week. Following the sudden price correction, the market stabilised at levels around $5.40 ahead of the March 2016 auction, which then cleared at $5.25.

Figure 2: Share and volume of non-compliance holdings in RGGI



Source: RGGI

With the reduced auction volumes, 2014 and 2015 were the first years since 2012 that were fundamentally short. This reduced the massive accumulated oversupply in RGGI, which was mainly built up in 2009-2013. In total, RGGI is oversupplied by more than 130m allowances, which equals around 1.5 years of RGGI emissions. However, the main share of these banked volumes are held by non-compliance players who held 34% of all allowances in circulation in March 2016. Financial players mainly entered the market in 2013, when prices started to increase. In the following years, they continued buying a significant share of the auction volumes (see Figure 2). With the compliance date for the second control period in 2015, their share of holdings increased again.

The banked volumes from financials will continue to play an important role in the upcoming years in RGGI. With the decreased auction volumes, compliance players will have to rely on the supply coming from financials.

Outlook

After a few years of heavy oversupply, RGGI started its third control period with a significant reduction to the cap. With regulatory changes starting to impact the market, RGGI could experience a shortage of allowances for the first time in its existence over the next few years. Despite the recent price drop, the bullish sentiment in RGGI is expect to continue in the mid-term.

For the longer term, RGGI is in the process of discussing its plans for post-2020. In its ongoing 2016 programme review, all stakeholders are asked for feedback on the current programme setup and any plans for the post-2020 period. So far no details have been agreed on, in particular, the cap post-2020, the Cost Containment Reserve, offsets and other parts of the programme setup.

While developing a post-2020 plan, RGGI will have to consider possible changes required by the US EPA's Clean Power Plan (CPP) (see Spotlight article). The connection between RGGI and the CPP is on one hand very strong, as the final CPP from August 2015 cited RGGI as a good example of how to comply. On the other hand, RGGI has existed before the CPP and is very likely to exist in the future independent of the fate of the CPP. RGGI could also go above and beyond the requirements of the CPP.

Overall, RGGI started the third compliance period with a bullish run that was only recently brought to a sudden stop. With several long-term decisions to be made in 2016, this year will provide some clarity on RGGI's future. This could come with more volatility in the short term, and for the long-term in particular, the setting of the post-2020 cap may give an indication as to whether the bullish trend in RGGI is likely to persist.

Further resources:

- Regional Greenhouse Gas Initiative (official website) **http://www.rggi.org**

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The Clean Power Plan

The Environmental Protection Agency's (EPA) Clean Power Plan will place further uncertainty into US carbon markets as political and legal challenges stand in the way of the proposed plan being implemented.

The Clean Power Plan would reduce overall US power emissions by 32% from 2005 levels by 2030. The plan would allow states to regulate emissions either through rate-based mechanisms or a mass-based mechanism, such as a cap-and-trade programme.

Under the plan, the states would have individual goals, but they could opt to link with other states to create multi-state carbon programmes. States would have to submit those compliance plans to the EPA by 2016, but that deadline is currently on hold due to pending legal challenges.

In an effort to appease states, the EPA allowed states to develop their own compliance plan, but they must phase in carbon reductions by 2022.

Because of the structure of the programme and the EPA's proposal, the rule was expected to give states an incentive to join existing carbon programmes, such as the Regional Greenhouse Gas Initiative (RGGI), or create their own systems.

However, the rule was placed in doubt in mid-February 2016 after the US Supreme Court halted the rules until a Court of Appeals panel can hear the legal merits of the case. Prior to this case, the Supreme Court had not granted a legal stay until a federal appeals court reviewed its merits.

The Court of Appeals is scheduled to hear oral arguments on the case in June 2016, but any decision will likely be challenged in the US Supreme Court. Therefore, the final decision on the CPP cannot be expected before 2017.

Impact on carbon markets in the US

If the rule goes forward, it could have a significant impact on the size and number of carbon programmes operating in the United States.

The Clean Power Plan, which was finalised last year, includes mechanisms that would allow a state to create a cap-and-trade programme or a so-called trade-ready programme. That mechanism could create more or larger carbon programmes in the US.

In the past 18 months, numerous states across the US have been discussing paths to compliance. Experts believe those programmes could develop around existing regional power grid or transmission line operators.

RGGI, which regulates power emissions from nine northeastern states, was expected to benefit the most from the finalised rules. The programme was expected to grow under the proposed plan, and as a result, its carbon prices could rise.

However, if the rule is struck down by the courts, it would not have an immediate impact on RGGI or the California carbon markets. Both systems have stated that they intended to move forward with their programmes regardless of the Clean Power Plan.

Other states would be unlikely to join existing programmes in the absence of a federal mandate to reduce greenhouse gas emissions. That could mean future widespread expansion in existing carbon markets or the start of new carbon markets could be directly tied to the fate of the Clean Power Plan.

Legal threat

The Clean Power Plan is facing significant questions about whether it can withstand political and legal threats to derail or significantly alter the proposed rule.

As mentioned before, the Clean Power Plan was halted by the US Supreme Court on 9 February 2016 until the DC Circuit Court of Appeals can rule on the merits of the case. Oral arguments are scheduled for 2 June.

The lawsuit challenges whether the EPA has the authority to enact the rule, and opponents also claim the rule would increase costs, reduce jobs and decrease reliability of the power grid. The EPA and the Obama administration have routinely defended the rule.

Experts believe the Court of Appeals judges would favour upholding the Clean Power Plan, because two of the judges were appointed by Democrats, who largely support the proposed programme. Any decision is expected to be appealed to the US Supreme Court.

The US Supreme Court is in flux after Justice Antonin Scalia died unexpectedly after the Clean Power Plan stay was granted. Scalia was seen as a key conservative on the nine-member court, and because of that, the next Supreme Court justice could create an ideological shift for the court.

Fearing that possibility, Republicans, who largely do not support the Clean Power Plan, are not willing to confirm any nominee. Republicans believe the next US president should get to nominate the next justice, meaning a full court might not come until 2017.

President Barack Obama nominated Court of Appeals Chief Justice Merrick Garland in March, but it is unclear whether Garland would be confirmed by the Republican-led US Senate. Garland is seen by experts as a moderate liberal who could appeal to Republicans.

In the event that the seat is not filled, the court would continue to operate as an eight-member court. A split decision would affirm the lower court's decision, but it would not create a national precedent.

Legal experts believe Scalia's vacant seat would get filled prior to Clean Power Plan getting appealed to the Supreme Court. Experts anticipate the case to be heard by the court in 2017.

Presidential politics

The Clean Power Plan could also depend on who becomes the next president of the US.

A Republican president could use his authority to strip the rule or derail it from being enacted, but experts believe that would take a considerable amount of time to do. Democrats could also fight those efforts in the US Congress.

It remains to be seen whether a Republican president would be willing to expend the time and resources to stop the rule.

On the other hand, a Democratic president is expected to maintain the rules that Obama set in motion. That outcome, with the ability to pick a Supreme Court justice, could enable the Clean Power Plan to be implemented in the future.

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Canada's carbon pricing

Canada accounted for 726m tonnes of the greenhouse gas (GHG) emissions in 2013, 1.8% of the global emissions, originating primarily from large fossil fuel industries and transportation. Thus, Canada has always been in the top 10 largest carbon emitters in the world, but has not had a national emission reduction programme since its withdrawal from the Kyoto Protocol in 2011. The Prime Minister and the provinces' premiers keep failing to agree on a common approach.

Canada in general

As a response to climate change and in order to meet the national target of cutting 30% of the 2005 level of emissions by 2030, the different provinces and territories have set their own GHG emission reduction targets. To reach the targets they implemented measures adapted to each of their amount of emissions (see Figure 1) and political circumstances.

General measures are

- cap-and-trade programmes
- carbon taxes,
- emission offsets or
- carbon capture and storage technologies.

Additionally, carbon mitigation projects are used to reach emission targets: Phasing out of coal-fired sources, intensified usage of renewable energy, development of energy efficiency, development of public transportation, forest expansion or active energy awareness programmes are very popular measures that governments like to advertise in their 'Action Against Climate Change' sections.

In the absence of national action against climate change, Canada's provinces have established different subnational mechanisms to either put a price on carbon or in a different way reduce their carbon emissions. Based on this, we aggregated the provinces into three groups:

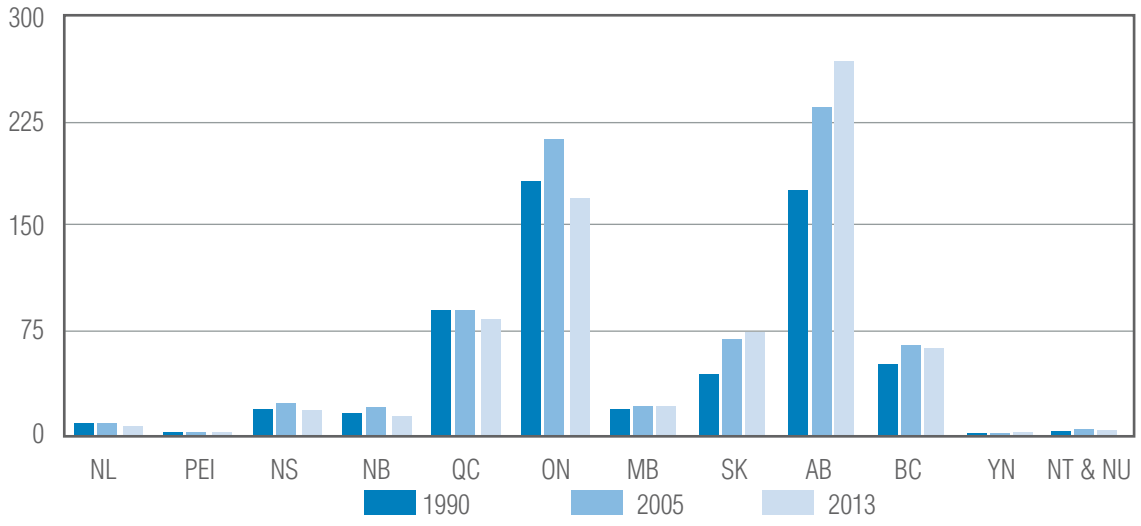
- Members of the Western Climate Initiative (WCI)
- Provinces having or in favor of introducing a carbon pricing system
- Provinces against or indifferent to a carbon pricing system

WCI provinces

The WCI is a collaboration of US states and Canadian provinces, formed in 2007, that works together on emission trading policies with the goal of fighting climate change by consistently tracking, reporting and capping GHG emissions using tradable permits. The first collective target is cutting 15% of 2005 emission levels by 2020.

The partner jurisdictions have designed a model cap-and-trade programme giving recommendations on GHG and sectors to be covered, thresholds for coverage, setting a cap, distribution of allocations, reporting and compliance. Since the WCI does not have a regulatory authority, several partners have decided to delay or drop the implementation of the programme.

Figure 1: Greenhouse gas emissions by province and territory (in megatonnes of CO2e)



Source: Environment and Climate Change Canada

Canadian partners are the provinces Quebec, Ontario, Manitoba and British Columbia.

Quebec is the only province with a fully implemented cap-and-trade programme since 2013, which linked with California's system one year later. You can find more information on Quebec's cap-and-trade programme in our 2015 Almanac, page 86.

Ontario has a rich history of discussing a cap-and-trade programme, with years of debate on how to shape environmental market-based policies. With the province only two-thirds of the way to hitting its 2020 target, the Ministry of the Environment and Climate Change announced in April 2015 that Ontario would adopt a cap-and-trade programme to mitigate the chance of missing their reduction goal. Since this date, the future regulators have been working with stakeholders to structure a programme, where in February 2016 draft regulation was released and a bill was submitted to the legislature. The programme has a very ambitious start date and is scheduled to commence on January 1, 2017.

On February 24, 2016, the government of Ontario proposed Bill 172, the Climate Change and Low-carbon Economy Act, 2016, which is aimed at formally establishing Ontario's cap-and-trade programme and providing guidance on how auction funds will be redistributed. At this time, the bill is in the early stages of the legislative process. However, if passed, it will provide a strong legal foundation for a cap-and-trade programme that would achieve GHG reductions across the economy and would enshrine in law Ontario's GHG goal of 15 percent below 1990 levels by 2020, 37 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050.

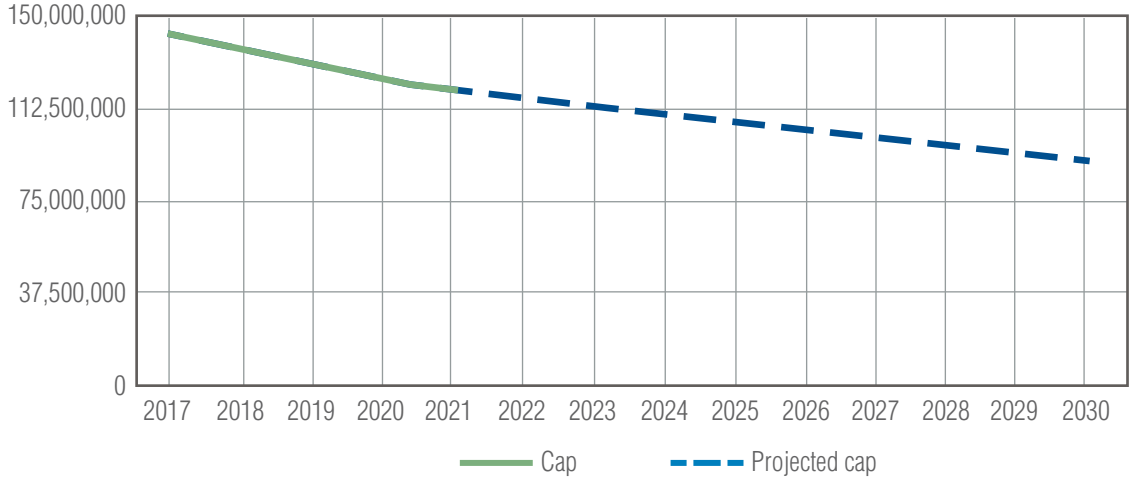
The day after the introduction of Bill 172, Ontario released draft regulation for their cap-and-trade programme. Similar to California, coverage will include reporting industrials, electricity generation, transportation and natural gas suppliers. In the regulation, the province established a cap through 2020, 142.3m in 2017 decreasing to 124.7m in 2020. Although the regulation did not definitively set a cap after this date, the post-2020 (to 2030) cap will more than likely align with the province's 2030 emissions target mentioned previously.

In addition, allocations will be given to large industrial emitters, but will be phased out over time. As another means to protect consumers and prevent leakage, price containment mechanisms are built into the programme. Ontario plans to allocate 5% of the annual allowance budget to a reserve that will be sold at high prices and plans to develop a robust offset program, although regulation for this programme has not yet been released.

As part of the WCI, Ontario plans to link their cap-and-trade programme with California and Quebec in its early years.

Manitoba's emissions are small, remaining under 3% of the national emissions. Meanwhile, 3.6% of the population inhabits the province. Its initial target was to stabilise emissions in 2010 at 2000 levels, which was achieved and followed by highly motivated targets for the future: The 2005 emission levels will be reduced by one third by 2030, by half by 2050 and by 2080 Manitoba aims to reach carbon neutrality. The province claims to already be very green, since 80% of its electricity is generated by hydropower.

Figure 2: Cap to 2030



Source: ICIS

At the COP21 in Paris, Manitoba announced the implementation of an ETS that will be designed to be linked with the existing California and Quebec systems. However, the system's success is highly dependent on this April's election results: The current democratic government supports the implementation of an ETS, while the Conservative Party's frontrunner in most recent polls does not.

Further design details have not been officially announced yet. Nevertheless, it is likely Manitoba will adopt the features and regulations implemented by California, Quebec or Ontario, since it lacks the necessary leverage to change the existing systems.

If Manitoba moves forward with the programme, a probable start for the system is 2018.

British Columbia has committed to reduce emissions by 33% of 2007 levels by 2020, and 80% by 2050.

In 2008, British Columbia's government established a revenue neutral carbon tax, which started at $5/tonne of CO2e and increased by $5 every year. It reached $30/tonne of CO2e in 2012, equivalent to a 7 Canadian cent increase per liter of gasoline, and remained at that level since then. The tax covers 70% of British Columbia's emissions. A further increase of the tax is being taken into consideration at the moment. Even without a further increase the British Columbia carbon tax is currently the highest carbon price in the world. Since the introduction of the carbon tax, British Columbia stopped working towards creating a WCI cap-and-trade programme.

British Columbia's approach seems to have been successful thus far, since the province has already reached a 6% emissions reduction in 2012 compared to 2007 levels.

Pro carbon pricing

Alberta is Canada's largest-emitting province with 36.8% of the emissions (see Figure 1) and only 11.4% of the population. It is not member of the WCI; nevertheless, Alberta has a four area GHG emission reduction plan, which includes electricity phase-out of coal-fired sources by 2030, capping emissions from oil sands to a maximum of 100m tonnes p.a., and reducing methane emissions from oil and gas extractions by 45% by 2025.

The fourth area is Alberta's own carbon pricing system. Facilities emitting more than 100,000 tonnes are required to reduce their emission intensity by 12% each year. The percentage increased to 15% in 2016 and will rise to 20% in 2017. In order to comply with the system's requirements, facilities can either:

- actually reduce their emissions by improving their production process,
- buy emission performance credits from other facilities that have reduced their emissions below their target,
- purchase Alberta-based carbon offset credits, or
- pay a contribution, similar to a carbon tax, of $15 for each tonne of CO2e above the reduction target to a climate and emission management fund. The contribution increases to $20/tonne in 2016 and $30/tonne in 2017.

Alberta's premier declared she would also back a nationwide carbon price floor of a minimum of $15/tonne as long as the revenue is used in the province. She also announced a plan to introduce an economy-wide carbon tax of $20/tonne in 2017 and $30/tonne in 2018, which will cover 78 to 90% of the province's emissions.

The four **Atlantic Provinces** (Prince Edward Island, Newfoundland and Labrador, Nova Scotia, and New Brunswick) have neither implemented nor announced a plan on introducing measures to price carbon yet. As their emissions are not negligible, they are considering a joint strategy to reduce GHG emission, which could include either a tax- or a market-based approach to put a regional price on carbon. They are skeptical of joining the WCI, since they believe that adjusting their systems to the WCI regulations is difficult and can take very long.

A carbon tax would not only reduce emissions, but also help their governments cut their budget deficit with the tax revenue. Nonetheless, political opposition in the provinces still creates a significant barrier for carbon pricing mechanisms.

Against carbon pricing

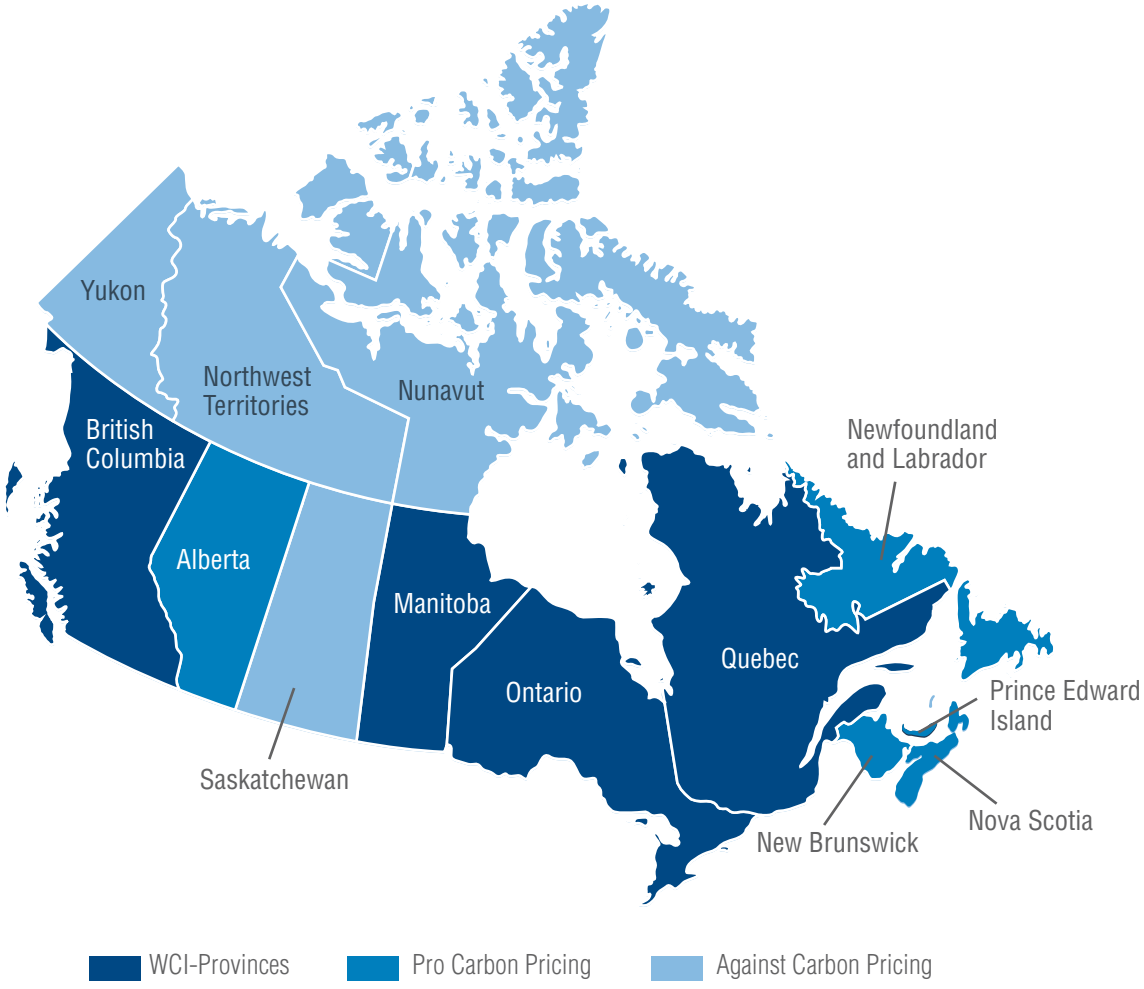
Saskatchewan is highly reliant on fossil fuels, thus it accounts for a large amount (10%) of the national emissions, considering only 3% of the population inhabits the province. Its government is committed to reducing GHG emissions, by encouraging its residents to reduce their carbon footprint and by investing into the development of a carbon capture and storage (CCS) technology. However, the premier wants to keep the balance between carbon emission reduction goals and economic growth, so he opposes any kind of carbon taxes, hoping the CCS-programme will be an acceptable emission reducing mechanism equivalent to carbon pricing.

As Canada's **Northern Territories** (Yukon, Northwest Territories and Nunavut) are inhabited by less than 1% of the country's population, they only account for a tiny fraction of the national emissions, as can be observed in Figure 1.

Although they all committed to GHG emission reduction targets and developed carbon mitigation projects and Yukon is a WCI observer, there is no publicly known plan to introduce a carbon price and, in general, the sentiment towards carbon pricing seems to be negative or indifferent.

Since the federal government is only taking an arbitration instead of a regulatory role, achieving Canada's emission reduction targets remains the responsibility of subnational governments. While some provinces

Figure 3: Aggregation of Canadian provinces



are very driven to achieve their reduction goals and have proven to be so, others are talking green, but supporting the status quo.

However, Ontario's recent developments show that more Canadian provinces have made a substantial push towards pricing carbon: Five of the six largest provinces, regarding emissions and population, use or are developing a carbon pricing mechanism as we speak.

While Ontario and Quebec, possibly soon followed by Manitoba, use the text book cap-and-trade version recommended by the WCI, British Columbia and Alberta choose to develop their own mechanisms to put a price on carbon. Canada's variety of carbon pricing methods can become an excellent research area for analysis of efficiency and economic and social impacts of different carbon pricing mechanisms.

Further resources:

Alberta: **http://www.alberta.ca/climate-leadership-plan.cfm**

British Columbia: **http://www2.gov.bc.ca/gov/content/environment/climate-change/policy-legislation-programs**

Manitoba: **http://www.gov.mb.ca/conservation/climate/**

Ontario: **https://www.ontario.ca/page/climate-change-strategy**

Saskatchewan: **http://www.environment.gov.sk.ca/climatechange**

Canada's Action on Climate Change: **http://www.climatechange.gc.ca/default.asp?lang=en&n=64778DD5-1**

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The Clean Development Mechanism

The Clean Development Mechanism (CDM) is not an emissions trading scheme like the national and regional schemes introduced before. In fact, it is an offset scheme overseen by the United Nation Framework on Climate Change Convention (UNFCCC), which was designed for compliance under the Kyoto Protocol. From 2008 on, emission reductions credits from the CDM could also be used as offset credits in the EU ETS. When started, the CDM was considered a combination of cost-effective emission reductions and the technology transfer to less developed countries. Over the last 10 years it became the largest project-based offset mechanism in the world with more than 7,600 registered projects. The monitoring and verification standards set by the CDM serve as a blueprint for many compliance and voluntary offset schemes worldwide. Following the COP21 in Paris in 2015, the newly established mechanism to support sustainable development is partly seen as a successor of the CDM. It remains to be seen how much of the CDM will be in this new mechanism.

System setup

The CDM is one of the three flexible mechanisms of the Kyoto Protocol, which developed countries can use to meet their binding emission reduction targets. Under the CDM, any public or private entity can implement an emissions reduction project in a developing country as defined by the Kyoto Protocol, and for each tonne of CO2 emissions reduced, it gets a tradable Certified Emission Reduction (CER). These CERs can be used by developed countries to comply with their Kyoto target or in other ETSs as offset credits (i.e. the EU ETS).

The CDM is overseen by the UNFCCC (a UN body), which sets projects standards, decides over the registration of projects and issues the CERs to the project owner. The choice of projects and the criteria for the issuance of CERs are based on the following principles:

- Methodology-based: For each project type –for example, renewable energy projects or industrial gas projects – there are defined methodologies from the UNFCCC that set the standards for the valuation of the project and the calculation of the emission reductions achieved by the project.

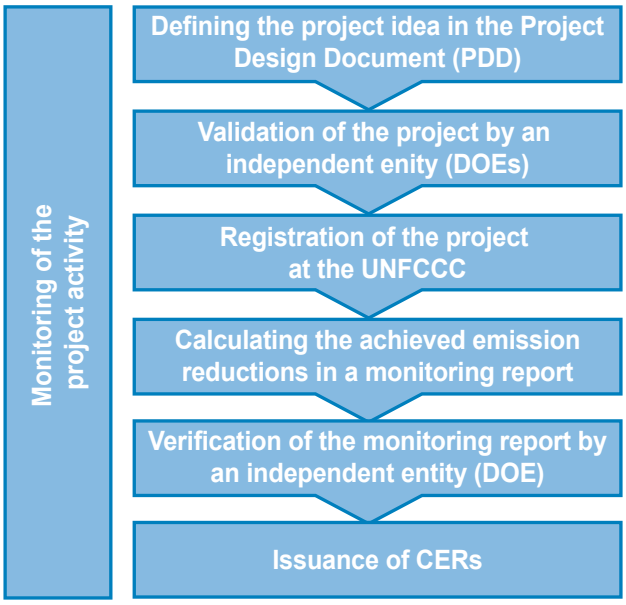
- Host country involvement: A project activity cannot get registered without approval by the host country. Possible host countries are all 'Non-Annex I' countries, i.e. countries which were considered developing countries when the UNFCCC was ratified in 1992. The list of Non-Annex I countries therefore includes both industrialised countries by today's standards such as China and India, as well as least developed countries (LDCs) such as Malawi or Haiti.

- Additionality: CERs are only issued for emissions reductions that are 'additional'. This means the project owner has to prove that the project would not have existed in the absence of the CDM. Additionality can either be proven with a financial analysis, where the project is only profitable with the income through the sale of CERs, or by proving that other institutional barriers prevented the implementation of the project.

- Third-party verification: Independent entities are involved in the registration and issuance process. Those Designated Operational Entities (DOEs) are accredited by the UNFCCC. They validate the project idea and verify each issuance request. Without the positive opinion of a DOE, a project cannot get registered or issue CERs.

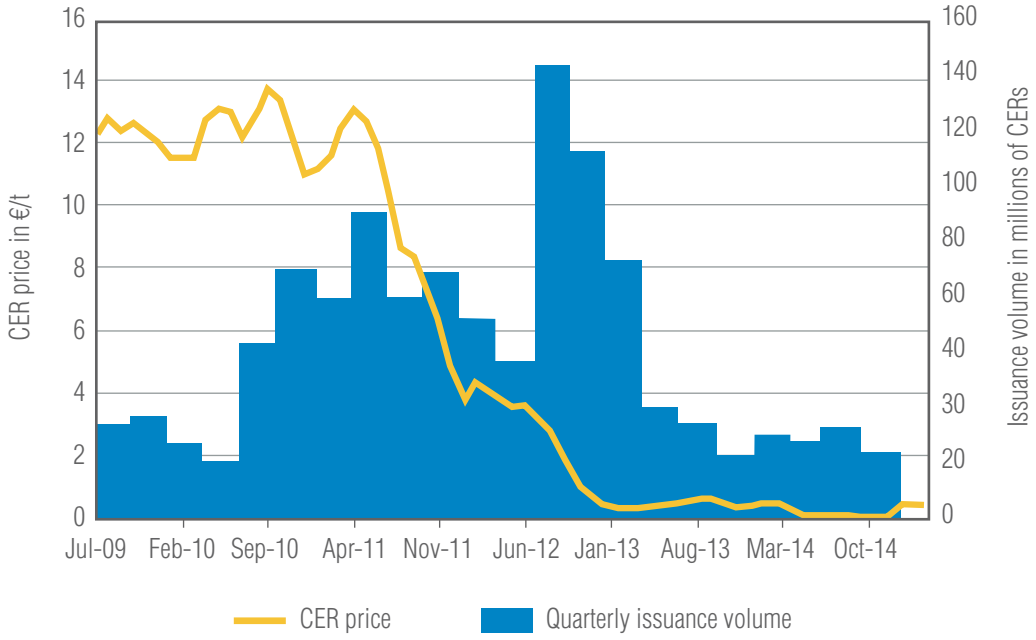
- Registration: CDM projects have to get registered with the UNFCCC in order to be able to receive CERs. During the registration process, the UNFCCC and the DOE control whether the proposed project fulfils all criteria to become a CDM project. Only after the registration can a project start its crediting period.

Figure 1: Registration and issuance process in the CDM



Source: UNFCCC

Figure 2: CER prices and CER issuance volume development



Source: UNFCCC and ICE

- Crediting period-based: Registered CDM projects can issue CERs only for a fixed time period. This so-called crediting period of a project starts with its registration date at the earliest and ends, depending on the project type, seven to 60 years later. This means that even if the project started before the registration date or goes on after the end of the crediting period, it cannot get CERs for these times.

To assure the correctness of the issued CERs, the process for registration of CDM projects and issuance of CERs is strictly regulated. From the first project idea until the issuance of CERs, the project passes seven steps as illustrated in Figure 1. The first three steps lead to the registration of the project activity. Involved in the registration process are the project owner, a DOE for the independent validation and the UNFCCC secretariat, which checks in the third step the completeness and eligibility of the project. After the registration, the crediting period of the CDM project starts and during the entire crediting period the emission reductions achieved have to be monitored. To earn CERs for the emissions reductions of the project, the project owner prepares a monitoring report, which includes the calculation of the achieved emissions reductions based on the data collected by the monitoring system. This monitoring report then has to be verified by a DOE and controlled by the UNFCCC before the UNFCCC issues CERs to the project owner. This complex process leads to significant delays between the actual start of the project and the moment when the CERs are transferred to the account of the project owner.

A monitoring report usually covers only a part of the crediting period of the project. The project owners can decide how often they prepare a monitoring report. However, all monitoring reports have to be consecutive.

The registration and issuance process contains several risks for the project owner. On the one side, the project activity itself may fail physically, on the other side the registration application could be denied or the issuance request could be rejected. There have been many projects in the UNFCCC process which were not able to finish the process successfully.

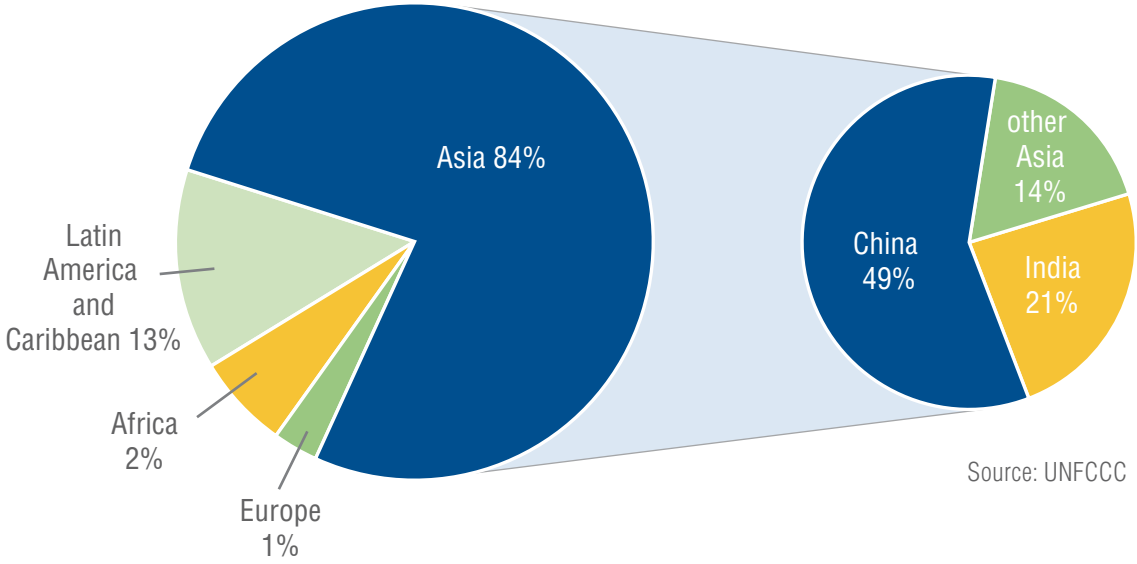
System history

The basic structure of the CDM was first described in Article 12 of the Kyoto Protocol in 1997. The detailed principles for the registration and issuance process were established with the Marrakesh accords in 2001. The implementation of the first projects started in 2003; the first CDM project, a Brazilian landfill project, got registered in November 2004. The first CERs were issued in October 2005. Up to early 2015, there had been 7,622 projects registered and 1,654m CERs issued.

Over time, the UNFCCC has updated the regulations for CDM projects on an ongoing basis, adopted more methodologies and enhanced the spectrum of the CDM. One enhancement was the development of Programmes of Activities (PoAs), which was started in 2005. PoAs enable project owners to register several similar small projects under the framework of one PoA, which reduces the otherwise high transaction costs per CER, especially for small projects.

Since the CDM is part of the Kyoto Protocol, CERs were originally intended to be used by developed countries to comply with their Kyoto reduction commitment. But the demand for Kyoto compliance has been low, since the entire first commitment period of the Kyoto Protocol was oversupplied. From 2008 on, CERs could also be used as offset credits in the EU ETS, which is still the main source of demand for

Figure 3: Distribution of registered CDM projects per region in 2016



Source: UNFCCC

CERs. Therefore the prices for CERs depended mainly on the demand from the EU ETS. Figure 2 shows the development of CER prices and the yearly issuance volume since 2009. In the start phase, CERs were traded for around €15-20; with the prices for EUAs falling significantly in 2011, CER prices also dropped. Due to the time delays between the start of the project and the actual issuance of CERs, the supply of CERs still increased in 2011 and 2012. This, combined with less demand from the EU ETS, led to even lower prices. Since the beginning of 2015, prices for EU ETS-eligible CERs on the secondary market were as low as €0.40.

State of play

With the drop in demand from the EU ETS, activity in the CDM slowed down drastically. Of the currently 7,600 projects registered, only 260 were registered in the last two years. As indicated in Figure 2, issuance volumes also slowed down to around 100m a year from more than 300m in the main years. This is still significantly more than the yearly demand from the EU ETS, which shows that other sources for CDM demand are becoming more important (see Spotlight article).

Despite the difficult times for the CDM, the high activity over the last 10 years resulted in more than 1,641m CERs issued from projects from all over the world. However, the projects are distributed unevenly among the developing countries. The country with the most registered projects at the moment is China, which hosts around 3,760 of the 7,600 registered projects. Second and third on the list are India and Brazil with 1,570 and 335 registered projects respectively. In total, 83% of CDM projects are registered in Asia and only around 2.5% in African countries.

For the issuance numbers, this is even more extreme: nearly 60% of the 1,654m CERs were issued to Chinese projects. With regards to the project types and used methodologies, most of the registered projects (75%) are renewable energy projects. However, on the issuance side, most CERs were issued to industrial gas projects (51%), such as HFC23 projects.

This uneven distribution between countries and scopes is mainly due to lower project transaction costs and risks for projects in further developed countries and for industrial gas projects. The statistics of issuance and registration volumes also display the discrepancy between the reality and the perception of the CDM: While the image of CDM projects is mainly influenced by pictures from small projects in rural areas of developing countries, the reality of the CDM consists of large issuance volumes from industrial gas destruction projects in China and India.

Over the last two years, the trend towards large projects in China and India has slowed down slightly. Only 50% of issuances in 2015 came from projects based in China or India (down by 20% compared to all historic issuances). Additionally, the share of issuances from LDCs increased from 0.26% to 0.76% over the last year. Despite all those changes being small, they could be the beginning of a new trend in the CDM, where projects are measured also based on their additional features promoting sustainability and green growth in least developing countries. While the main reason for the survival of those projects currently is the likely the voluntary market, this could be the first step of the CDM towards the new mechanism to support sustainability, defined in Article 6 of the Paris Agreement.

Outlook

The CDM defied the challenging circumstances over the last two years. Despite secondary market prices well below issuance costs of most CERs, issuance volumes slightly increased in 2015. The future of the CDM will always depend on new sources of demand. The compliance for the first compliance period of the Kyoto Protocol was finalised in

2015, while demand from the EU ETS is slowing down even more and is currently not considering offsets for the time post-2020. This leaves the CDM with large issuance potential and many ideas of how to improve and widen the scope of projects; however, there is no matching demand. The voluntary market, which has likely been saving the CDM in the last years, comes with a change in the structure of CDM projects. While in the time of high demand from the EU ETS, a CER was a commodity, nearly independent of the host country or scope of the underlying projects, the market is now much more fragmented. Demand for CERs is in many cases already project specific, project scope, host country and additional social benefits-based and those parameters can influence the price of the issued CER significantly. A few new sources of demand for specific CERs are discussed in the Spotlight article.

The Paris Agreement is unlikely to have an immediate impact on the CDM. In the discussions on the general structure of the new mechanism, the CDM is likely to be cited and maybe its methodologies will partly be used in the new mechanism. However, already the main idea of the CDM, developed countries investing in developing countries, does not work under the new Paris Agreement, in which all countries are required to reduce their emissions.

This all leaves the CDM with an uncertain future. Increased demand from the voluntary side and a smooth transition in into the new mechanism of the Paris Agreement is currently the best case that CDM developers can hope for. The downside risk, on the other hand is large, and in many ways the CDM will lose its importance as a global scheme over the next years.

Further resources:

- United Nation Framework on Climate Change Convention
  http://unfccc.int

- The Clean Development Mechanism
  http://cdm.unfccc.int

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The use of the CDM around the world

At the time of its invention, the Clean Development Mechanism (CDM) was meant to be used as an offset mechanism under the Kyoto Protocol. Together with the Joint Implementation (JI) mechanism, the CDM was designed to help industrialised countries to fulfil their compliance obligation under the Kyoto Protocol. This was in 2001. In the following 10 years, two separate developments changed the face of the CDM. Firstly, the compliance system under the Kyoto Protocol turned out to be substantially oversupplied, leaving no incentives for industrialised countries to invest in the CDM for their Kyoto compliance. Secondly, the EU ETS was set up and included CERs and ERUs (credits from Joint Implementation) as their offset credits. This opened a potentially huge market for project developers, in the years following 2008, the CDM saw a massive increase in issuance volumes, most of which were meant for the EU ETS. With a drop in demand from the EU ETS in the years following 2012, CDM project developers started looking for different sources of demand for their CERs. This article will shortly describe the main sources of demand for CERs over time. It will start with the conventional sources of demand, Kyoto compliance and EU ETS, and then explore the more recent developments of demand for CERs from new ETSs (South Korea, China), other carbon pricing mechanisms (Mexico, South Africa), demand from industrialised countries to fulfil their emission reduction targets (Norway, Sweden) and the voluntary market.

Kyoto demand

In December 2015, the 37 Annex 1 parties of the Kyoto Protocol had to finally hand in their compliance volumes for the first compliance period of the Kyoto Protocol (2008-2012). In total, 63.58bn compliance instruments were handed in, mainly in Assigned Amount Units (AAUs), which are the general allowance under the Kyoto Protocol. It is unclear how many of those are CERs, however, it is likely that the number is rather low, given the immense oversupply with cheap AAUs.

Furthermore, the Kyoto Protocol was in sum oversupplied by 13.1m, even when excluding all offsets. This indicates that there was little room for offsets and CERs used under the Kyoto Protocol were likely acquired either through long-term contracts from governments or at relatively low prices. So even with the Kyoto Protocol being the reason for designing the CDM in the first place, the demand from Kyoto compliance was not the reason for it becoming as large as it has.

EU ETS

Strictly speaking, the EU ETS is also a result of the Kyoto Protocol. It was designed as a burden-sharing mechanism for the EU states to comply with their obligations under the Kyoto Protocol. However, over the years, the EU ETS outgrew this purpose and became the largest and most active ETS in the world. Additionally, EU ETS compliance companies were over many years the main source of demand for CERs. The legal foundation of this is the Linking Directive from 2004, in which the EU allows the limited use of offset credits from Joint Implementation (JI) and CDM projects to be used to cover emissions in the EU. As a result, many EU ETS compliance companies started investing in the CDM. In the second trading period of the EU ETS (2008-2012), a total of 1.06bn offsets were used, 670m of which were CERs. This equals nearly 60% of the entire CER issuance by the end of 2012.

In the third compliance period of the EU ETS, the demand for CERs dropped drastically. This was the result of a combination of factors, namely:

- Compliance companies are only allowed to use their unused offset entitlements from the second trading period. This reduced demand significantly, as in total, compliance companies can only use around 70m of offsets by the end of the third trading period.
- The EU put qualitative restrictions on the CERs that can be used for compliance. From 2013 on, CERs from industrial gas projects and from newly registered projects hosted in Non-LDCs are excluded from the use in the EU ETS.
- Unexpectedly high issuance volumes from JI projects put a price pressure on CERs. In total, around 870m ERUs were issued mainly in the years 2011-2013. ERUs were in general cheaper than CERs and despite intensive criticism of their non-transparent issuance process and missing additionality, compliance companies used nearly 390m ERUs in the second trading period.
- The prices of EUA declined in the second control period, reducing the demand for offsets as a cheaper compliance option.

With the demand from the EU ETS breaking down, the issuance volumes for CERs dropped significantly. Many project developers are starting to look for other sources of demand and also compliance companies in the EU ETS that had been actively supporting CDM project development started to focus on new markets for CERs.

The voluntary market

The voluntary market for carbon offset credits is an unstructured market with many different credits and standards; the CDM is only one

[1] *State of the voluntary carbon market 2015, Ecosystem Marketplace 2015*

of them. With its tarnished reputation, CERs have a difficult standing in the voluntary market. In 2014, only 1.4% of credits used in the voluntary market were CERs, this equals around 0.8m CERs[1]. However, in September, the UNFCCC established a platform to voluntarily cancel CERs. This platform aims to make the process of voluntary buying CERs easier for buyers as well as for project owners. By March 2016, not even 0.16m CERs were cancelled via that UNFCCC platform.

In the market of voluntary carbon offsets, the details of a project define the price of the offset credit. Projects with co-benefits for the community that the project is in are seen more valuable than simple renewable energy projects or industrial gas projects.

Government buying

Another source of voluntary demand for CERs comes from governments buying large lots of CERs to reach their national emission reduction target or to generally support the CDM. The main countries that bought large amounts of CERs in the recent years are Norway and Sweden. Additionally, large funds financed by the World Bank have supported CDM projects, in particular in recent years with demand from the EU ETS dropping. With the Paris Agreement urging countries to take pre-2020 action, the CDM could see more demand from developed countries in the form of funds or government buying.

Norway, as an example, has a target of reducing its carbon emissions by 30% of 1990 levels by 2020. Part of its plan to reach this target is to acquire 60m CERs in the years 2013-2020 via open tenders. CDM projects supported by Norway need to fulfil strict eligibility criteria, as projects from industrial gas projects and several large renewable energy projects are excluded. Additionally, the projects have to be vulnerable, which means they would not be able to continue under current market prices. In exchange, Norway historically paid on average €2.20 per CER, which is significantly higher than the current market price of around €0.40.

Emerging markets

In the main years of the CDM, developing countries were largely seen as host countries and therefore suppliers for CERs. In recent years, the CDM plays a more and more important role in domestic carbon pricing schemes in emerging carbon markets. The main countries to mention here are China, South Korea, Mexico and South Africa. Each of those countries has established or proposed rules on how to use the structures of the CDM for their domestic scheme.

China, as the main host country for CERs, has set up its own offset mechanism for the local ETSs and the future National ETS. All details on that can be found in the respective articles in this publication. For the CDM, the system of CCERs did not provide any new sources of demand. However, a number of CDM projects that had not issued CERs yet, switched to the Chinese system, reducing potential supply of CERs in the future.

South Korea went down a different road to include South Korean CERs in their domestic ETS. Details on the process and restriction of CERs in the South Korean ETS can be found in the respective article in this publication. By now 10m CERs have been transferred to the South Korean offset system, another potential 20m could be voluntarily cancelled for that purpose by 2018.

Mexico and South Africa are regularly mentioned as future sources for CERs. Both countries have proposed a national carbon tax where offsets could be used to comply with that tax. While Mexico's carbon tax officially started in 2015, South Africa's carbon tax is still in the proposal state. However, for both markets, the criteria and/or the mechanism on how to use offsets to comply is yet to be confirmed.

Outlook

The CDM is currently in a complicated situation. With the main source of demand gone, many projects have stopped issuing allowances. With new players entering, the market becomes more and more fragmented. CERs are priced dependent on their location and scope, which creates several sub-markets in the CDM rather than one large CER market. This situation is unlikely to change.

However, the number of countries using CERs in their domestic strategies shows that the CDM did not only export technology, but also expertise and mechanism how to price and reduce carbon in developing countries. In that sense, the CDM has grown from a mechanism used and dominated mainly by industrialised countries to a mechanism that facilitates carbon pricing in emerging economies all around the world.

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Glossary

AAU
Assigned amount units (AAUs) are emissions allowances under the Kyoto Protocol. Each AAU equals one metric tonne CO2 equivalent.

AB 32
The Assembly Bill (AB) 32 is the main regulation for the Californian cap-and trade programme. It sets the legislation to reduce state-wide greenhouse gas emissions to 1990 levels by 2020.

ACCU
ACCUs are issued under the Carbon Farming Initiative (CFI) which promotes emissions avoidance and sequestration projects. Under the CPM, liable entities can cover up to 5% of their carbon obligation with ACCUs during the fixed price period (2012-2015) and an unlimited amount in the floating price period (2015-onwards).

Annex B / Annex I countries
Annex I countries are industrialised countries that are listed in the Annex I of the UNFCCC. They committed to reduce their GHG emissions to 1990s levels by 2000. Annex B countries on the other hand are countries that have an emissions reduction commitment under the Kyoto Protocol. Both lists include the EU, the US, Bulgaria, Canada, Japan, Switzerland, New Zealand, Russia, Ukraine, Norway and Australia. Only Belarus and Turkey are Annex I but not Annex B countries.

ARB
The Californian Air Resources Board (ARB) is an institution of the Californian Environmental Protection Agency. It is in charge of monitoring and managing the Californian ETS (especially the free allocation, quarterly auctions and reserve sales).

ARBOC
Air Resources Board Offset Credits (ARBOC) are a type of carbon permit in the Californian ETS. One ARBOC can be used for compliance of one metric tonne CO2e GHG emissions. To get ARBOCs it is required to realise an offset project in the US in one of the following protocols: forestry, ozone depleting substances (ODS), urban forestry, livestock projects and mine methane capture. Only 8% of all surrendered allowances for compliance of a covered entity are allowed to be ARBOCs.

Auctions
In general, the supply side of an emissions trading system is composed of freely allocated permits, auctioned units, and offsets. Compliance entities who do not receive free allocation or do not have enough free permits to comply with their carbon obligations can purchase allowances auctioned by the government at an auction.

Back-loading
Amid the oversupply of allowances in the EU ETS, back-loading refers to the postponing of the auctioning of 900 million allowances until 2019-20. Back-loading entered into force in February 2014.

BAU emissions
Business as Usual (BAU) emissions are the GHG emissions that would have occurred in the absence of the cap-and trade system.

Benchmarks
In the EU ETS, the benchmarks refer to the value indicating the average carbon intensity of a particular product produced by the 10% best performing installations. The benchmarks are one of the key elements used to calculate free allocation alongside historical activity levels. The term “benchmark” can have different meaning in other emissions trading systems.

Cap
In a cap-and-trade system, the cap is the maximum volume of CO2-equivalent that can be emitted by the sectors covered by the emissions trading system.

Carbon leakage
The transfer of production, and therefore of domestic emissions, from one country to another due to the latter country having less stringent or no carbon regulation.

CCA
Californian carbon allowance (CCA) – a permit allowing the holder to emit 1 tonne of CO2 equivalent in a certain period (e.g. 2013) within the Californian ETS. CCAs can be purchased on quarterly auctions and reserve sales. In the beginning of each compliance period most of the CCAs are allocated for free to the capped entities.

CCER
Chinese Certified Emission Reduction (CCER) – type of carbon permit issued by the National Development and Reform Commission (NDRC) for an emission reduction achieved in China. CCERs can be surrendered by companies included in the seven pilot schemes (Beijing, Chongqing, Shanghai, Tianjin, Shenzhen, Guangdong, Hubei) to cover their emissions for compliance. Different pilot schemes have different qualitative restrictions on the type of CCERs to be used for compliance.

CCER EB
The CCER Executive Board(CCER-EB) supervises the Chinese Certified Emission Reduction under the authority and guidance of the NDRC. The CCER-EB is the ultimate point of contact for CCER Project Participants for the registration of projects and the issuance of certified emission reductions

CCO
Californian Carbon Offsets (COOs) is the more common name of ARBOCs, the offset credits in the Californian programme.

CCR
A Cost Containment Reserve (CCR) is a volume based market stabilisation mechanism. The allowance volumes held in the CCR are auctioned if the auction priced reaches a predefined trigger price. A CCR with a volume of 10m allowances yearly is currently used in RGGI.

CDM
The Clean Development Mechanism (CDM) is one of the three market based mechanisms (together with emissions trading and Joint Implementation) under the Kyoto Protocol. It is defined in Article 12 of the Kyoto Protocol and sets the framework for the implementation of emission reduction projects in developing countries. Those CDM projects then can earn saleable CERs that Annex B countries can use to meet their Kyoto target.

CDM EB
The CDM Executive Board (CDM-EB) supervises the Kyoto Protocol's Clean Development Mechanism under the authority and guidance of the CMP. The CDM-EB is the ultimate point of contact for CDM Project Participants for the registration of projects and the issuance of certified emission reductions.

CER
Certified Emission Reductions (CER) are emissions reduction certificates issued to CDM projects or PoAs by the UNFCCC. Each CER equals 1 metric tonne of carbon dioxide equivalent and can be used as an offset in the EU ETS or to meet the country´s Kyoto target.

CFI
Carbon Farming Initiative - domestic offset scheme established under the Australian Carbon Pricing Mechanism (repealed in 2014)

CO2 equivalent
The measure of CO2 equivalent describes how much global warming a given type and amount of greenhouse gas may cause, using the functionally equivalent amount or concentration of CO2 as the reference.

Co-Decision (now called Ordinary Legislative Procedure)
In the ordinary legislative procedure both co-legislators of the EU (the European Parliament and the Council of the European Union) have the same weight in the adoption process of a piece of legislation. Among other areas economic governance, immigration, energy, transport, the environment and consumer protection are covered by the co-decision process.

The process is as follows:

- Commission proposes a legislative text
- Proposal is forwarded to responsible committee in the parliament
- Committee votes up a report (taking the opinions of other committees into considerations) and forwards this to the plenary
- Plenary votes on the report and if adopted it is forwarded for the first reading in the Council in the European Union
- If the Council adopts the text, the legislation becomes law

This is the process without any detours. There are several other possible ways, for example trilogue negotiations, several rounds through the committee stage, second reading, etc.

The European Parliament has an extensive explanation of the Co-Decision procedure on its homepage (link) and in a flow chart (link).

COP
The Conference of the Parties (COP) is the supreme body of the UNFCCC and meets once a year to review the Convention's progress.

CMP
The Conference of the Parties (COP) serves as the meeting of the Parties to the Kyoto Protocol. This is referred to as the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

CPM
The Carbon Pricing Mechanism (CPM) is a scheme which requires Australian businesses to pay a price for each tonne of CO2 emitted. The scheme, introduced in November 2011 under the Clean Energy Act, covers approximately 60% of the total Australian emissions, including electricity generation and stationary energy, industrial processes, fugitive emissions, waste, and natural gas suppliers. The CPM has a fixed price for the 2012-2015 period (fixed price period) and moves to an emissions trading system (floating price period) in 2015.

CP
Compliance Period could refer to different periods of time depending on in which scheme this term is used. Under Korean ETS, for instance, the first Compliance Period (CP1) refers to the three-year period from January 2015 to December 2017.

CPA
A Component Project Activity (CPA) is an emission reduction project that is included in a PoA.

CPP
The Clean Power Plan (CPP) is aimed at reducing emission from power plants in the US. It is a federal regulation via paragraph 111d of the Clean Air Act and seeks to cut national power sector emissions to 30% below 2005 levels by 2030.

CSCF
In the EU ETS, the Cross-Sectoral-Correction-Factor (CSCF) refers to the factor which ensures that the volume of free allocation distributed to installations annually does not exceed the industrial cap. The CSCF is only triggered if the preliminary free allocation exceeds the annual maximum volume.

CSMAD
Directive on criminal sanctions for market abuse (CSMAD).

DAP
The Direct Action Plan (DAP) is a scheme put forward by the new Abbott government to replace the Carbon Pricing Mechanism. The central element of the DAP is the Emissions Reduction Fund (ERF) which aims to purchase low cost abatement from Australian businesses.

DOE
A Designated Operational Entity (DOE) is accredited by the CMP to validate and verify CDM projects and CER issuances.

EAOC
Early Action Offset Credits (EAOC) are a special kind of offset in the Californian ETS. They are issued by the ARB to offset projects in the US that follow approved Early Action Protocols for emissions reductions between 2005 and 2014. All Early Action projects have to be listed before 1 January 2013.

EMIR
European Market Infrastructure Regulation on OTC derivatives, Central Counterparties and Trade Repositories.

EPA
The US Environmental Protection Agency (EPA) is an agency of the United States. Its task is to protect the environment and human health.

Emission quota (Kazakhstan)
Kazakhstan carbon permit allowing the holder to emit 1 tonne of CO2 equivalent in a certain period (e.g. 2013) within Kazakhstan's ETS. The quotas are freely allocated to operators based on their historical emissions.

ERF
Emissions Reduction Fund - principal policy instrument that the Austrian government is relying on to meet the national emissions reduction target

ERU
Emission Reduction Units are emissions reduction certificates issued to JI projects. Each ERU equals one metric tonne of carbon dioxide equivalent and can be used as an offset in the EU ETS or to meet the country´s Kyoto target.

ESA
European Supervisory Authority, such as ESMA.

ESMA
The competent authority for drafting Regulatory Technical Standards ("RTS") and Implementing Technical Standards ("ITS") for the directive MiFID II.

EU ETS Directive
The EU ETS Directive is the general piece of legislation which regulates the EU Emissions Trading Scheme. Changes to this directive have to be done via the co-decision process. Several features (eg auctioning) of the EU ETS are, however, governed by special regulations.

Consolidated EU ETS Directive http://www.tschach-solutions.com/wp-content/uploads/2011/11/EU-ETS-Directive-consolidated-version.pdf

EUA
European Union Allowances (EUAs) are the primary compliance allowance for the EU ETS. Therefore, an EUA allows the holder to emit 1 tonne of CO2-equivalent within the EU ETS. EUAs were designed to be identical with the equivalent AAU defined by the Kyoto Protocol.

EUAAs
EUAAs (European Union Aviation Allowances) are the allowances created for the aviation sector in the EU ETS. A proportion of the allowances are handed out for free, and, the remainder are auctioned.

EEA-EFTA
The European Economic Area (EEA) is an alliance including the three states of the European Free Trade Association (EFTA) – Iceland, Liechtenstein, Norway – and the 28 member states of the European Union (EU)

Free allocation
In general, the supply side of an emissions trading system is composed of freely allocated permits, auctioned units, and offsets. Free allocation is an industry assistance mechanism which usually support companies conducting emissions intensive and traded-exposed activities (e.g. metal) or other activities which put them at a competitive disadvantage to international competitors which do not face the same carbon regulations.

GHG
Greenhouse Gas Emissions (GHG)

ITRE
The Industry, Research and Energy Committee (ITRE Committee) is the committee responsible in the European Parliament for topics surrounding industrial, research and energy legislation.

ITS
Implementing Technical Standards proposed by an ESA and adopted by the Commission under powers conferred by an EU regulation or directive.

JCP
Under the Australian Carbon Pricing Mechanism (CPM), the Jobs and Competitiveness Program (JCP) is one of the industry assistance schemes which provides support (e.g. free allocation) to companies with emissions-intensive trade exposed activities.

JI
Joint Implementation is one of the three market based mechanisms under the Kyoto Protocol. It is defined in Article 6 of the Kyoto Protocol and allows Annex B countries to implement emissions reduction projects in other Annex B countries. Each JI project can earn ERUs which can be used by Annex B countries to meet their Kyoto target. There are two procedures for the registration and issuance of JI projects: Track 1 and Track 2. For Track 1, the host party of a JI project oversees the registration and issuance process and verifies that the emission reductions generated by the JI project are additional. Track 2 is overseen by the Joint Implementation Supervisory Committee (JISC) of the UNFCCC.

KAU
Korean Allowance Units (KAUs) are the primary compliance allowance under Korean ETS. Covered entities' holding of 1KAU allows the entity concerned to emit 1 tonne of CO2-equivalent of GHG under Korean ETS. KAUs trading is limited to covered entities only until the end of 2020.

KCU
Korean Credit Units (KCUs) refer to offset credit units for compliance under Korean ETS. During the first Compliance Period (CP1, 2015-2017) under Korean ETS, covered entities are allowed to submit KCUs as much as up to 10% of their yearly GHG emissions. Trading of KCUs within Korean ETS is limited to covered entities only until 2020.

KOC
Korean Offset Credits (KOCs) are the first form of approved emissions from locally registered offset projects. Although trading of KOCs is allowed for non-covered entities, the conversion of KOCs into KCUs is limited to covered entities until 2020. To cover emissions for ETS compliance, companies are required to convert KOCs into KCUs.

Kyoto Protocol
The Kyoto Protocol is an international agreement under the UNFCCC to reduce GHG emissions. It was adopted in Kyoto on 11 December 1997 and entered into force in 2005. Under the Kyoto Protocol, industrialised countries commit to binding emissions reduction targets. The first commitment period of the Kyoto Protocol was from 2008 to 2012, and post-Kyoto negotiations are still ongoing.

LDC
Least Developed Countries (LDCs) are the defined by the United Nations as countries with the lowest indicators of socioeconomic development of all countries in the world. Currently, there are 48 LDCs, most of which are located in Africa. A list of all LDCs can be found here: http://www.un.org/en/development/desa/policy/cdp/ldc_info.shtml

Linear reduction factor
The term linear reduction factor (LRF) refers to the linear factor with which the cap of the EU ETS is reduced every year. Article 9 of the EU ETS Directive regulates that the cap decreases each year by 1.74% of the average annual total quantity of allowances issued by member states.

Linking Directive
The Linking Directive (adopted in 2004) regulates the linkage between the EU ETS and the international project based mechanisms CDM and JI. In principle the directive amends the EU ETS Directive to allow operators to use credits obtained through the above mentioned Kyoto mechanisms.

LULUCF
Land Use, Land-Use Change and Forestry (LULUCF) activities are accounted for in Article 3.3 of the Kyoto Protocol and can be used to meet the emission reduction targets of the Kyoto Protocol. Examples of LULUCF projects are forest management or reforestation.

MiFID
Markets in Financial Instruments Directive. The recast of the MiFID directive, which is going to be applicable from January 2017, is redefining EUA's as financial instruments.

MiFIR
Markets in Financial Instruments Regulation, the EU Regulation corresponding to MiFID.

MoE
Ministry of Environment (South Korea)

Market Stabilisation Measures
Under Korean ETS, the government could potentially intervene the market through Market Stabilisation Measures when the regulatory conditions are fulfilled. Details of Market Stabilisation Measures are explained within this almanac.

MSR
The Market Stability Reserve (MSR) describes a measure proposed by the commission to tackle the structural oversupply in the EU ETS; more information in the system description of the EU ETS

Linking Directive http://www.tschach-solutions.com/wp-content/uploads/2011/11/Linking-Directive.pdf

MDDELCC
Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC), the ministry of Sustainable Development, Environment and the Fight against Climate Change, is the main regulator for Quebec's cap-and trade programme.

NAT
The NATs (National Allocation Tables) are the NIMs of the member states corrected with the Cross-Sectoral Reduction Factor. Consequently the NATs contain the actual number of allowances installations receive for free.

The NATs have to be updated on a yearly basis by member states to "reflect reduced production or reduced capacity of installations in the preceding calendar year". The commission has to check every year the update of the member states before the allocation volumes is cleared to be handed out by member states to installations.

National Development and Reform Commission
The National Development and Reform Commission (NDRC) is a macroeconomic body which has broad administrative and planning control over China. The Department of Climate Change is responsible for the formulation of key strategies and policies dealing with climate change. In 2011, the NDRC identified seven provinces/cities to start their own pilot ETS in preparation for a national carbon market.

National Allocation Plan (Kazakhstan)
Government resolution from the Ministry of Environmental Protection in the Republic of Kazakhstan, establishing the distribution of emissions quotas and the volume of reserve quotas.

New Entrants Reserve
The New Entrants Reserve (NER) is a set aside of allowances for new participants in an ETS after the start of the latter. For instance in the EU ETS, it is ultimately built up by 5% of the annual EU-wide cap and is earmarked for new installations which do not receive free allocation in the beginning of the trading period.

NIM
The NIMs (National Implementation Measures) are the installation lists the member states hand in to the commission for the calculation of free allocation per installation. Therefore, every member state hands in a separate NIM.

The NIMs contain the preliminary free allocation volumes per installation in the respective member state. Not included in the NIMs are the installations which do not receive free allocation in the third trading period (eg electricity generators), airlines as well as new entrants.

The commission examines and checks all NIMs and calculates the CSRF according to the NIMs.

New Zealand Units (NZU)
The primary unit of trade for the emissions trading scheme is the New Zealand unit (NZU), which is the unit created and distributed by the Government. One NZU is equivalent to one tonne of carbon dioxide equivalent emissions.

Non-Annex I Countries
Non-Annex I countries are developing countries that are part of the UNFCCC but have no emissions reduction commitment.

Offsets
Offsets in emissions trading schemes are credits for emissions reductions in sectors that are not covered by the emissions trading scheme but can be used for compliance. Each ETS has its own offset regulations, which ensure that the emissions reductions are real, measurable, additional and sustainable. Compliance companies can use offsets to meet their compliance obligation up to a specific limit set in the ETS. Offset credits are generated by offset projects that comply with the requirements set by the ETS.

PDD
In the Project Design Document (PDD) of a CDM project, the project participants describe the main characteristics of the project including location, scope, monitoring plan and expected annual emission reductions.

PoA
Programmes of Activities (PoAs) are a special kind of CDM project. A PoA describes the coordinated implementation of emissions reduction projects. Once the PoA is registered, an unlimited number of Component Project Activities (CPAs) can be included in the PoAs. The PoA therefore provides the framework under which the CPAs are registered.

Reserve Quota (Kazakhstan)
Reserve volume of emission quotas for new and expanding facilities in the National Allocation Plan. In the first phase of the ETS the reserve will be auctioned at a fixed price to operators having exceeded their emissions quotas. Subsequently the reserve may be used to create flexible supply, for the purposes of price management. This will be done by allowing operators to submit an application for part of the reserve to be auctioned off. The auction will take place when at least 10 applications have been approved.

RGGI
The Regional Greenhouse Gas Initiative (RGGI), started in 2009 and is the first emissions trading scheme in the USA for carbon. It combines the ETS of the 9 northeastern U.S. states Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Only power producing facilities with at least 25 MW are covered entities.

RMU
Under the Kyoto Protocol, a removal unit (RMU) is a unit on the basis of land use, land-use change and forestry (LULUCF) activities such as reforestation. It is equal to 1 metric tonne of carbon dioxide equivalent.

ROCs
Registry offset credits (ROCs) are offset credits issued by an Offset Project Registry in California. These credits can be used in the voluntary market. If they were issued to offset projects within the Californian cap-and trade, they can be transformed into CCOs by the ARB.

RTS
Regulatory Technical Standards proposed by an ESA and adopted by the Commission under powers conferred by an EU regulation or directive.

Structural Measures
The term Structural Measure refers to the commission's plan to structurally reform the EU ETS. The commission published (14/11/2012) in its "The state of the European carbon market in 2012" report six different possibilities to reform the EU ETS to tackle the oversupply built up in the second trading period.

State of the carbon market in 2012 http://www.tschach-solutions.com/wp-content/uploads/2013/12/Commission-Report_2012-11-14_State-of-the-European-carbon-market-in-2012.pdf

TP 1 Allowance
EUAs eligible in the first trading period of the EU ETS (2005-07)

12th five-year plan
The five-year plans (FYPs) of China provide detailed social and economic development guidelines for all its regions. The 12th FYP is for the period 2011 to 2015. The 12th FYP sets the goal of reducing carbon intensity by 17% by 2015, compared with 2010 levels. The plan also establishes the goal that China will gradually establish its own carbon emissions scheme as part of its strategy to tackle climate change.

UNFCCC
The United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty to limit the increase of global temperature and cope with the impacts of climate change. At the moment, 195 countries are party to the convention under which agreements like the Kyoto Protocol were adopted.

http://unfccc.int/

WCI
Western Climate Initiative (WCI) is a North American regional initiative including the US State of California and the Canadian provinces Quebec, British Columbia, Ontario and Manitoba. Founded in 2008, the WCI provides administrative and technical services to support the implementation of regional emissions trading schemes. It also provides its member states with a recommended common ETS programme design in order to facilitate future linkage between the schemes. Currently only California and Quebec have implemented an ETS, which has been linked since 1 January 2014.

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