# CARBON MARKET YEAR IN REVIEW

## ALL TIME HIGH FOR CARBON: World emission markets grew strongly in 2018, both in volume and value

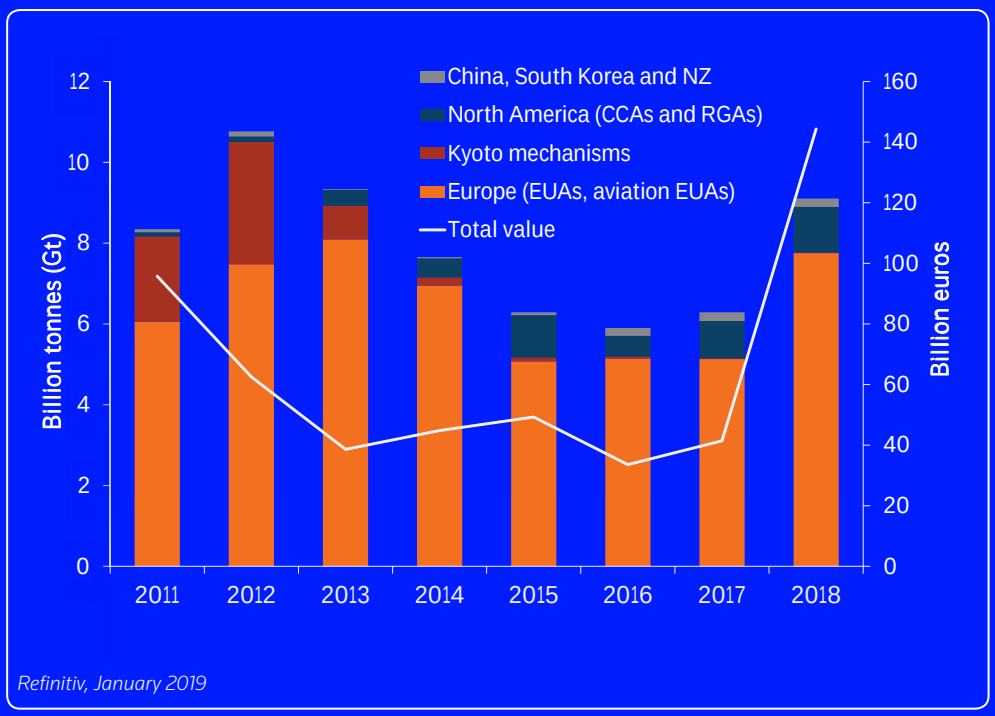
15 January 2019

- Strong growth in emission trading in 2018: traded volume reached 9 billion allowance units, equal to 9 gigatonnes of CO2 equivalents. That is a 45 per cent increase from 2017 and the highest volume since 2013.
- Total market value jumped 250 per cent to €144 billion. That is by far the highest level since we started our assessments upon the launch of the European carbon market (the EU ETS) in 2005.
- Europe represents 90 per cent of the global market in terms of value, North America (WCI and RGGI) another 9 per cent. The South Korean market and the Chinese pilot ETS still see limited trading, although they cover vast emission volumes.
- In Europe we attribute the price rise mainly to anticipation of the Market Stability Reserve that came into effect in January 2019: it will significantly tighten the supply of emission allowances.

CONTENTS



**World Carbon Markets 2011-2018**
Total value, volumes by segment.




*Refinitiv, January 2019*

The Financial and Risk business of Thomson Reuters is now **Refinitiv**

REFINITIV™

# REVIEW OF CARBON MARKETS IN 2018

15 January 2019

This report presents Refinitiv's assessment of the world's major carbon markets in 2018. The aim is to show the main trends in global emission trading systems, and areas where such systems are emerging. We collect data from official sources (most notably carbon trading platforms such as ICE, EEX, KRX, and the Chinese carbon exchanges) and where relevant estimate the size of bilateral (over-the-counter) transactions. This gives us an estimate of the actual volume traded.

We do not include trading in voluntary markets targeting individual consumers and companies (e.g. for offsetting carbon footprint of flights). We do include volumes from the UNFCCC platform for voluntary cancellation of CERs. For trades not documented on a trading platform, we multiply volumes with (average) prices at the time of transaction, which gives us an assessment of the overall value of the respective market.

The carbon team at Refinitiv (originally Point Carbon, then part of the financial and risk business of Thomson Reuters) has published annual assessments of global carbon markets since 2006. These publications have consistently served as a reference in the world of carbon trading. The main focus of this report is to provide a summary of market and policy trends over the past year.

This report covers the main regions in which there are existing or emerging emission markets: Europe (the EU ETS), North America (the WCI and RGGI, emerging market in Mexico), China (regional pilot ETS, emerging national ETS), South Korea (KETS), New Zealand and Australia (NZETS, trading in Australia's legacy carbon pricing policies), and global transactions in the CDM market as well as developments toward the future international offset market for aviation emissions. In order to facilitate easy trend comparisons, we attempt to minimize changes in the report's scope from one year to another. However, sometimes we do need to update the selection of market segments, to ensure that the analysis reflects the markets that are currently important - either because of actual trading, or because of anticipation of future trading. This means that some markets that used to be important are no longer covered, e.g. the Joint Implementation mechanism whose offset units (ERUs) are no longer eligible in the EU ETS, or Kazakhstan's ETS (which has seen no trading activity recently).

This report has been co-authored by the following team of analysts: Maria Kolos, Lisa Zelljadt, Hongliang Chai, Tianyu Meng, Jon Berntsen, Hæge Fjellheim and Anders Nordeng.

Note that our numbers have often varied significantly from other similar analyses. Most important among these is the World Bank's annual market assessment. The World Bank looks at issuance and available units of emission allowances and offsets in the various markets, rather than actual transaction volume. This approach tends to give a much lower volume than our assessment, since it does not take into account that allowance and offset units typically change hands more than once during a year.

REFINITIV™

# 1. Strong growth and spiking prices

## TRADED VALUE INCREASED BY 250% TO €144 BILLION

With the notable exception of China, all large carbon markets grew significantly in 2018, continuing and accelerating an upward trend that had started in 2017. Total traded volumes reached some 9.1 billion tonnes (Gt) of emission allowances in 2018, up 45 per cent year-on-year.

We assess the total value of these transactions to be on the order of €144 bn. That is a whopping 250 per cent increase from 2017, and is mainly due to the 200 per cent rise in the price of EUAs (European carbon emission allowances), from €8 to €25/t. The Market Stability Reserve (MSR) will withhold significant volumes of EUAs starting from January 2019 - anticipation of this was the main price driver in Europe in 2018.

In the North American markets (WCI and RGGI) volumes grew 22 per cent to 1.2 Gt, whereas value grew 39 per cent to $13.5 billion (just under €12 bn), showing that prices increased relatively more than the number of transactions. This bullish development is largely due to factors similar to those in Europe: both North American regional markets are entering a new compliance period in 2021 that will tighten allowance supply.

The New Zealand ETS is another market that grew on expectations of tighter rules going forward: prices for the country's allowances (NZUs) hit all time highs in the latter part of 2018 as regulators came closer to finalising revisions to the programme that will see a tighter supply demand balance as of 2020. NZUs even traded above their de facto price ceiling of NZ$25 (€14.80) on assumptions that this ceiling will rise this year.

In the Chinese pilot carbon markets – where transacted volumes have always been modest compared to the amount of emissions covered – 2018 marked a 22 per cent downturn from 127 to 99 Mt, mainly due to a relative dearth of financial product transactions like carbon repo deals that had been more prevalent in 2017.

Volume and values in South Korea's ETS, which has been in operation since 2015 but experienced only limited trading due to its ban on participation by financial institutions, increased markedly in 2018. See the summary figure for each market in Table 1.1, and more details in the respective chapters on the following pages.

## EUROPE: NO BOOST IN GAS GENERATION, KEY POLICY FILES CONCLUDED

After several years of discussions, the European institutions finalised a review of the ETS directive in late 2017. It was formally approved in February 2018, and came into effect in April. The most immediate effect of the new rules is a 32 per cent reduction in the auction volumes brought to market in 2019. The main objective of the regulatory reform was to define the rules for the upcoming fourth trading period that will run from 2021 to 2030, including important elements such as the cap reduction (the so-called linear reduction factor), the split between auctioning and free allocation, and the size of the modernisation and innovation funds. The fact that European policy makers eventually managed to agree on a tighter/more ambitious ETS seems to have reassured compliance companies, traders and investors of their commitment to carbon pricing as a key climate policy instrument.

**Table 1.1 Global carbon market size 2016-2018**

Refinitive's assessment of volume and value of the major carbon markets from 2016 to 2018. Millions of tonnes (Mt), millions (m) of euros.

| | 2016 | | 2017 | | 2018 | | *Volume change 2017-18* | *Value change 2017-18* | *Share of total value* |
|---|---|---|---|---|---|---|---|---|---|
| | Mt | € million | Mt | € million | Mt | € million | | | |
| Europe (EUAs, aviation EUAs) | 5 145 | 27 545 | 5 129 | 30 919 | 7 754 | 129 736 | *51%* | *320%* | *90%* |
| CERs (primary and secondary) | 49 | 63 | 21 | 23 | 15 | 32 | *-29%* | *39%* | |
| North America (CCAs, *RGAs) | 511 | 4 913 | 923 | 9 238 | 1 126 | 12 871 | *22%* | *39%* | *9%* |
| **South Korea (exchange-traded and auction data, excluding OTC) | 5 | 62 | 7 | 140 | 22 | 390 | *228%* | *179%* | |
| Chinese pilot schemes (allowances and offsets) | 113 | 202 | 127 | 204 | 99 | 167 | *-22%* | *-18%* | |
| New Zealand | 76 | 774 | 81 | 870 | 88 | 1 165 | *9%* | *34%* | *1%* |
| **Total** | **5 898** | **33 559** | **6 288** | **41 394** | **9 104** | **144 361** | ***45%*** | ***249%*** | |

**The units traded in the Regional Greenhouse Gas Initiative are short tons, which are 0.907 metric tonnes. For unit consistency, we have converted RGGI's total volume figures to metric tonnes. All non-European transactions are priced in local currencies, for the sake of consistency we have converted values into euros.*

***SK 2018 data includes both exchange-traded and auction data, so may not be compared directly with 2017 data, which includes exchanges only.*

*Source: Refinitiv, January 2019*

European energy market dynamics also had a bearing on carbon prices in 2018. The year saw a sustained tight supply of gas following an exceptionally cold winter that created a huge demand for gas for heating. Combined with declining Dutch production and low LNG arrivals, this led to a marked increase in gas prices. In consequence, we saw little coal-to-gas switching in the power sector despite the strong rally in EUAs that would typically make gas more profitable than coal as a source for electricity. Now that the UK has phased out most of its coal generation, there are primarily four member states with a huge potential for coal-to-gas switching: Germany, Italy, Spain and the Netherlands. In these four countries coal-fired generation continued to decline in 2018, but was replaced by renewables rather than by gas.

The most important energy and climate discussions in 2018 centred around two files that decided 2030 targets for renewable energy (its minimum share of the power mix) and for energy efficiency (improvement compared to a 2007 baseline). After long negotiations, the European Parliament and the Council eventually agreed on targets of 32 per cent for renewables and 32.5 per cent for energy efficiency. As an effect of these more ambitious energy targets, according to the European Commission's modelling, Europe will be on a trajectory to reduce emissions by more than 45 per cent by 2030, in other words well above the official target of 40 per cent. The targets will also affect the long term emission trajectory of Europe's power sector, and therefore carbon allowance prices.

## GROWTH IN NORTH AMERICA, CHINA IN A HOLDING PATTERN

In North America, both the Western Climate Initiative (WCI) and the Regional Greenhouse Gas Initiative (RGGI) grew in terms of volume and value - largely in anticipation of new rules in both trading systems for when they enter new trading periods starting in 2021. The supply-demand balance will become tighter going forward. In WCI the year was marked by the departure of Ontario, which set up an ETS in January 2017, joined the California-Quebec led WCI one year later, and then left after elections in June 2018 resulted in a provincial government opposed to carbon pricing. Ontario's pullout ended up having a bullish effect on the WCI as a whole: it reduced uncertainty in the market (as evidenced by increased interest in future vintage allowances at the auctions) and had no noticeable effect on secondary market trading. Ontario's covered entities, however, are left with millions of worthless allowances for which they will not be compensated.

In RGGI, rising prices in the second half of the year led to an 80 per cent increase in market value year-on-year. We attribute this rise partly to the cap tightening for the years 2021-2030, partly to expectations that more states will join the trading system in 2020/2021, and partly to fundamentals given 2018's cold winter and hot summer.

Mexico saw little progress toward the ETS it has been developing for over five years, as a new government after elections in July put on hold a 3-year pilot phase of the country's carbon market intended to start in August. As a consequence of the delay a mandatory carbon market in Mexico is now unlikely to enter into force until mid-2022.

Developments of China's national ETS was also marked by delays. The country's massive reconfiguration of its departmental competencies, which included an entirely new ministry dealing with climate change issues, caused months of delay in ETS implementation at the national level. Starting in September, regulators began indicating progress on vital ETS infrastructure elements such as an account registry and a trading platform. Although we expect steady progress establishing the nuts and bolts of the national ETS in 2019, we do not expect even simulated trades (officially scheduled for 2019) to happen until the end of the year.

## INTERNATIONAL OFFSETTING ON THE HORIZON

Some years ago the carbon offset mechanism under the Kyoto Protocol (the CDM) accounted for a significant chunk of global carbon market transactions several years ago. Back then, industrialised countries could use emission reduction credits from projects in developing countries to meet their UN climate targets by offsetting their own emissions. With European countries not doing so after 2012, the CDM market has petered out - the volumes transacted and the price per offset unit (CER) are tiny compared to the heyday of the CDM. However, projects are still generating CERs, and whether and how this will continue is a major sticking point in the international climate negotiations.

One source of demand for CERs - or for any type of carbon offset unit that can be traded internationally - is the Carbon Offset and Reduction Scheme for International Aviation (CORSIA) that is currently being developed by the International Civil Aviation Organization (ICAO). Since they are not emitted in any one country, greenhouse gases from international air traffic are not covered by the UN climate agreement - outside of Europe, few countries regulate aviation emissions. ICAO thus aims to achieve "carbon neutral growth" from 2020, by requiring air carriers to offset additional emissions with carbon credits from projects that cut greenhouse gases. Whether CERs will be eligible as offset credits under this system (and if so, from which project types and years) has been the key carbon market question for the CORSIA since it was agreed in 2016. Stakeholders expected some clarity on this in June 2018, when a set of CORSIA rules was adopted - but those rules deal mainly with monitoring, reporting and verifying emissions from flights - they do not yet specify which types of offsets that will be eligible under the scheme. Continued difficult negotiations on the criteria can be expected in 2019. Another tricky question is to what extent Europe will be satisfied with what seems so far to be a very lax system, especially compared to the way intra-EU aviation emissions are covered under the EU ETS.

# 2. Europe

## STRONG GROWTH SPURRED BY ANTICIPATION OF TIGHTER BALANCE

The European carbon market saw 7.8 Gt worth of emission allowances (regular EUAs and aviation EUAs) change hands in 2018. This represents a 51 per cent increase in volume from the 5.1 Gt traded in 2017. The market value, however, quadrupled compared to the previous year, to €130 billion. This is due to the average allowance price nearly tripling over the course of 2018, from €5.88/t in 2017 to €16.12/t in 2018. In terms of daily closing prices, the front-year benchmark contract closed 2018 at €25.01/t, up more than 200 percent from the December 2017 closing price of €8.18/t.

The European Emission Trading Scheme (EU ETS) has been criticised over the years for not delivering greenhouse gas emission reductions, as the market has been plagued by an oversupply of allowances in the aftermath of the economic crisis in 2008. Against this backdrop, the now 14-year-old EU ETS made a strong comeback in 2018, with prices reaching levels not seen in a decade. While stakeholders generally assumed prices would go up in 2018 ahead of measures to tighten the programme entering into force this year, the magnitude and the speed of the market's rally far exceeded expectations. A year ago, when rules for the trading scheme's fourth phase (2021-2030) had finally been agreed politically, we forecasted prices to rise from their then €8/t level - as it happened, the yearly *average* for 2018 ended up at twice that level.

The main factor behind the stunning price increase was anticipation of the supply-tightening measure known as the Market Stability Reserve (MSR), which took effect on 1 January 2019 and will significantly reduce the available volume of EUAs in the years to come. Conceived as a response to the accumulation of a vast surplus of EUAs following the financial crisis in 2008, the MSR will each year withhold a volume of EUAs equivalent to 24 per cent of the allowances in circulation. In practice, it will absorb fresh EUAs that would otherwise have been offered at the EU countries' regular allowance auctions. For 2019 this means the offered volume will be reduced by almost 400 million. From 2024 onwards the withdrawal rate will be at 12 percent, hence the cuts in annual auction volumes will be reduced accordingly. Reducing the surplus turns the EU ETS back into a market in which fundamentals and abatement costs are again relevant for setting the EUA price.

The 24 per cent intake rate as well as an agreement to cancel allowances from the reserve (from 2023 onwards) were part of the wide compromise on the legislation for the fourth trading phase of the EU ETS (2021-2030). The political negotiations reached a conclusion in November 2017, and the new version of the EU ETS directive was formally approved by member states' ministers on 27 February 2018. However, the upward trend for European carbon had started back in the second half of 2017, on clear signals that the supply-tightening mechanism would be more ambitious than previously expected. Discounting some drops along the way, the price arrow pointed continuously upward throughout 2018 until it reached a year-high at €25.79/t on 10 September. The EU ETS will still be oversupplied on a cumulative basis, but the annual shortage due to the MSR have led market participants to revise their buying strategies last year, front-running their carbon hedging to mitigate risk of becoming short on allowances.

## POWER MARKET FUNDAMENTALS – NOT MUCH SWITCHING FROM COAL TO GAS

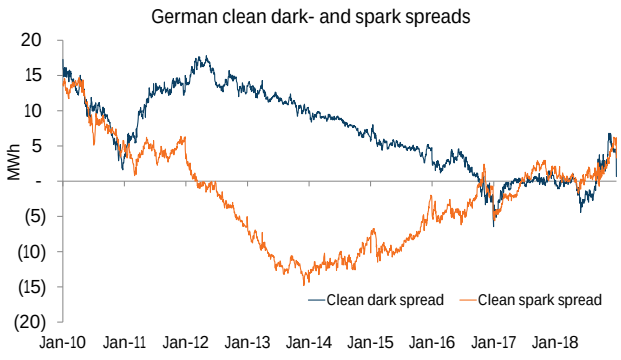
Europe's bullish energy complex in 2018 also contributed to the EUA price rally. Coal prices largely followed global crude prices upward over the year, until peaking in early October. Oil prices rose on the back of tighter supply, due to sanctions on Iran and limited production in Venezuela. Underlying global oil demand also grew in 2018, despite global economic uncertainties such as trade wars and rising geopolitical tensions. In parallel with the upward trend in oil and coal prices, European gas markets saw sustained tight supply due to record low gas storage levels after an unusually cold winter, declining Dutch production, and low LNG arrivals. The tightness in the gas market spilled over to carbon, as elevated gas prices pushed power prices to record high levels - ironically, this increased the relative competitiveness of coal-fired power generation vis-a-vis gas-fired generation by increasing the coal power plants' margins.

Thus the tripling of carbon prices in 2018 did not serve to boost gas-fired power generation in Europe. The share of coal continues to decrease, but it is being replaced by new renewables, not by gas. A tight gas market prevented fuel switching from taking place at any significant level. National electricity statistics from Germany, Italy and Spain (three countries with the lion's share of gas generation capacity available for fuel switching) show insignificant shifts from coal to gas in power generation through 2018 compared to 2017. In Italy, for instance, gas-fired generation was relatively unchanged year-on-year at 125 TWh, while generation from hard coal fell 18 per cent from 35 TWh to an estimated 29 TWh - the drop was entirely offset by higher amounts of power from renewable sources. Spain saw similar declines in both coal- and gas-fired generation, offset by 14 TWh more hydropower in 2018.

The limited impact on fuel switching in 2018 compared to 2017, despite the record high carbon prices, shows the complexity in power market dynamics where the actual generation mix is defined by an intricate interaction between power, carbon, coal, and gas prices.

On the trading front, 2018 saw a rise in EUA futures transactions - but also a sharp rise in EUA options trading. In late November, on

**Figure 2.1: Incentives for fuel switching (Front year German Phelix base, API2 coal, TR TTF gas, ICE EUA)**




*Source: Refinitiv*

the ICE trading platform, total Open Interest (OI) for EUA Dec-18 futures options (expiry on 12 December) reached as high as 470 Mt, exceeding the OI for Dec-18 futures (expiry on 17 December). This represents a significant increase from previous years, when the majority of OI was in EUA futures. The rise in options trading is mainly the result of increased speculative trading that typically follow a dramatic price rally, as well as some market participants using EUA options as insurance to protect them from further price rises.

## LONG-AWAITED REVISION OF THE ETS REGULATORY FRAMEWORK

In terms of policy, the year 2018 marked the end of a long period of uncertainty related to the revision of the EU ETS directive. The process that started with the Commission's draft proposal in July 2015, reached a political agreement in trilogue in November 2017, was formally approved in February 2018 and entered into force in April. The revised ETS directive sets out the parameters for the period 2021-2030 on important elements such as the cap, the split between auctioning and free allocation, and the size and operation of the Modernisation and Innovation funds. The revision also changed the design of the MSR, with important adjustments on its rate of intake and cancellation. The immediate outcome, that the 2019 auction volume will be only two thirds of what it was in 2018, was the single most important EU ETS price driver in 2018.

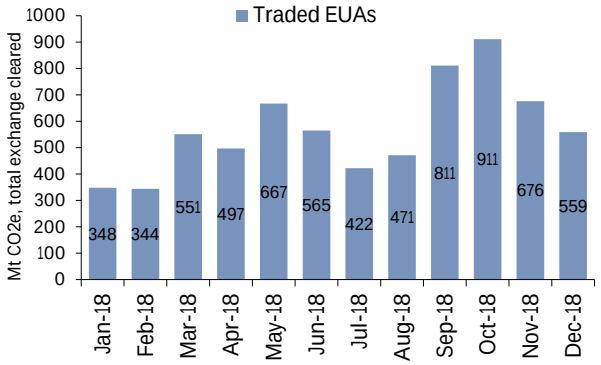
Another important policy to enter into force in 2018 was the Effort Sharing Regulation (ESR), which sets emission reduction targets for the member states in areas not covered by the EU ETS (e.g. transport, agriculture, buildings). The targets range between zero and 40 per cent reduction in 2030 compared to 2005 levels. The regulation is meant to give member states flexibility on how to achieve their national targets. Most importantly, member states can trade ESR allowance units (AEAs) among themselves. They can also count some of the net positive contribution from CO2 uptake by forests. A special bonus is given to some central-eastern European countries, whereas a group of western European countries are allowed to convert a limited volume of EUAs (100 m in total) into AEAs as part of their emission reduction effort in non-ETS sectors.

Together the ETS and ESR files are meant to lead Europe towards its 2030 target of cutting greenhouse gas emissions 40 per cent below their 1990 levels. The ETS will account for most of this reduction (43 per cent down from 2005 levels) while non-ETS sectors will reduce 30 per cent from the same year.

## NEW 2030 TARGETS FOR RENEWABLES AND ENERGY EFFICIENCY

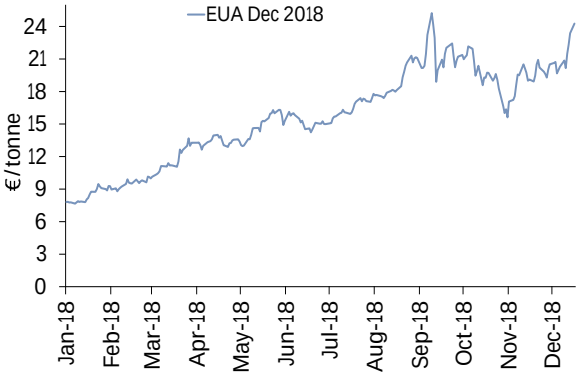
Though they do not immediately affect the EU ETS, other policy decisions at the EU level are relevant because they will have a bearing on emissions levels in the future. EU lawmakers reached a final political conclusion in June 2018 on targets for renewable energy in the electricity mix and energy efficiency, both of which will affect the long term emission trajectory in Europe's power sector. The renewable energy share target for 2030 was set at 32 percent (as share of final energy consumption). The efficiency target for the same year was set as a 32.5 percent improvement compared to a 2007 baseline. The two targets were formally approved in the Council on 4 December 2018, and are set to enter into force in early

**Figure 2.2: EUAs volume month-on-month .**




*Source: Refinitiv*

**Figure 2.3: EUAs prices**




*Source: Refinitiv*

2019. As an effect of these more ambitious energy targets, Europe seems set be on a trajectory to reduce emissions by 45 percent by 2030, in other words well above the official target of 40 percent.

The files on renewable energy and on energy efficiency are both part of the jumbo "Clean Energy for All" package, whose eight draft proposals were presented in late 2016. Other elements in this massive proposal cover electricity market governance and the role of the Agency for the Cooperation of Energy Regulators (ACER). The wide range of detailed legislation in the package includes ETS-relevant decisions like maximum emission levels for power generators to qualify as so-called capacity mechanisms (generators held on "stand-by") post 2020. The last four parts of the Clean Energy package were finalised in trilogue in November and December 2018, and still need to be formally approved by the European Parliament and in the Council. This will likely take place in Q1 2019.

Most climate and energy files have displayed the same general trends: the European Parliament wants more ambitious emission measures than the Council, and the latter is internally split between climate concerned members of northern and western European countries vs. members from central and eastern European countries worried about protecting coal's role in the energy mix.

The position of Germany - Europe's most important member state in these decisions – seems to have shifted in 2018. Domestically,

environment minister Svenja Schulze (SPD) has lost several intra-government discussions on climate change policy. On EU level Germany used to support the climate ambitious coalition, but that was not always the case in 2018. In mid-December Germany was conspicuously absent from a statement by nine member states to "strengthen and extend carbon pricing in Europe".

## COAL SET TO ENTER TWILIGHT ERA, BREXIT QUESTION

Future carbon emissions are not decided solely by EU policy, but also by national climate and energy policies. The single most important element in this balance is Germany's forthcoming plan to phase out coal from its power mix. Carbon market watchers have therefore followed communications from Germany's special commission tasked with proposing a concrete coal phaseout timeline, which have been ambiguous. Originally set to be announced by the end of 2018 at the latest, the commission's final report has been delayed to 1 February 2019.

Germany is not the only country pondering when to give up coal. A dozen other member states have plans to stop coal-fired generation, with deadlines ranging from 2020 to 2035. Spain, Italy and the Netherlands all count among the top ten coal power countries in Europe. Even Poland, coal's most ardent champion, has signalled it will not develop new coal-fired plants beyond those already under construction. In November, Warsaw unveiled a plan to reduce the share of coal in the Polish power mix (currently at 80 per cent) to 60 per cent in 2030 and 30 per cent in 2040.

Nevertheless, for the more immediate future, the Polish government keeps protecting coal. It passed a law in late December to shield households and industry from the carbon costs passed on in energy bills by freezing power prices, and compensating utilities for their reduced income.

When and how the UK will leave the EU was one of the key factors affecting the future of the European carbon market in 2018, and will continue to be so this year. The House of Commons votes on a UK withdrawal deal on 15 January, with carbon traders worrying that in a "no deal" scenario UK market participants will suddenly offload their surplus and create a glut in the EU ETS.

If it exits with a deal, UK companies will continue to be covered under the EU ETS in 2019 and 2020, and we expect only a modest impact on market operations. The "no deal" scenario would see the UK leave the common emission market, and UK installations will instead become subject to a new carbon emission tax fixed at £16/t, starting in April 2019. The current Carbon Price Support rate will remain frozen at £18/t, meaning that UK power producers would still pay a total carbon price of £34/t even after Brexit.

One practical consequence of Brexit already manifest is the growing share of carbon transactions (both futures and option contracts) taking place on EEX (based in Leipzig) at the expense of the once dominant ICE platform in London. This move seems to be triggered not so much by the UK departure from the EU ETS (either in March 2019 or at the beginning of 2021), but by the prospect of London ending up outside of the European regulatory framework for trading in derivatives (such as EUA futures).

**Table 2.1: Energy prices year-on-year**

Closing prices for key energy price contracts on last trading day of December 2018, compared to December 2017

| Contract | Closing Price | Change |
|---|---|---|
| EUA Dec-19 | €25.01/tonne (8.25) | 203.2% |
| German power front year | €51.44/MWh (37.15) | 38.5% |
| Front month Brent crude oil | $53.80/bbl (66.87) | -19.5% |
| Summer-ahead NBP gas | 53.34 pence/therm (42.37) | 25.9% |
| Year ahead coal contract | $83.70 /tonne (85.29) | -1.9% |

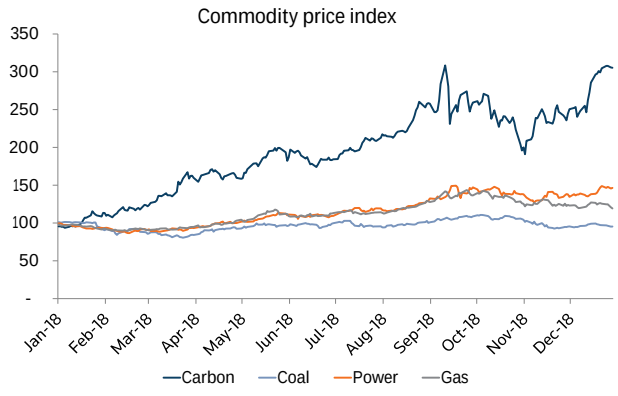
## THE YEAR AHEAD

In 2019 the climate and energy policy debate will focus on the draft 2050 climate strategy presented by the European Commission in late 2018. It describes various scenarios for how Europe can achieve vast greenhouse gas abatement. European leaders have already expressed support for the block to become "climate neutral" by 2050. More discussions on the report will take place during the upcoming energy and environment council meetings, and also at the next high level Council meeting in Sibiu, Romania in May 2019. The final decision on the 2050 strategy will most likely not be made before 2020 or later.

Apart from the 2050 strategy and the finalisation of ongoing files, the 2019 policy pipeline will be limited by the European Parliament elections in May, and the appointment of a new Commission in the autumn. Any major new draft legislation will most likely be put on hold until after the change of guards.

On the level of member states, the German coal phaseout commission's recommendation in early February and the path for Brexit in March will also have a bearing on EUA prices.

**Figure 2.4: EU commodity price index**




*Source: Refinitiv*

# 3. North America

Both North American carbon markets grew in 2018, in terms of volume traded but especially in terms of overall market value - the Western Climate Initiative (WCI) saw nearly 900 million permits change hands, with a total market value of $13.5 billion (just under €12 billion), and 264 short tons traded in the Regional Greenhouse Gas Initiative (RGGI) for a total market value of $1.3 billion (€1.1 billion). In both ETS this represents a significant rise compared to the previous year, mainly because both are starting a new phase/trading period in 2021, for which regulators finalised rules over 2018 that will tighten the market going forward. The most important development in the WCI was the dramatic mid-year pullout of its newest member Ontario, though trading and prices remained relatively unaffected. RGGI prices surged on the back of power market fundamentals, upcoming cap-tightening, and the prospect of two more jurisdictions joining the market. Going forward, we expect both markets to continue their bullish trend in expectation of tightened compliance rules starting in January 2021.

## WCI CONTINUES GROWTH DESPITE ONTARIO PULL-OUT

North America's largest carbon market (and the world's second-largest after the EU ETS by value) was marked by dramatic events in the Canadian province of Ontario, whose provincial ETS had been up and running since January 2017. Ontario officially joined California and Quebec as part of the WCI in January 2018 - its allowances were sold at the programme's first 3-way auction in February and its second in May, which were oversubscribed. The WCI was at that point 25 per cent larger in terms of cap size than in 2017, due to the addition of Ontario's covered emissions - the province's emitters, in general shorter on allowances than their counterparts in California and Quebec, brought demand to the market. But even as the sold-out auction looked promising for the future of the WCI, the popularity of Ontario's Liberal Party (under whose leadership the province had established the ETS) sank dramatically ahead of provincial elections in June.

The right wing Progressive Conservatives (PC) gained in the polls, with carbon pricing opponent Doug Ford emerging as its leader in March - in June his party won enough votes to form a majority government in Ontario. Ford's first action as premier was to begin repealing the province's ETS, even though the Canadian government requires each province to have a carbon pricing programme in place and Ontario offered no alternative to WCI membership. With the new government moving quickly to cancel the underlying climate legislation authorising Ontario's ETS, allowance trading was halted in the province, Ontario entities did not participate in the WCI's August allowance auction, and their carbon assets were essentially frozen. California and Quebec regulators blocked registry transactions of Ontario-held emissions allowances to avoid them flooding (and thus destabilising) the WCI market.

The provincial climate law was officially repealed on 31 October, amid protests from environmental groups and Ontario's own regulatory bodies including its environment commissioner (whose position the Ford government is eliminating). The province is now in violation of the Canadian federal government's carbon pricing requirement, as the vague programme replacing the climate law does not apply federally required measures to price carbon at C$20/tonne in 2019 rising to C$50/tonne in 2022. Along with the province of Saskatchewan, Ontario's government is challenging the federal government over this requirement in court - the case will be heard in Q2 2019.

Over the 18 months it has had an ETS (six of which under the WCI), Ontario earned close to C$2.8 billion in revenues from the sale of allowances – the province used these to pay for various climate change mitigation programmes including popular consumer rebates for energy efficiency and renewable energy installations, whose funding is now gone. More importantly, Ontario companies who were covered by the WCI hold now-worthless allowances for which they will not be reimbursed. While the total value of such allowances could be C$2-3 billions - the PC government has set aside only C$5 million total for reimbursement to emitters while it has budgeted C$30 million for the above-mentioned legal challenge.

Overall, however, Ontario's pullout ended up having a bullish effect on the WCI as a whole: uncertainty about Ontario's participation going forward had dampened trading in early 2018 and sent mixed signals in prices. After Ontario was clearly excluded, indicators of trust in the market's future strengthened: the first 2018 auction without Ontario in August featured bid-to-cover ratio for future vintage allowances was the highest ever recorded at 1.45, and the next auction in November saw future vintage allowances sell at a premium to current vintage ones. Buyers gobbled up the 380.3 million allowances offered at all four WCI auctions in 2018, after previous years had seen several auctions go undersubscribed and their leftover allowances set aside. Those leftovers were fed into the 2018 auctions, making it all the more significant that they sold out, while secondary market action also remained relatively strong throughout the year.

Meanwhile, the California Air Resources Board (CARB) held several stakeholder consultations and public hearings in the process of setting the WCI's rules after 2020: with the state's legislature having passed a law in 2017 that ensures the ETS will continue through 2030 (ever since which all of the WCI's allowance auctions have sold out and prices have risen), it is on CARB to decide the rules for that 2021-2030 period. Given the state's strong transparency requirements, all discussions, consultations, stakeholder submissions and responses thereto are part of an iterative public process that ran throughout 2018 and will continue well into 2019. A first set of decisions was slated for October, but then postponed to November, meaning they will be approved at CARB's next meeting in January 2019. At stake are trigger prices for the programme's price containment reserve (price ceiling) as well as price floors and eligible offset types.

## RGGI GROWS AHEAD OF TIGHTENED CAP, NEW MEMBERS

North America's other carbon market featured similar growth, albeit on prospects of gaining new members rather than losing existing ones. RGGI's volume was up nearly 30 per cent from 2017, but rising prices - especially in H2 - made for an 80 per cent increase in total

market value compared to the previous year. We attribute at least some of the increase to the fact that RGGI is expected to cover more emissions from 2020. New Jersey, which was part of RGGI from its start in 2009 through 2012, will rejoin the programme by that year. The coal-heavy and populous state of Virginia, whose Democratic governor has made establishing an ETS that will link to RGGI a priority despite strong opposition from the Republican-dominated legislature, is also slated to join the market before 2021. Virginia's legislature rejected in January a proposal to join RGGI outright, but the state's environment agency under the governor moved forward with setting up an ETS over the course of the year. The legislature then passed a bill to block adoption of a cap-and-trade programme without its approval, but the governor vetoed that in April. Progress on an ETS continues, with Virginia's projected covered emissions in 2020 exceeding those of New York to make it RGGI's biggest member if it joins.

New rules for RGGI were developed after a programme review in 2017 - currently in the process of being adopted by all RGGI member states, they will tighten its cap to a three per cent annual reduction in the 2020-2030 period. They also include a 2021-2025 "adjustment" of the bank of surplus allowances that built up over the programme's early years in which caps were not as tight. Additional measures include an Emissions Containment Reserve (ECR) to reduce auction supply in auctions that clear below a predetermined price - the revised rules will enter into force in January 2021. We attribute much of this year's RGA price rise to that impending market tightening, as it offers similar prospects for decreased supply/demand ratio as the WCI's tighter rules in that year.

For RGGI, fundamentals appear to have been in play during 2018 as well: cooler temperatures in the northeastern US made for a 22 per cent increase in the power sector emissions covered by RGGI in Q1 of 2018, and the hot summer's air conditioning demand continued power sector emission highs: Q2 and Q3 emissions were also higher than those of 2017. Auctions provided evidence of increased allowance needs from emitters, as both June and September allowance sales were heavily oversubscribed and a greater proportion of buyers were compliance entities (as opposed to speculators). Prices increased steeply over the summer months and beyond.

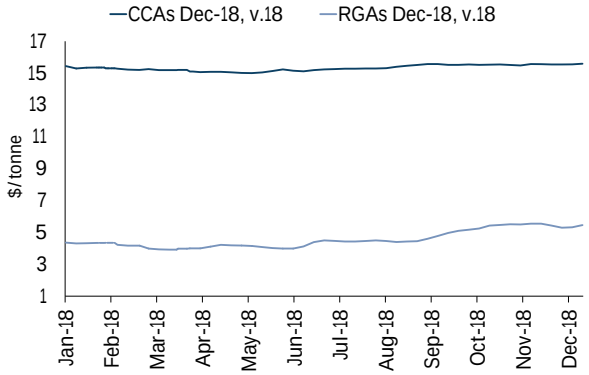
So far, RGGI's new "Model Rule" has been adopted in Delaware, Maine, Maryland, Massachusetts, Rhode Island, and Vermont - Connecticut is expected to finalise the new regulations in early 2019, while New Hampshire's legislature is drafting a relevant bill. New York's regulators are expected to approve the new rules, but have not laid out a timeline to do so - that move is crucial to the market, as New York is RGGI's highest emitting state at roughly 30 Mt/year.

## MEXICO IN A HOLDING PATTERN

The country of Mexico, which has been developing an ETS since 2012 and already has a carbon tax on fuels, saw repeated delays to its ETS implementation timeline during 2018. In late April, the Mexican senate passed a bill solidifying the mandate for the country's ETS - together with a bill from the lower chamber that had passed in December 2017, then-president Peña Nieto signed it before elections in July, such that Mexican ETS development was ensured even if the new government did not prioritise carbon pricing. Relevant Mexican businesses participated in a market simulation that began in October 2017 and were eager to continue the momentum toward a long-awaited mandatory market, as was Mexico's environment ministry (SEMARNAT).

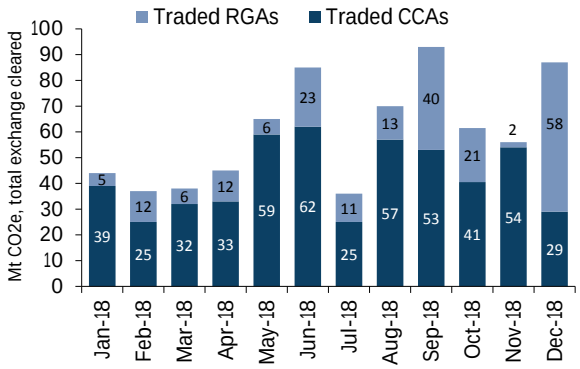
The bill amended the national climate change framework law to refer more specifically to emissions trading: it directs SEMARNAT to move forward with its ETS under any new administration. The election of President Andres Manuel Lopez Obrador in July seems to have delayed the process, however: a 3-year pilot phase for the Mexican ETS had been scheduled to start in August, but was delayed to January 2019 in a new timeline released in October. Media reports from December's UN climate summit in Poland quoted Mexican officials as saying the new administration under Lopez Obrador needs even more time to familiarise itself with emissions trading, such that the pilot start will likely be pushed well into 2019. Given that the law requires the pilot phase to take 36 months, a mandatory carbon market in Mexico is now unlikely to enter into force until mid-2022.

**Figure 3.1: Historical CCA and RGA prices**




*Source: Intercontinental Exchange (ICE)*

**Figure 3.2: Historical CCA and RGA traded volumes**




*Source: Intercontinental Exchange (ICE)*

*The high RGA volumes in December are due to RGGI's end of year compli ance deadline.*

**Table 3.1: North American carbon markets**

| | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|
| | Mt | € million | Mt | € million | Mt | € million | Mt | € million |
| WCI | 770 | 8 957 | 338 | 4 088 | 628 | 7 351 | 887 | 11 763 |
| *RGGI | 252 | 1 475 | 173 | 825 | 185 | 615 | 239 | 1 107 |
| Ontario | n/a | n/a | n/a | n/a | 110 | 1 272 | n/a | n/a |
| **Total** | **1 023** | **10 432** | **511** | **4 913** | **923** | **9 238** | **1 126** | **12 871** |

**The units traded in the Regional Greenhouse Gas Initiative are short tons, which are 0.907 metric tonnes. For unit consistency, we have converted RGGI's total volume figures to metric tonnes.*

# 4. China

Reorganisaton of China's government departments delayed implementation of its national ETS for half a year, but starting at the end of Q3 the relevant departments made progress on carbon trading infrastructure including the registry and exchange. Both traded volume and value of China's eight regional pilot ETS collectively declined slightly from the previous year's levels, mainly due to a relative dearth of financial product transactions like carbon repo deals that had been more prevalent in 2017. Almost all pilots saw tighter allocations, as indications that their allowances will not carry over into a national ETS have spurred efforts to reduce allowance surpluses. Although we expect steady progress establishing the nuts and bolts of the national ETS in 2019, we do not expect even simulated trades (officially scheduled for 2019) to happen until the end of the year.

## NATIONAL ETS

The most significant political development for China's national ETS in 2018 was a massive government shuffle that redefined the competent authority for emission trading policy. As part of a wider reorganisation of government departments that started in March, responsibility for China's national emissions trading scheme (ETS) changed from the National Development and Reform Commission (NDRC) to a newly created Ministry of Ecology and Environment (MEE). The relocation of administrative authorities was not officially completed until September -this delayed implementation of the national ETS (which was "launched" back in late 2017) because officials cannot decide major issues prior to the finalisation of restructuring.

However, completion of the new competency arrangement was followed by several targeted ETS implementation actions in Q4:

Firts, the new MEE convened a first of its kind "mobilisation meeting" for the national ETS involving 300 provincial officials, power sector executives, representatives from industrial associations and academic institutions. The vice minister of ecology and environment made telling statements at this meeting, including that the ministry would strive to make the national ETS the main measure to achieve GHG emission reduction targets, and avoid overlapping policies. This confirms that China's government is now beyond the phase of evaluating the function and benefit of a national carbon market vis-à-vis other policies, and is instead focusing on implementing carbon trading.

Secondly, infrastructural components of the national ETS are underway, according to an early December statement by climate change department director Li Gao. Officials are creating the allocation plan for the power sector (the first and as yet only sector to be covered by the ETS) that incorporates improvements in emissions data quality. Concrete plans for the national allowance registry and exchange are in place, as confirmed by the fact that Hubei Emission Exchange (the provincial trading platform responsible for developing the national allowance registry) selected a provider for registry infrastructure with a clearing function for CNY 3.65 million (~ €14.6 million[1]). Unlike in other ETS, this transaction clearing function will be associated with the registry rather than with the national exchange –the Shanghai Environment and Energy Exchange is the entity responsible for developing the national trading platform.

And finally, provinces that do not already have pilot carbon markets are preparing to be covered by the national ETS. The national government conducted ETS-related trainings in these provinces throughout 2018, and several prepared studies on their own. The Sichuan government contracted a local consultancy for CNY 1 million (~€12.7 million) to study allocation, and Lu Liang city in Shangxi province spent CNY 1.2 million on GHG inventory development.

## PILOT ETS

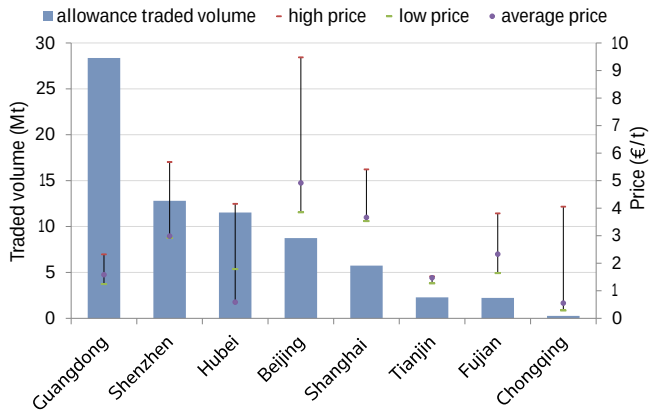
Just over 72 million allowances traded in the eight pilots in 2018 - the overall value of the market was €165 million. Both figures are slightly down from the previous year, in which 78 Mt traded and the market value was €171 million. The lack of pilot market inactivity in 2018 was particularly prevalent from January through May in 2018, in which period only 19 million allowances changed hands - this is less than 60 per cent of the volume traded during the same period in 2017. We attribute the low volumes to a decrease in the number of transactions involving financial products such as carbon repo deals, which is in turn due to financial institutions' lack of interest in such products absent actual trading in the national ETS. Pilot market action in 2017 had largely been in expectation of the

[1] *In this report, the rate is CNY 1= €0.127.*

national market entering into force, but now that trading in the latter will not begin anytime soon, interest on the part of liquidity providers has cooled. In contrast to previous years, local regulators did not encourage creation of new financial products: Hubei ceased the forward contracts it had started offering in May 2016 for 2016 vintage allowances – they were not available for 2017 vintage allowances. Unlike in previous years, there were few notable deals of carbon financial products in 2018.

Despite the lower volumes, overall average allowance prices edged up in all pilots in 2018 as almost all of them tightened their 2017 allocation to reduce oversupply - they did so by adopting tougher benchmarks and/or tougher emission reduction factors. Prices in Shanghai's carbon market, for instance, extended their long term upward trend and reached CNY 44/t on 30 July – the highest they have been since July 2014. In Hubei, the allowance price surged

**Figure 4.1: Traded volume and price on exchange[2] in Chinese pilot ETS in 2018**




*Source: Refinitiv*

to CNY 31/t on 9 August – a record high since the market started and also double the average price in 2017. The tightening occurred because officials from the Climate Change Department have hinted allowances of ETS pilots are not likely to be valid under the national ETS - regional authorities thus sought to reduce surplus allowances in their programmes.

Plans to expand pilots - either by covering entities in new sectors or by linking pilot regions - were abandoned. Shenzhen and Shanghai, for instance, had signed contracts with other provinces/cities on a possible expansion, but did not pursue the deal in expectation of the national ETS entering into force. Beijing's ETS covered cement firms located in neighboring Hebei province, but unofficially excluded these in 2018 since the national programme will only cover the power sector.

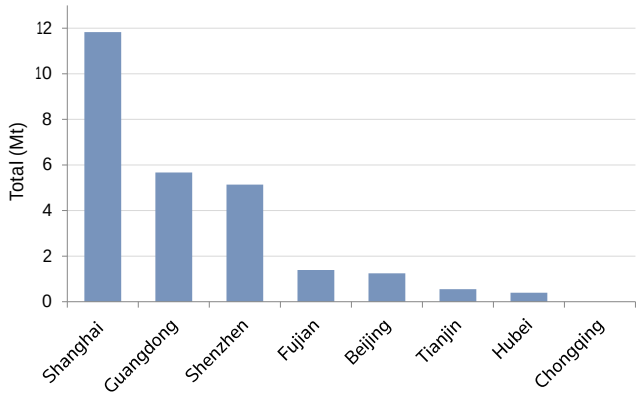
In terms of liquidity, Guangdong continued to top the list of pilots with over 28 million allowances traded. It accounted for almost 40 per cent of the eight pilots' collective traded volume for 2018. Shenzhen surpassed Hubei to become the pilot with the second most trading – nearly 13 million allowances changed hands. In line with efforts to decrease allowance surplus, Guangdong stopped auctioning 2018 vintage allowances: in previous years, 95-97 per cent of its allowances were allocated for free while the rest was auctioned quarterly - not offering those allowances for sale at all tightened the market and raised prices. Shanghai held a one-time auction on 31 July (its compliance deadline) to help short entities comply. In total, some 305,000 allowances were sold at the floor price of CNY 41.5/t to seven companies.

In Tianjin, trading only occurred from April to June due to a change in trading rules. The city's emissions exchange published requests to purchase allowances on behalf of covered entities. All trades took place bilaterally at CNY 10-12/t. The trading appears to be driven solely by compliance needs.

Despite the decreased interest in pilot market trading on behalf of financial institutions, several pilots' exchanges received major capital investments in 2018. In August, Chinese business giants Ant Financial and Beijing Automobile Group bought stakes in the Beijing Environment Exchange - the trading platform for Beijing's ETS. This elevated the exchange's registered capital from CNY 300 million to CNY 500 million. In April Ant Financial also became a shareholder of the Tianjin Emissions Exchange, the trading platform for Tianjin's ETS, with injection of CNY 78 million to its original registered capital of CNY 100 million. Ant Financial operates the world's largest mobile and online payment platform, and aims to expand its green finance business and bring in its customer resources for revenue generation.

On the administrative front, provinces underwent the same restructuring of climate change competency that occurred at the national level - completion of this at the local level did not occur until November in most provinces, where subnational counterparts of the MEE were established. All of the provinces and municipalities that run pilot ETS established an "Ecology and Environment Department" - though most did not disclose this new body's personnel, it has become clear that climate officials in these regions' Development and Reform Commission (DRC) were largely

**Figure 4.2: CCER traded volume in eight pilots in 2018**




*Source: Refinitiv*

*[2] Exchange trading includes both online and bilateral trading. Exchanges publish the price for online trading but not for bilateral trades, as the latter is negotiated by the counterparties. Exchanges do publish the aggregated value of both types of transactions. Thus high and low prices in this figure reflect online trading only, while the average price corresponds to the overall traded volume.*

transferred to the newly-created environment department, ensuring sufficient expertise remains in running pilot ETS.

In terms of compliance, pilots had initially set June/July 2018 as deadlines to surrender credits covering entities' 2017 emissions. Guangdong and Tianjin achieved 100 per cent compliance on time, while Beijing, Shanghai, Hubei and Fujian completed theirs only with extended deadlines. Chongqing did not even begin to verify 2017 emissions until November, and has not announced the result. In Shenzhen, seven entities failed to comply by the deadline, representing a collective shortage of 90,000 compliance units - they were issued a notice and are set to face penalties, with the final outcome not to be released. Overall compliance performance for each pilot is very similar to that in 2017 (for 2016 emissions compliance), except that officials extended the deadline longer. That in turn was due to delays caused by the government restructuring.

## OFFSET MARKET

The registry for CCERs (Chinese offsets) was suspended from December 2017 to 4 May 2018 for system upgrading, which negatively affected the national offset market (and caused some pilots to suspend offsets altogether) because offset credits could not be physically transferred. Only 26 million of CCER were traded across the eight pilot exchanges in 2018, which is 55 per cent of the amount (46 million) transacted in 2017. The online traded price of a CCER ranged from €1.3/t and €2.6/t, while the price of bilateral trading – the majority was traded bilaterally – was lower. Overall, due to lack of fresh supply, eligible CCERs for pilot ETS compliance secured a higher price compared to 2017. Among all pilots, Shanghai continued to have the most active offset trading: 12 million CCERs changed hands in 2018, accounting for nearly half of the total traded volume in all pilots. Guangdong was second with nearly 6 million CCERs changing hands. Chongqing was the only pilot without any CCER trading.

In terms of offset development, officials made frequent references to inclusion of forest offsets in the national ETS. However, the central government did not clarify when it will resume offset project registration and issuance since the suspension in March 2017. Altogether, some 2871 projects are in the offset pipeline, while 1047 projects have been registered. Since the regulator started issuing CCERs in 2014, around 72 million have been issued (see Table 4.1).

At the pilot level, offset developments were mixed as not every ETS includes local offset trading: local offsets are issued by the local Development and Reform Commission (DRC) as per the local approved methodologies and regulations. They are only traded and accepted in the pilot where they are issued. Guangdong, where covered entities may use offsets for compliance, saw regulators issue roughly 610,000 local offsets (known as PHCERs) in 2018: 410,000 went to forestry projects in June and 200,000 went to 10 projects (four solar power and six forestry projects) in late August. Guangdong also held four offset auctions over the course of 2018, selling 769,600 PHCERs. The clearing price of each auction was higher than the floor price and the closing price in the allowance market the same day. The latest such auction (in October) closed at CNY 22.5/t, a record high for Guangdong offset auction clearing prices. In the secondary local offset market, over 1.1 million PHCERs traded in 2018.

Local offset programmes are also gaining traction outside of the pilot ETS, with potential demand from voluntary buyers or as programmes to address rural poverty. Guizhou province launched a forestry offset market in July aimed at poverty alleviation - individuals and enterprises can buy credits voluntarily through a platform established by the local government, with the units purchased constituting emissions reduced through afforestation of areas operated by local low-income families. Guizhou aims to raise CNY 13 million and involve 10,000 low-income famers by 2020. Hubei, a northern Chinese province with significant heavy industry, released an action plan in October to launch a provincial offset market by 2020. Though Hebei is not one of the provinces with a pilot ETS, the initiative is intended to supply the eventual national carbon market with offsets - and to be a source for local offsets to promote carbon neutrality in the province. Hebei Energy and Environment Exchange will be the platform for local offset trading and is in charge of designing the programme's rules.

## OUTLOOK FOR 2019

Completion of the government reconfiguration cleared administrative hurdled to implementation of China's national ETS, and the Q4 statements by national officials indicate the programme will now be rolled out steadily. We expect the allocation method for the power sector to be published in Q1 2019. Draft regulations on verifier selection were distributed in late 2018, and we expect them

**Table 4.1: CCER issuance - Number of projects and volumes**

| # of Projects in pipeline | # of Projects registered | # of Projects with issued CCERs | CCER issued (Mt) |
|---|---|---|---|
| 2871 | 1047 | 400 | 72 |

**Table 4.2: Auctioned volume and clearing price of Guangdong local offset in 2018**

| | May | | Jun | Oct | Total |
|---|---|---|---|---|---|
| Auctioned volume (t) | 27,000 | 34,000 | 308,000 | 400,000 | 769,600 |
| Clearing Price (CNY/t) | 16.34 | 16.01 | 16.32 | 22.5 | / |

to be finalised in 2019 - these will unify the procedures and criteria for entities providing emissions verification services, which currently differ by province.

Beyond these already initiated developments, however, we do not expect an *acceleration* in national ETS implementation: massive training will be needed in regions that do not have ETS pilots. Both the 1700 power companies that will be covered and the thousands of local officials in charge of the national ETS in their jurisdictions have to learn about carbon trading, many under a new government configuration. Meanwhile, the set up of the national exchange remains unclear and the national registry was only recently contracted. The "master plan" of the national ETS issued in December 2017 states that 2019 is the year for simulation trading. We doubt whether actual trial transactions will occur (on a large enough scale to constitute a true simulation) in 2019 - if so, we assume they will not take place until late in the year.

Meanwhile, all eight pilots will continue to operate in 2019 (for 2018 compliance) in parallel with development of the national ETS. Shenzhen, Guangdong, Tianjin and Shanghai have already distributed the vintage 2018 allowances. Unlike in 2017 and 2018 (for 2016 and 2017 allocations), when they assigned tougher reduction factors or changed the allocation method from grandfathering to benchmarking for some sectors, they tightened the 2018 allocations mainly by updating the base years of benchmarks (eg. 2013-2015 emissions data for 2017 benchmark calculation but 2014-2016 data for 2018). We expect the other pilot ETS to allocate allowances shortly, and also to continue tightening allocation to absorb the surplus allowances accumulated from previous years. We expect allowance prices to remain at roughly 2018 levels in 2019. Pilots with offsets, including Guangdong and Fujian, will continue issuing them for compliance.

# 5. South Korea

Over 22 million allowances and offsets traded on Korea's exchange and in its one auction in 2018, with a total value of KRW 500 billion (€390 million). The allocation plan for 2018-2020 of the Korea ETS (KETS) was finalised in 2018, including monthly auctions starting in early 2019. Korean companies continued to cancel CERs for domestic offset use.

## MARKET OVERVIEW

More than 17 million allowances traded on the Korean exchange in 2018, over 90 per cent of which were the KAU-17 contract. This volume is only about 3 per cent of the programme's annual cap. Prices on the exchange ranged from KRW 21,500 to 24,000 (~€17-19) per tonne throughout 2018. In total, exchange-traded transactions of Korean compliance units (allowances and offsets) in 2018 were worth about KRW 400 billion (~€310 million).

The Korean government held its only auction of the year on 1 June 2018 ahead of emitters' annual compliance deadline. In total, 4.66 million out of 5.5 million KAUs on offer were sold at the auction, at a price of 22,500 KRW (€18.02) per unit. The auction thus added some KRW 105 billion (€84 million) to the total annual market value. Going forward, auctions will be held on a regular basis (see below).

However, exchange and auction data do not reflect the de facto market value in Korea: most transactions are done over the counter, with correspondingly low price transparency. We estimate that OTC transactions accounted for close to 90 per cent of actual total traded volume in 2018. The table below includes anecdotal data from Korea's main carbon credit brokerage and analysis firm Ecoeye on OTC volumes, though figures for the 2017 contract are not available.

**Table 5.1: Korean ETS trading summary in 2018**

| Product | Exchange-traded volume[Mt]* | Exchange-traded value [bn KRW] | OTC volume [Mt]** |
|---|---|---|---|
| KAU-18 | 1.7 | 38.73 | 10.63 |
| KAU-17 | 15.77 | 351 | Not available |
| Offset (KOC) | 0.24 | 5.66 | 1.65 |
| **Total** | **17.71** | **395.39** | **12.28** |

*source: Korean exchange
**source: Ecoeye

Counting only exchange-traded volumes and auctioned allowances, the traded (KAU and KOC) volume was 22.37 Mt and the market value was KRW 500 billion (€390 million) in 2018.

## OFFSET USE CONTINUES

The most internationally relevant feature of the KETS is that covered entities may offset their emissions by canceling CERs, the emission reduction credits generated by projects under the Kyoto Protocol's offset mechanism CDM. With CERs being worth less than one Euro on average (whereas KOCs trade at roughly the price of Korean allowances), Korean firms have taken advantage of the option to cancel CERs from Korean CDM projects and using them for compliance under the KETS. This has in turn become one of the only remaining steady sources of demand for CERs (see the CDM section of this report). So far, the Korean government has issued 24 million KOCs that can be used by companies for ETS compliance - of those, the vast majority are cancelled CERs from CDM projects.

In May, the Korean government finalised rules allowing CERs from non-Korean CDM projects to be converted to KOCs and used for compliance as well - for up to 5 per cent of an entity's compliance obligation, and provided the project is owned by a Korean company.

Korean companies have thus started developing new international projects under the CDM platform, with an aim to supply offsets to domestic market once the project starts emissions reduction activities. In 2018, the CDM Executive Board registered such a project in Bangladesh.

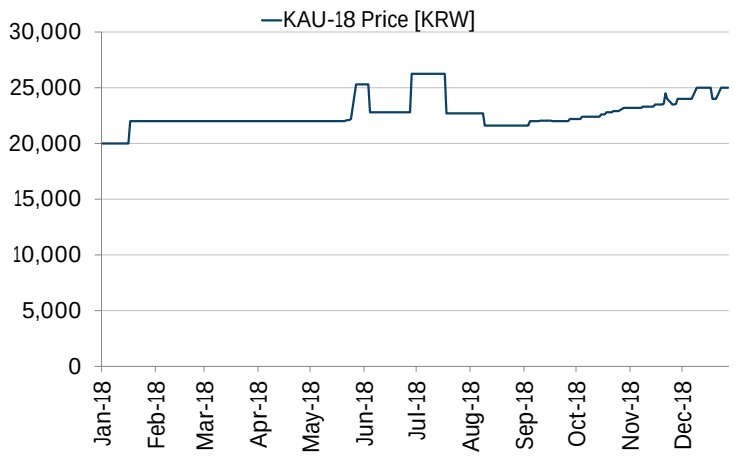
## PHASE 2 ALLOCATION DECIDED

In late October 2018, Korea's environment ministry decided on facility-level permit allocation plan for the ETS's second phase, which covers emissions in 2018, 2019, and 2020. Covered entities have been notified of their individual allocation, but the overall allocation plan was not made public. It is worth noting that 37 million Phase 1 allowances are banked into Phase 2.

In terms of allocation methods, the government announced that it will auction 20.69 Mt allowances in Phase 2, 7.95 Mt of them in 2019. The first such auction is on 23 January 2019.

Further expected changes to boost liquidity include allowing forward and futures trading - currently only spot transactions are allowed. As in China's national ETS, trading is limited to covered entities - banks and other financial institutions may not participate in the market, which severely dampens liquidity. The Korean government has indicated, however, that the ban on financials will be lifted starting with the programme's third phase in 2021. Officials said in December that in preparation for this, banks will be allowed to act as market makers from next June by trading KAUs lent to them by the government.

**Figure 5.1: Korean Carbon Price in 2018**




*Source: The Korea Exchange*

# 6. New Zealand

New Zealand allowance prices increased significantly over 2018 under expectations that a review of the ETS would result in an increased ceiling price (currently NZ$25), ending the year at all-time highs above that ceiling price. The review resulted in suggested reforms publicised at the end of the year, but those did not include an immediate change to the ceiling price. They spelled out design changes that would enter into force in 2020, including an annual emissions cap and auctioning of allowances. To what extent emitters will be allowed to use international credits for compliance, as well as whether and when the agriculture sector will be covered, remain undecided.

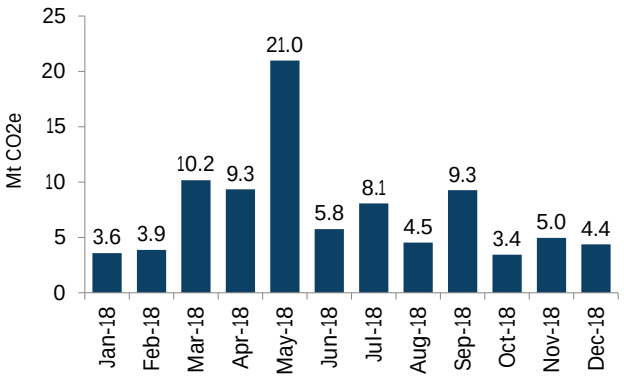
## MARKET OVERVIEW

Traded volume of New Zealand Units (NZUs) rose slightly from the previous year, totaling 88 million tonnes vs. 81 million in 2017. The total value of the market, however, increased by 34 per cent due to higher allowance prices. NZUs gained 22 per cent over the year and ended 2018 at NZ$25.12 (~€14.80).

NZU prices normally do not surpass NZ$25, since covered entities have the option to pay the government NZ$25 for every tonne by which they exceed their emissions limits instead of surrendering an NZU for that tonne. This "fixed price option" (FPO) is thus the programme's de facto price ceiling - but from late August 2018, NZUs regularly traded higher in expectation that the government's ongoing ETS review would result in new design rules that would increase demand, as well as in an increase to the FPO itself. NZU sellers (mostly the owners of post-1989 forests) abstained from trading, anticipating higher prices following the review outcomes. This cut supply, which in turn boosted prices.

NZUs hit their highest price ever (NZ$25.85) in mid-December, as regulators announced they would publish the long-awaited ETS review outcomes expected to include a change to the FPO. However, the revisions to the NZ ETS market design lacked an exact decision regarding the FPO: the fixed price will be replaced with a cost containment reserve, but decisions on its structure and what its trigger prices will be were punted to later rulemakings. The FPO will remain at its current price for now, and may be increased in 2019.

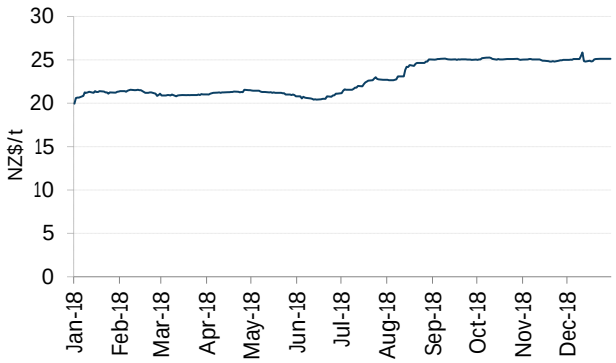
**Figure 6.1: NZUs monthly traded volumes**




*Source: New Zealand Environmental Protection Authority*

*The volumes in May are high due to New Zealand's 31 May compliance deadline for covering 2017 emissions.*

**Figure 6.2: NZUs - spot daily prices**




*Source: New Zealand Environmental Protection Authority*

## ETS DESIGN CHANGES

Other design changes were more definitive: the programme will feature an absolute cap determined 5 years ahead on a rolling basis, a portion of allowances will be auctioned rather than given out for free, and permanent post-1989 forests will be covered rather than categorised as a source of offsets. Permanent forest owners will thus participate in the scheme in the same way owners of other forests do, i.e. they will receive NZUs equal to the amount of CO2 their forests remove from the atmosphere and can sell those to other emitters.

But like the FPO details, several other issues were punted to this year.

- Forest sector emissions may be assessed through a methodology called "averaging," which would eliminate a surrender obligation for harvesting wood if the area is replanted.
- The government also has yet to define the eligibility of foreign offsets in the NZ ETS. Large industrial emitters are interested in using offset credits from projects outside the country, and New Zealand is one of a handful of parties to the UNFCCC that has explicitly expressed interest in using internationally tradable units to meet its commitment under the Paris Agreement - but the government appears to be leaning in the other direction, with its Climate Change Minister having said in early November that the country would prioritise domestic emission reductions over international credits.
- Whether the NZ ETS will finally cover agriculture, which accounts for half of the country's emissions, is also still under consideration. An interim Climate Change Committee, established by the government in April, explored this issue throughout 2018 on the back of several reports advocating inclusion of the sector - these included a draft report from the country's own Productivity Commission that urged the current

government to decarbonise its economy and specifically referred to covering emissions from agriculture, as well as analysis from the bank Westpac that showed New Zealand's 2030 target can be met if agriculture is covered from 2020.

By the original rules of the NZ ETS, under which an increasing amount of sectors were to be covered over time, the agriculture sector should have been included by now - but previous governments delayed its entry due in part to pressure from farmers. Farming, including raising livestock (especially sheep) is the largest source of emissions in New Zealand while sectors traditionally covered by an ETS (power and industry) account for proportionally fewer emissions because most of the country's electricity comes from hydropower.

### WHAT TO EXPECT IN 2019

The "2-for-1 rule" continues to be phased out, though we expect its bullish effect on the market to be dampened by the fact that the phaseout is expected. Non-forestry ETS participants (those from energy, industry, liquid fossil fuels and waste) had been allowed to surrender only one allowance for every two tonnes CO2 emitted, but that option has been on a pre-agreed phasout: emitters had to surrender enough units to cover 67 per cent of their 2017 emissions in 2018, with the share growing to 83 per cent of 2018 emissions for this year and 100 per cent of 2019 emissions in 2020.

The compliance deadline for 2018 emissions is the end of May 2019, but covered entities can comply as soon as they have their 2018 emissions verified, which occurs in January. Covered entities may try to complete their compliance as early as possible, while the FPO is still at NZ$25, on expectations that it could be raised anytime in 2019 before being replaced by the cost containment reserve in 2020. We expect NZU prices to remain high (and likely volatile) until this uncertainty around whether and by how much the FPO will be raised is resolved.

Prices may further hinge on signals from the government regarding the ETS design points that remain open (use of foreign offsets, inclusion of agriculture). A decision on changing the forest accounting methodology to "averaging" is most imminent in our view, but will not affect prices as it does not significantly alter long-term supply either way.

All the amendments decided in the late 2018 ETS review outcome are subject to a vote of New Zealand's parliament in 2019. If passed, they will enter into force in 2020.

**Table 6.1: NZUs - spot prices**

Closing prices for contracts on the last trading day of 2018 vs. 2017

| NZUs - spot (NZ$) | 2017 prices | 2018prices | Difference |
|---|---|---|---|
| | 20.60 | 25.12 | 22% |

# 7. Australia

After an unexpected leadership change in Australia's ruling coalition in August, the government abandoned the energy policy it had pursued during the prior part of 2018 - known as the NEG, this policy contained a measure that could have involved carbon credit trading. Despite clear evidence of Australia's fast-rising emissions, the new leaders claim Australia can meet its targets under the Paris Agreement without any climate change mitigation measures and are thus not pursuing policies related to carbon pricing. The two legacy climate policies still in place involve purchasing domestic carbon offsets. Given the weak emission reduction requirements for Australian companies, there is little demand for those offsets - and government funds earmarked for buying them have not been replenished. Volumes purchased at the two offset sales in 2018 were the lowest ever. All eyes are on the election in 2019: the opposition Labor party announced in late 2018 that its energy policies will include an emission intensity target for Australia's power sector, as well as climate change mitigation measures in other sectors.

### GOVERNMENT CHANGE KILLS ONLY PROSPECTIVE GHG CUTTING MEASURE

The year 2018 was marked by inconsistency on the climate policy front, with Prime Minister Malcolm Turnbull being ousted by his own governing coalition in August. The political grouping's internal disagreements centred largely around carbon pricing, with the conservative arm of his own Liberal Party opposing efforts to incorporate emission reduction into its energy policy. Prime Minister Turnbull was replaced by his treasurer Scott Morrison and Energy Minister Josh Frydenberg was replaced by then Cybersecurity Minister Angus Taylor, who stated in several media appearances that Australia is on track to achieving its Paris Agreement pledge and thus needs no carbon pricing or other greenhouse gas mitigation measures.

In fact Australia is set to miss its Paris target by about a billion tonnes CO2e without additional climate policies. According to figures published by the Department of Environment and Energy,

Australia's greenhouse gas emissions climbed 1.3 per cent from Q1 2017 to Q1 2018. The new leadership's official denial of this ends any carbon market related developments in the country going forward - except carbon pricing plans of the opposition parties, since those have a chance of being implemented should the opposition win in next year's elections. Surveys in late 2018 showed the opposition Labor Party ahead of the coalition of right-leaning parties that forms the current government.

Before Turnbull's ouster (i.e. during the first half of 2018), Australian carbon market developments had centred around the ruling coalition's only measure related to carbon trading: its proposed energy policy called the National Energy Guarantee (NEG), aimed at increasing the country's energy security and reducing the carbon intensity of its power sector. The latter component would have required Australia's retail power providers to keep their net emissions intensity under a certain threshold - doing so could have involved trading of credits to meet the requirements for emissions per unit of output, and those credits could have included Australian Carbon Credit Units (ACCUs) and/or other offsets. Whether and how such a market component would be incorporated into the NEG was under discussion until the Liberal Party leadership change, which ironically occurred largely because the conservative wing of the Liberal Party wanted to scrap the emission intensity component of the policy to make it about energy security only. Under Morrison, the government has abandoned the NEG entirely.

Given that it would have only addressed the power sector, and that the carbon intensity reductions it would have required represent that sector's business-as-usual trajectory, an early 2018 analysis found that the NEG would not have contributed significantly (if at all) to emission reduction in Australia - but the potential for using credit trading of some kind to meet the emission intensity requirement left room for some form of carbon market related mechanism in the country. Now even that scenario is off the table, so Australia continues to lack carbon pricing despite having been on the verge of adopting an emissions trading system under some of the six prime ministers it has had in the last decade.

## EXISTING MEASURES PLOD ALONG

Two emission reduction mechanisms started by previous government constellations remain operational in Australia: the Safeguard Mechanism (SM) launched in 2016 and the Emission Reduction Fund (ERF), which buys ACCUs via auctions on behalf of the government since early 2015.

The SM sets emission intensity benchmarks for companies in the electricity, mining, oil, gas, manufacturing, transport and waste sectors (which together account for about half of Australia's greenhouse gas emissions) based on historical baselines. If a firm's intensity exceeds its baseline, it must offset the difference with domestic emission reduction credits (ACCUs). Given that the rules of the SM allow firms to largely self-determine their baselines and to exceed them under certain circumstances, achieving the required intensity levels has not involved much emission reduction and hence create much demand for ACCUs. In early 2018, the Clean Energy Regulator released data from the first year of Australia's SM operation showing that all the companies that reported in 2018 on their 2016 – 2017 emissions stayed below their baselines - in total, those 203 firms purchased only 448,097 ACCUs to do so.

## DOMESTIC OFFSET PRICES AND VOLUMES DOWN

The lion's share of ACCUs generated so far (and set to be generated in future by ongoing projects), were acquired by Australia's ERF. The ERF has already spent over 90 per cent of its budget, having contracted around 193 million carbon units over the past three years. It now holds only about A$200 million with which to buy further ACCUs and has not been replenished as originally envisioned upon its creation.

However, Australia's new environment minister Melissa Price announced in September that she would push for ERF replenishment as a part of the country's budget to be finalised in May 2019. That statement, repeated in an October media interview, has not incentivised new project development so far - demand for ACCUs remains low. The ERF held two reverse auctions in 2018, at which the regulator purchased the lowest volumes ever: the most recent auction in December saw the government contract just 3.27 million ACCUs at an average price of A$13.87 (~€8.66) each.

In early 2018, New Zealand based brokerage OM Financial started quoting daily ACCU closing prices based on Sydney exchange information to bring more transparency into the ACCU market. Based on this data, ACCU prices decreased slightly from A$15.50/t in late April (when price quoting started) to A$15.37/t (~€9.60) in late December.

## WHAT TO EXPECT IN 2019?

The federal elections planned for May this year are key to carbon markets in Australia, as the current government will pursue no policies related to emissions trading. The country remains party to the Paris Agreement without actually attempting to achieve its commitment under the deal, as the current government denies its own findings that rising emissions challenge its ability to meet its Paris pledge.

With recent polls showing a decrease in the popularity of the ruling coalition, the opposition Labor party announced its energy policy in late November - measures include reintroducing the NEG with a carbon intensity reduction component more stringent than the one originally proposed under Turnbull. The new version of the scheme would require the carbon intensity of Australia's retail electricity sales to be 45 per cent below their 2005 levels by 2030, whereas the previous version aimed at a 26 per cent intensity reduction.

Labor also promised to come up with emission reduction policies for other sectors like manufacturing and transport, possibly by tightening the lax baselines of the above-mentioned SM and converting it into more of a "baseline-and-credit" scheme to increase demand for ACCUs.

# 8. CDM

CDM project inflow and CER issuance were low in 2018, while CER trading was mostly supported by domestic initiatives (South Korea's ETS and Colombia's carbon tax). The annual UN climate summit (COP) at the end of 2018 failed to provide clarity on the future of the CDM, pushing a decision on the post-2020 fate of the mechanism to future negotiation rounds. This will prolong the current uncertainty regarding the potential use of CERs to meet countries' commitments under the Paris Agreement until the next UN climate summit in Chile. It also affects negotiations around the international offsetting scheme for aviation emissions (CORSIA - see our aviation market comment), which has yet to decide offset eligibility rules. Given the lack of decisions on all these fronts, we expect another year of uncertainty and lack of demand for CERs.

## CDM MARKET SLOW, SUPPORTED BY REGIONAL INITIATIVES

Close to 15 million CERs traded in 2018 according to our estimates - this represents a decrease from 21 million in 2017. The value of CER transactions, however, increased vs. the previous year to €32 (€23 million for 2017). Lower traded volumes were mainly a result of decreased activity in several CER-buying initiatives, including the World Bank's Pilot Auction Facility and governments of some European countries. Germany, for instance, purchased considerable volumes of CERs back in 2017 - instead, compliance to domestic carbon reduction programmes in Colombia and Korea was the source for most CER demand in 2018.

Korea currently allows entities covered by its ETS to use CERs from Korean CDM projects to fulfill their compliance obligations - the units are converted to domestic offsets (KOCs). With Korean allowance prices being relatively high and rising, CERs earmarked for KOC conversion sold at prices orders of magnitude higher than the average CER prices seen in most large volume transactions of 2017 - to the extent that the 2018 CDM market value is higher than that of 2017 even though volumes were lower. The government of Korea changed the ETS's offsetting rules in 2018, allowing emitters to use CERs from projects outside Korea for compliance, as long as a Korean entity is involved in the project. This will continue the (small) degree to which Korea's ETS creates demand in the CDM market.

Colombia implemented a carbon tax in 2017 that allows emitters to cancel CERs in lieu of paying the $5/t fee - starting in January, the CERs were only allowed to come from projects in Colombia. The policy has increased demand in the CDM market, since CER prices average well below $5/t. Local market players estimate the average price for CERs canceled to offset Colombian emitters' carbon tax obligations was $3.0-3.5/t per tonne over 2018. Like those of Korean emitters, the comparatively small volumes purchased by Colombian emitters disproportionally raised market value vis-à-vis 2017 because of the vastly higher prices those emitters paid for the CERs.

The price of secondary CERs rose slightly over the course of 2018, starting the year around 17 cents and ending at 26 cents in December. Volumes remained low, however: only 7 million CERs traded on exchanges all year.

## LOW PROJECT INFLOW AND CER ISSUANCE, CANCELLATIONS STABLE

Just a handful of new projects either started the CDM project cycle or were registered in 2018, compared to roughly 20 per day in the CDM's heyday 5 years ago. Furthermore, six projects deregistered from the CDM in 2018, presumably to try their luck under other carbon credit programmes like a voluntary offset standard. Issuance continued to be low – only 79 million CERs were granted to CDM projects in 2018, which is nearly half the volume issued in 2017.

CER cancellations from the UN registry, however, increased: 11 million CERs were cancelled in 2018, close to 65 per cent by Colombian and Korean emitters for the compliance purposes explained above. The rest of the CERs were cancelled under different voluntary initiatives, such as offsetting emissions for corporate social responsibility programmes and making events carbon neutral. The predominance of cancellation for compliance rather than voluntary purposes confirms that voluntary demand remains unstable.

## CDM EB UNABLE TO ADDRESS LOW DEMAND

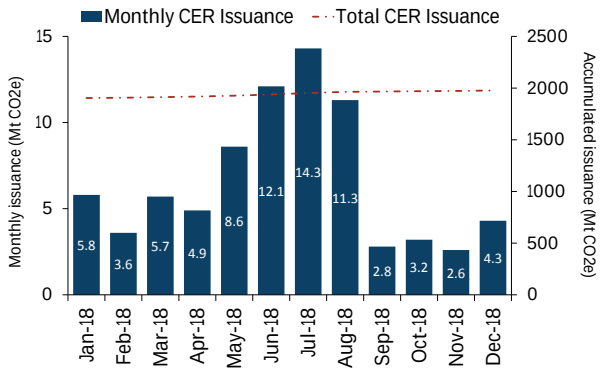
The CDM Executive Board (CDM EB) had its usual set of regular meetings over the past year, most of which involved simplifying and streamlining the CDM project cycle as well as trying to make the mechanism more attractive for potential developers and CERs buyers. The changes adopted are rather insignificant given the continued uncertainty around the fate of the CDM, as they cannot increase the market's main problem of extremely low demand. The EB promoted the use of the CDM among voluntary offsetters and emerging compliance initiatives.

**Table 8.1: CERs by segment**

| | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|
| | Mt | € million | Mt | € million | Mt | € million | Mt | € million |
| Primary | 50 | 63 | 38 | 60 | 11 | 18 | 8 | 30 |
| Secondary | 50 | 24 | 11 | 3 | 10 | 5 | 7 | 2 |
| **Total** | **100** | **87** | **49** | **63** | **21** | **23** | **15** | **32** |

The international aviation sector and its offsetting scheme (CORSIA), set to start in 2021, represent the largest potential source of demand for CERs - but it remains unclear which CERs (if any) will be eligible to offset air carriers' emissions (see aviation market comment). According to various projections, airlines will need to offset 2 to 3 billion tonnes of CO2-equivalent to achieve CORSIA's goals of reducing aviation sector emissions growth between 2021 and 2035. CDM is one of the key projected suppliers of offsets, but the global aviation organisation ICAO and its member countries have not agreed what types of offsets will be eligible. In late 2018, more than 60 civil society organisations officially requested ICAO not to let CERs into the aviation agreement, as they question the additionality of most CDM projects. Whether CERs will be eligible for use under CORSIA (and if so, which project types and/or vintages) remains uncertain, also because any post-2020 mechanism for trading emission reduction credits must be aligned with the Paris Agreement in order to avoid double counting.

**Figure 8.1: CERs issuance by month in 2018**




*Sources: Refinitiv*

## COP24: NO DECISION ON CDM'S FATE POST-2020

Among other issues, December UN meeting (COP24) held in Katowice address the question of post-2020 carbon markets, including the future role of the CDM. The Parties were divided on whether to allow reductions that took place before 2020, as many reports question the additionality of Kyoto era CDM credits. Most industrialised country parties oppose applying the CDM's governing structure to a "new" market mechanism under the Paris Agreement, which would be known as a Sustainable Development Mechanism (SDM). However, countries that host the majority of CDM projects - Brazil and China – are vehemently committed to continuing the mechanism.

Only a handful of countries - including Canada, South Korea, New Zealand and Switzerland - have explicitly stated they would meet their Paris Agreement commitments using offsets, meaning credits for emissions reduced in other countries such as CERs.

**Figure 8.2: CERs issuance by project host country and project type**

| Country | Amount issued (Mt $CO_2e$) |
|---|---|
| China | 1,087 |
| India | 250 |
| Republic of Korea | 177 |
| Total three | 1,515 |
| Share of total issuance | 77% |

| Project-type | Amount issued (Mt $CO_2e$) |
|---|---|
| Industrial processes | 910 |
| Renewable energy | 617 |
| Energy efficiency | 173 |
| Total three | 1,701 |
| Share of total issuance | 86% |

*Source: Refinitiv*

*Listed are the three host countries and project types accounting for the largest share of CER issuance in 2018*

## WHAT TO EXPECT IN 2019

The text on Article 6 of the Paris Agreement remains bracketed, showing the parties' the lack of agreement. The draft rulebook resulting from Katowice includes a number of options for the CDM, from completely transferring the mechanism and its credits to completely scrapping them. The matter is to be negotiated further at the next UN talks, making these the key events of 2019 for CDM market stakeholders.

Meanwhile, we do not expect any increases in the CDM project pipeline or issued volume. CER trading will continue to be bolstered mainly by compliance to regional carbon pricing initiatives that allow CERs as offsets, as it was this year by the policies of Colombia and South Korea. Chile may join the list of countries allowing CERs for compliance with domestic carbon pricing initiative by incorporating offset use into the carbon tax it is currently developing, though implementation of that tax may not occur until after 2019.

ICAO's CORSIA negotiations are complicated by the lack of clarity on post-2020 carbon market regulations. We doubt that ICAO would make any offset types eligible for CORSIA compliance that are not in line with the Paris Agreement's Article 6. Thus, the delay in defining the CDM's role at the international level under the Paris deal may also postpone the decision on CORSIA-eligible offsets.

An overall agreement on the PA rulebook at COP24 stranded on disagreement over carbon markets/Article 6. We expect these discussions to take the centre stage of the much of the negotiations leading up to COP25 in Chile.

# 9. International aviation emissions

The International Civil Aviation Organization (ICAO) in June adopted rules for its Carbon Offset and Reduction Scheme for International Aviation (CORSIA), through which air carriers from most major countries will offset emissions from international flights starting in 2021. Those rules set standards for monitoring, reporting and verifying emissions from flights, but they do not specify which offsets will be eligible. Until they do, the potentially huge source of demand for offset credits globally (airlines) is in limbo. China was thought to be among the over 70 countries voluntarily starting offsetting under CORSIA from 2021, but in July announced it was not committed to that start date. This decreases the potential effects of the programme, since Chinese airlines account for about 10 per cent of international aviation emissions. Procedural requirements for adopting CORSIA rules pitted EU institutions against each other at the end of 2018, and failure to determine the fate of international offsets beyond 2020 at December's UN climate summit is further delaying ICAO's decisions about offsets.

## SOME CORSIA RULES ADOPTED

The International Civil Aviation Organization (ICAO) adopted rules for its Carbon Offset and Reduction Scheme for International Aviation (CORSIA), through which air carriers from all countries will have to offset the emissions from international flights because these are not covered by the Paris Agreement. *That* they will have to do so was decided back in 2016, but *how* such offsetting will work is being laid out via so-called Standards and Recommended Practices (SARPs) that ICAO members must adopt - in the case of CORSIA, the SARPS are the offset programme's "rules." ICAO's official adoption of the SARPs in June thus constituted the year's major milestone for carbon trading in the aviation sector - but to the frustration of carbon market stakeholders, those rules determine only questions around monitoring, reporting and verification. The only factors essential to the carbon market, namely which offsets will be eligible (along with other controversial decisions about definitions of biofuels) were punted to future meetings because member countries could not agree on them. Countries essentially adopted a set of rules with placeholders for those crucial elements, leaving CORSIA as a whole in a fragile state going forward.

Adding to the discord, ICAO procedural requirements around implementing the SARPs caused clashes among EU institutions - the EU Parliament, keen to maintain its pricing of international aviation emissions under the EU ETS, wanted member states to express reservations about CORSIA, whereas the EU Commission wanted member states' official ICAO filings to support CORSIA implementation. With ICAO processes renowned for their intransparency, countries' official submissions have not been made public - we expect more information to come out in early 2019.

## DETAILS - WHAT'S APPROVED, WHAT'S MISSING?

The SARPs as adopted include monitoring, reporting and verification (MRV) rules, as well as use of an aviation-specific CO2 reporting tool. From January 2019, airlines must report their fuel consumption and emissions levels in preparation for the start of CORSIA's first voluntary phase in 2021. The second voluntary phase begins in 2024, and offsetting becomes mandatory in 2027. During the initial stages, CORSIA will only apply to international flights between states that have volunteered to take part.

Though common methods for assessing emissions are essential to carbon trading, what will shape the market is *which offsets are eligible* - disagreements about this continued during the ICAO council's 215th meeting in November and remain unresolved. China and Brazil want their domestic offsets to count, which would open the door for a surplus of old Kyoto credits of low environmental integrity. That in turn undermines CORSIA's ability to cut emissions from aviation, and would lead to an oversupplied market and low offset prices. The U.S., which was not a party to the Kyoto Protocol, opposes eligibility of old Kyoto credits - so does the EU, on grounds that they weaken the programme's carbon cutting effect.

The other major unresolved issue concerns the *definition of biofuels* under CORSIA - though it does not relate directly to offsets, it affects potential demand for them. ICAO members are at odds over what should constitute "biofuel," with some (EU countries) wanting a narrow definition to preserve environmental integrity and others (Brazil) wanting biofuels derived from monoculture plantations to count - still others (oil-producing nations) want conventional fuel refined in facilities powered by renewable power to count as biofuel or 'alternative fuel.' The broader the definition, the greater the extent to which alternative fuel use covers airlines' required emission reductions - which in turn decreases demand for offsets and thus decreases prices.

## WHO IS IN AND WHO IS OUT?

Countries had to inform ICAO before October 22, the date on which the SARPs became effective, if they disapproved of any part of them. Though countries' communication to ICAO is not made public, available information indicates that no country registered an official disapproval. However, in June advocacy organisations publicised communications of some European countries to ICAO from back in early 2018 that expressed reservations about the weakness of CORSIA's targets and strong preferences for strict offset eligibility. This sheds light on the precariousness of the agreement beyond the set MRV components, with the wording of some countries' communications suggesting they would back out of CORSIA altogether if offset and biofuels criteria end up too weak.

Further uncertainty arose in July, when China removed itself from the list of countries applying CORSIA from its first voluntary phase starting in 2021. This list had included 73 countries whose air carriers account for 90 per cent of global aviation emissions. China and the U.S. had announced their intent to participate in a separate joint climate change declaration, but China said this did not constitute an official listing under ICAO's tally. Given that China accounts for more than 10 per cent of the world's aviation emissions, CORSIA now faces a considerable gap in coverage in the first phase. The U.S. still intends to start CORSIA from 2021, as the country signed on to the ICAO deal under the Obama administration and the current administration has not withdrawn this commitment.

Countries had to inform ICAO before 1 December if any differences exist between the adopted SARPs and their national regulations on 1 January 2019 – for typical SARPs, this reveals the relevant measures' initial legitimacy as member countries work to incorporate the agreed standards into their own laws. For CORSIA, however, the act of "filing a difference" was complicated by the fact that key parts of the overall SARPs remain undecided - ICAO members were left evaluating only the MRV components' compatibility to their national standards and assuming they will regulate offsets and biofuels when those are decided.

ICAO has not made public whether, how many, or which countries filed a difference - but the issue threw up internal conflict within EU institutions in November because European ICAO member countries are also EU Member States subject to the EU ETS. The latter covers intra-European aviation emissions, and represents the only "leverage" countries have over CORSIA's stringency: the EU will consider to include emissions from all international flights to and from Europe (not just intra-EU ones) under the EU ETS if it deems final CORSIA rules less effective at reducing global aviation emissions. This has long created an incentive within ICAO to make CORSIA ambitious or risk subjecting air carriers to differing regulatory regimes.

Members of the European Parliament, finding CORSIA's rules weak already, encouraged Member States to file a *reservation* (stronger than a "difference") to ICAO to prevent CORSIA's rules from applying to the flights currently covered by the EU ETS. The EU Commission, on the other hand, is concerned the hard-fought CORSIA agreement might collapse altogether if the very countries fighting for it to be ambitious file reservations rather than differences - the Commission therefore told European ICAO countries to file a "normal" difference that leaves room to accommodate the SARP elements yet to be decided within ICAO. It provided a template for this, which we suspect many countries used if they filed a difference. EU parliamentarians in turn balked at having had their recommendations to Member States in ICAO overridden.

## MORE CHALLENGES IN 2019 AND BEYOND

Internal wrangling aside, the EU is currently adapting its aviation MRV legislation to that of CORSIA, introducing corresponding amendments to monitoring rules. The Commission published a so-called delegated act under the EU ETS Directive on 28 November that sets out additional verified emissions information that airlines must report for mandatory compliance under the MRV rules of CORSIA's SARPs. The delegated act was open for public comment through 26 December, and once adopted by the Commission, Parliament and Council have two months to formulate any objections. If they do not, the delegated act enters into force. This would render the EU's aviation MRV rules "CORSIA-compliant" within Q1 of 2019.

The real question of "CORSIA vs. EU ETS" will come when ICAO sets standards for offset eligibility and biofuels - the EU will review CORSIA in 2019-2020 to decide if its rules are in line with the EU's climate ambition. They would not be applied until the start of CORSIA's first voluntary phase in 2021, in which the EU remains committed to participating. Until then intra-EEA flights will continue to be covered by the EU ETS.

Further complicating the issue, COP24 failed to decide the fate of the CDM (the offset mechanism under the Kyoto Protocol) after 2020. This renders the status of old Kyoto credits (CERs) uncertain, which in turn puts the breaks on deciding whether they are eligible under CORSIA. Whether and how emission reductions from projects that avoid deforestation (so-called REDD credits) will be tradable credits that can be used as offsets by air carriers also depends on the outcome of further discussion in the UNFCCC, specifically on the Paris Agreement's Article 6.

With CORSIA's offset eligibility thus linked to further UNFCCC negotiations and the EU's position in in turn depending on the stringency of ICAO's SARPs, operators prefer not to start purchasing carbon credits - they do not know what offset project types (and from what years) will count for compliance. The first compliance deadline for the ICAO scheme does not fall until 2024, however. This leaves half a decade for air carriers to cover emissions from the first 2021 – 2023 CORSIA period.

## Contacts


**EDITORIAL ENQUIRIES**
Hæge Fjellheim
hege.fjellheim@refinitiv.com
Tel +47 23 31 65 09

**OTHER ENQUIRIES**
Refinitiv Carbon Team
Dronning Eufemias gate 16
0191 Oslo, Norway
www.refinitiv.com


**THE FINANCIAL AND RISK BUSINESS OF THOMSON REUTERS IS NOW REFINTIV**

Refinitiv, formerly the Financial and Risk business of Thomson Reuters, is one of the world's largest providers of financial markets data and infrastructure. Serving more than 40,000 institutions in over 190 countries, we provide information, insights, and technology that drive innovation and performance in global markets. Our 160-year Reuters heritage of integrity enables customers to make critical decisions with confidence, while our unique open platform, best-in-class data, and cutting-edge technology bring greater opportunity to our customers. By advancing our customers, we drive progress for the entire financial community.



REFINITIV™