Emissions Trading Worldwide

International Carbon Action Partnership (ICAP)
Status Report 2018

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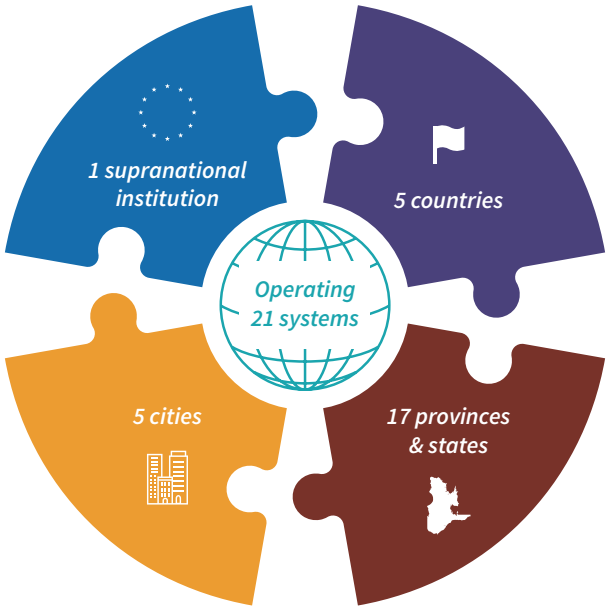
Foreword

Messages from the ICAP Co-Chairs

In the first year since the entry into force of the Paris Agreement, emissions trading worldwide has once again taken a significant step forward. Developments in 2017 bring the global ETS count to 21 systems in operation in early 2018, at different levels of government. With the launch of the Chinese national ETS, the share of global emissions covered by a domestic ETS has reached almost 15%. Now, economies with an ETS in place produce more than 50% of global GDP and are home to almost a third of the global population. These figures reflect the steady expansion of ETS policy and the strengthening of implementation around the world.

The culmination of several years of hard work, 2017 has seen the emergence of three new ETSs as well major reviews, reforms and new legislation in four of the world's pioneering systems: the Western Climate Initiative (WCI) jurisdictions of California, Québec and Ontario; the Regional Greenhouse Gas Initiative (RGGI); the European Union ETS (EU ETS); and the New Zealand ETS (NZ ETS). The reforms are coming at a crucial time, as policy-makers are taking the lessons onboard from the past years of ETS operation, while sharpening their systems in preparation for the declared climate targets of the next decade and beyond. In this regard, the effect of the Paris Agreement has been to crystalize the international response into national and sub-national commitment to climate action, providing momentum to domestic policy at all levels of government.



From Local to Supranational
28 jurisdictions are implementing 21 ETS across scales

In this ICAP Status Report, we will look into the technical details of the recently completed reforms, as well as to the launch of the Chinese national ETS and other promising developments. Starting with WCI, in 2017, both California and Québec have successfully extended their ETS regulations and cap trajectories until 2030, strengthening confidence in an increasingly stringent long-term carbon price signal in the linked WCI carbon market. Especially critical was this accomplishment in California, the largest WCI partner, where the extension resulted from a hard-won political battle in the Californian legislature, with strong political leadership by Governor Brown on the issue. The new law in California endorses one of the steepest cap trajectories worldwide (4% per year in 2021–2030), to meet California's climate goal of 40% below 1990 levels by 2030. Importantly, the law was passed with a two-thirds majority in the legislature, insulating the program from future legal challenges. In a further welcome development, Québec and California concluded and signed a new linking agreement with the Canadian province of Ontario, which officially joined the WCI carbon market on 1 January 2018.

On the eastern seaboard of the United States of America, the nine RGGI participating states this year settled on the parameters to guide their ETS through the 2020s. The states equally endorsed a cap trajectory until 2030, corresponding to a 30% cap reduction compared to 2020 levels. With five Republican and four Democratic governors currently leading the states, the RGGI reform process demonstrated that ambitious bipartisan climate policy is possible in today's United States of America. They also continue to innovate ETS design with a new tool to balance supply and demand in the RGGI carbon market—the Emissions Containment Reserve—which reduces the cap when the allowance price falls below a trigger level, indicating that mitigation in the system is cheaper than expected.

The pioneering EU ETS has also reached an important milestone in 2017. After more than two years of negotiations, the reform process to prepare the EU ETS for the period up to 2030 was completed. Perhaps even more than anticipated, the reform helps reduce the current surplus in the EU allowance market by increasing the stringency of the Market Stability Reserve. This also includes a provision to permanently remove excess allowances from 2023 onward and thus raises the prospect of carbon prices that "bite" in the second half of the 2020s. Importantly, the reform also allows member states to unilaterally cancel allowances to compensate for overachieving domestic policies and actions. The question of whether there is a need for further measures to bolster the carbon price, such as a price floor, is set to remain a hot topic for discussion over the next few years, with proponents considering action at the national level or through a "coalition of the willing".

Over the last two years, the NZ ETS has been subject to an in-depth review, which identified both operational strengths and fundamental shortcomings. The proposed reforms seek to make New Zealand's central climate policy fit-for-purpose to reach their 2030 target. The reforms aim to give policymakers the tools to better manage the supply of allowances, and bring more predictability to the market. While auctioning a share of allowances is now planned by 2020, perhaps more important is the intention to announce decisions on unit supply volumes five years in advance. In an exciting development, the new government has recently indicated that the agricultural sector may be brought into the NZ ETS in the coming years. This would be a world first, making New Zealand a pioneer in using emissions trading for both forestry and agriculture, with significant potential for lessons to be transferred to other regions that are considering carbon pricing and where land-use is a major source of emissions.

While established systems have been busy implementing improvements, the last year has also witnessed significant development of new systems. The province of Ontario, the largest Canadian province, has established a new sub-national ETS, bringing the share of emissions covered by carbon pricing instruments in Canada close to 80%. On the other side of the Pacific, in the last days of 2017, China launched its much-anticipated national ETS, overtaking the EU as the world's largest carbon market. China's ETS will initially target companies in the power sector, with the expectation of other sectors being included gradually. Considering the ambitious timeline and momentous challenge of building a carbon market of this size in a country as diverse as China, this achievement is a testament to the hard work and dedication of policymakers and experts there. With the first phase characterized as a "learning phase" by the national government, we expect to see ongoing developments and consolidation of the Chinese national ETS in the years to come. Important steps are also being taken in South Korea, where phase two of the Korean emissions trading system (KETS) begins this year. There, consultation has recently begun on the long-term pathway of the KETS up to 2030, with a view to aligning the instrument with the objectives of the Paris Agreement.

In sum, while the challenge of climate change grows with every year, so also does the competency and determination of the policy response. In this sense, we are confident that ETS is bound to its promise of delivering a cost-effective tool for implementing national pledges under the Paris Agreement. A wide range of actions are taking shape across all levels of government, from the municipal level all the way up to the international level. This last year has shown that sub-national governments in particular have a vital role to play. From ICAP, we thank you for your motivation and engagement, and we look forward to another year of steady progress towards our common goal.

Jean-Yves Benoit
Co-Chair of the International Carbon Action Partnership, Carbon Markets Division, Québec Ministry of Sustainable Development, Environment and the Fight Against Climate Change

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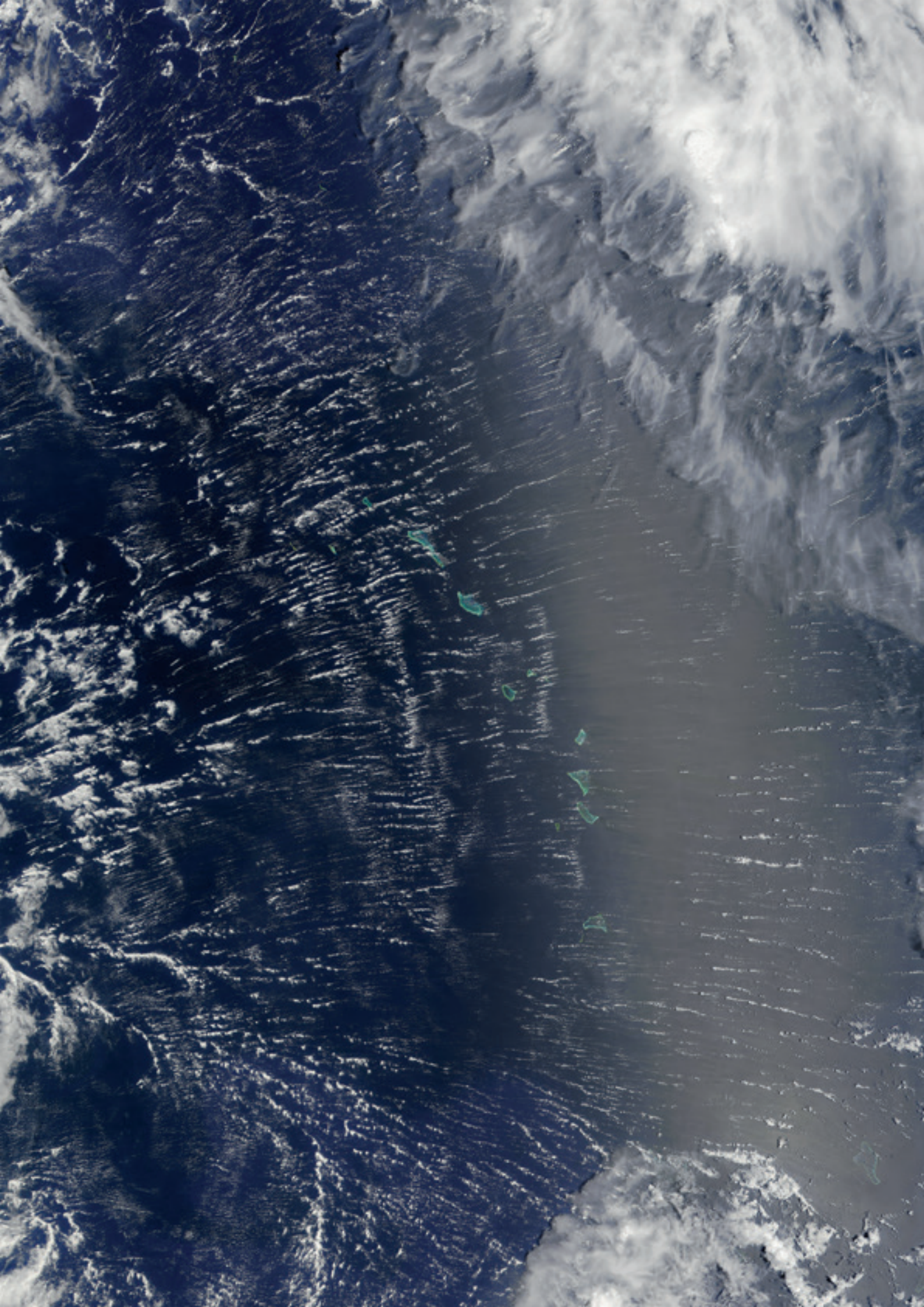


Practitioner Insights
Designing Cap-and-Trade

In this section, ETS policymakers from around the world discuss the latest trends in emission trading in their jurisdictions, drawing on their own practical experiences and the latest analyses. Addressing recent legislative successes in California, David Clegern and Mark Sippola of the California Air Resources Board outline how the Cap-and-Trade Program is set to achieve the ambitious climate targets for 2030. With agreement on innovative reforms, the RGGI states show that bipartisan climate policy is still possible in today's United States of America. Lois New of the New York State Department of Environmental Conservation and William Space of the Massachusetts Department of Environmental Protection examine the upcoming changes in the RGGI system including the new Emissions Containment Reserve. Having reached a milestone agreement in 2017, the EU ETS faces a package of reforms. Dirk Weinreich, Helen Monzel, Lisa Katharina Schmid and Angelika Smuda from the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety provide deeper insights into the EU ETS reforms including an analysis of changes to the Market Stability Reserve. Also, with the conclusion of a comprehensive review process, Eva Murray, Charlotte Berg and Sarah Deblock, of the New Zealand Ministry of the Environment, describe how New Zealand's ETS review and reform outcomes can make the NZ ETS fit-for-purpose in the Paris Agreement world. In a historical achievement, China recently launched the world's largest carbon market. Qian Guoqiang and Huang Xiaochen from SinoCarbon Innovation & Investment Co. Ltd. provide deeper insights into China's national ETS and explain why there is good reason to be optimistic for the path ahead. Finally, policymakers from three of Latin America's emerging carbon markets, Nicolás Westenenk of the Partnership for Market Readiness in Chile, Victor Escalona of the Mexican Secretariat of Environment and Natural Resources, and Sebastián Carranza of the Colombian Ministry of Environment, share their personal insights into climate policy, priorities and collaboration in their countries.

California Cap-and-Trade Program

Recent Developments and Future Direction

David Clegern and Mark Sippola
California Air Resources Board

California Cap-and-Trade Program background

California's governors and legislature prioritize public health and the environment. A series of executive orders and laws have generated policies and actions across state government, among local and regional governments, and within industry. These policies also have encouraged collaboration with federal agencies and spurred partnerships with many jurisdictions beyond California's borders. Moving forward, California will continue its pursuit of collaborations and advocacy for climate change action. California is on track to reduce statewide greenhouse gas (GHG) emissions to at least 1990 levels by 2020 and has developed a Climate Change Scoping Plan to further reduce GHG emissions to 40 percent below 1990 levels by 2030. The California Cap-and-Trade Program (the Program) is a key element in California's portfolio of measures to achieve these goals.

The Program began in 2013 as one of a suite of measures developed in response to the California Global Warming Solutions Act (Assembly Bill (AB) 32), 2006. It sets an aggregate emissions limit on over 400 entities responsible for about 80 percent of California's GHG emissions, incentivizing production efficiency and driving the transition to cleaner fuels and more efficient energy use. Successful implementation of AB 32 initiatives has kept California on course to achieve its 2020 emissions target, even as the state's population and economy have grown.

"Recent legislation, recent updates to the Cap-and-Trade Regulation (the Regulation), and upcoming changes for the Program post-2020 aim to build on these achievements to reach goals set for 2030 and beyond."

Recent California legislation

Two pieces of legislation passed in July 2017 help to clarify and focus the Program. AB 398 expressly supports the California Air Resources Board's (CARB) authority to continue the Cap-and-Trade Program beyond 2020 and directs CARB to modify certain aspects of the Program after 2020. Details of the AB 398-required changes to the Program are outlined below. As companion legislation to AB 398, the legislature also passed AB 617, which recognizes the efforts of California's environmental justice community to push the state to better address local, non-GHG air pollutants. This bill requires strengthening community-level air monitoring and the development of a statewide strategy to further reduce health-damaging air pollutants in communities with high cumulative exposure levels.

Disadvantaged communities bearing disproportionate pollution burdens will see improvements in air quality as well as opportunities to participate in California's rapidly growing low-carbon economy.

"Bolstering the tools for reducing health impacts from poor air quality and confronting environmental justice concerns under AB 617 allow the Cap-and-Trade Program to remain focused on delivering cost-effective GHG reductions."

Recent amendments to the Cap-and-Trade Regulation

A nearly two-year public process to update the Regulation culminated in the adoption of amendments in July 2017 that extend the Program through 2030 and allow the joint California and Québec Programs to link with Ontario's Cap-and-Trade Program on 1 January 2018. Linking the Program with Ontario expands overall emissions reduction opportunities and improves liquidity in the carbon market. More information on these recent amendments is available at the CARB website.[1]

Upcoming amendments for the post-2020 California Cap-and-Trade Program

AB 398 requires the post-2020 Program to include, among other changes, a specified price ceiling and price containment points, additional limits to the amount of offsets that may be used, and the maintenance of existing levels of allocation to industry. CARB will undertake a public process to amend the Regulation to accommodate these features.

The Program currently includes an Allowance Price Containment Reserve (APCR) to contain costs. APCR allowances are available for sale at pre-determined fixed prices if any entity requests that a sale occur. Under the current Regulation, allowances remaining in the APCR after 2020 will be available for sale at a fixed dollar amount above the floor price with the fixed amount increasing each year by the inflation rate. If APCR allowances are exhausted, additional allowances would be pulled from future years' allowance budgets and made available at the same cost. AB 398 directs the post-2020 Program to replace the APCR with an allowance price ceiling and two interim price containment points. In establishing these prices, CARB must consider impacts on households, businesses, and the economy, as well as the social cost of

1 California Air Resources Board. Available at https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm

carbon, emissions leakage, the auction floor price, and the price needed to incentivize research, development and deployment of low-carbon technologies.

AB 398 also requires that the offset credit limit be capped at four percent of an entity's compliance obligation for 2021–2025 and at six percent for 2026–2030. Further, at least half of offset credits surrendered must provide direct environmental benefits to the state. Currently, offset credits may be used to satisfy up to eight percent of a compliance obligation with no other restrictions.

Industrial entities covered by the Program currently receive free allowances to minimize emissions leakage. For 2013–2017, industry assistance factors used to calculate allowance allocation are set at 100 percent for all industrial sectors. These assistance factors are only one factor—alongside benchmarks, product data (for most sectors), and an adjustment factor that decreases every year with the cap—used to calculate allocations. This means a 100 percent assistance factor does not translate into an allocation sufficient to cover an entity's annual emissions. Under the current Regulation for 2018–2020, these assistance factors will be reduced to 50, 75, and 100 percent for sectors with low, medium, and high emissions leakage risk, respectively. AB 398 directs that assistance factors for the post-2020 Program will be at 100 percent for all industrial sectors; further, CARB has directed staff to evaluate and propose applying a 100 percent assistance factor for the 2018–2020 period.

"Moving forward, California will continue to advocate for broader climate action and to pursue partnerships with other jurisdictions to expand opportunities for GHG reductions."

Upcoming climate efforts in California

In recognition of this, in the coming year, California will underscore the urgency of coordinated climate action by hosting both the Governors' Climate and Forests Task Force annual meeting on 10–11 September and the Global Climate Action Summit on 12–14 September. Together, these meetings will further demonstrate the role of subnational climate leadership in advocating for inclusive, green economies, convening people from all walks of life to showcase the surge of climate action around the world, and strengthening the push for greater emissions reduction targets.

The Regional Greenhouse Gas Initiative
The RGGI Review and the Path Ahead

Lois New, New York State Department of Environmental Conservation
William Space, Massachusetts Department of Environmental Protection

The successful Regional Greenhouse Gas Initiative (RGGI) continues to evolve and improve. 2018 will mark the 10th year of the program, and the 38 successful auctions held through to the end of 2017 have yielded more than USD 2.8 billion in proceeds for participating states, much of which is invested in energy efficiency programs that yield large macroeconomic benefits. Recently announced changes will result in a 2030 emissions cap that is 65% below the initial 2009 cap, and the implementation of an "Emissions Containment Reserve." Furthermore, the addition of one or more states to the RGGI market is a real possibility.

"While the proposed abandonment of the federal Clean Power Plan is a significant setback for the United States as a whole, the RGGI states continue to demonstrate that the RGGI cap, together with the reinvestment of auction proceeds in cleaner and more efficient energy, is not only reducing emissions, but also improving public health, reducing electricity bills, and creating jobs."

RGGI recently completed its second program review. The review process extended over two years, and included nine public regional stakeholder meetings and webinars. The states initiated the public component of the program review in late 2015 by sharing a list of key topics, and went on to consider thousands of public comments and more than 25 distinct modeling runs. In August 2017, the states announced their proposed changes, including:

- A regional cap of 75.148 million short tons of CO_2 in 2021, which will decline by 2.275 million short tons of CO_2 per year thereafter, resulting in a total 30% reduction in the regional cap from 2020 to 2030.
- Additional adjustments to the RGGI cap, to account for the full bank of excess allowances at the end of 2020. The amount of this adjustment will be calculated in 2021 according to a formula established in the revised Model Rule, and it will be implemented over the period 2021 to 2025.
- Modifications to the Cost Containment Reserve (CCR) size and trigger price. The proposed CCR size from 2021 onwards will be 10% of the regional cap. The CCR trigger price will be USD 13 in 2021, and will rise by 7% per year, ensuring that the CCR will only be triggered if emission reduction costs are higher than projected.
- Implementation of an Emissions Containment Reserve (ECR) in 2021, wherein states will withhold allowances from circulation to secure additional emission reductions if prices fall below established trigger prices. The ECR trigger price will be USD 6 in 2021, and rise at 7% per year, so that the ECR will only be triggered if emission reduction costs are lower than projected. At this time, Maine and New Hampshire do not intend to implement an ECR.

"The states implementing the ECR will withhold up to 10% of the allowances in their base budgets per year. Allowances withheld in this way will not be reoffered for sale."

Stakeholder feedback on the ECR was overwhelmingly positive, and an August 2017 analysis of the ECR concept completed by Resources for the Future (RFF) identified a number of ways in which an ECR could reduce risk and improve the functioning of the RGGI market.[1] RFF titled their analysis "Expanding the Toolkit," suggesting that the ECR is a RGGI program element that may be of interest to other jurisdictions, just as the RGGI auctions have been.

"The most important part of the program review is the selection of a proposed 30% reduction in the regional cap between 2020 and 2030. However, the inclusion of the ECR, which is designed to secure additional reductions when costs are low, generated nearly as much interest among stakeholders."

1 http://www.rff.org/research/publications/expanding-toolkit-potential-role-emissions-containment-reserve-rggi

As noted above, the program changes have been proposed by states, but have not yet been finalized. For the changes to take effect, each state must complete a rulemaking process pursuant to its own statutory requirements. The processes are critical because the RGGI allowance market depends on the existence of consistent rules in all participating states; there is no centralized rulemaking authority. Individual state rulemaking processes are expected to take place in 2018.

Another development is the potential for new states to link with the RGGI market. Virginia and New Jersey, both of which are US states that are located contiguous to the RGGI region, are current possibilities. The process has progressed furthest in Virginia, with the completion by Virginia of draft regulatory language and modeling runs that address a potential combined allowance market, as well as the release of a statement by the RGGI states applauding Virginia's progress and noting similarities between Virginia's regulation and the RGGI model rule. Serious work with New Jersey is expected in 2018, after the inauguration of a newly elected (and supportive) governor. Notably, governors in both states were elected after having indicated support for RGGI. Of course, "linking" would bring challenges, but fortunately there are resources, such as the forthcoming 'ICAP Guide to Linking', to help guide the process as the RGGI states move from theory to practice.

Looking further ahead, 2019 could be a relatively quiet year, but the next program review is scheduled for 2021, so planning for that will need to begin in 2020. Stay tuned to the RGGI website and ICAP's updates to follow the implementation of the ECR, the ongoing assessment of Virginia's program development, and all of the latest RGGI news.

The EU ETS

A Resilient System to Support Long-Term Decarbonization

Dirk Weinreich, Helen Monzel, Lisa Katharina Schmid and Angelika Smuda
German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

Since its establishment in 2005, the European Emissions Trading System (EU-ETS) has always been a learning system. The agreement on far-reaching reform measures finalized in late 2017 marks the successful conclusion of lengthy negotiations. It incorporates lessons learned from earlier trading periods and brings the system in line with the EU's 2030 climate targets. With the recently agreed reform package,[1] negotiators have struck a balance between strengthening the price signal, protecting industry from carbon leakage, and securing solidarity mechanisms for poorer member states. Most changes will be implemented in the fourth trading period that will last from 2021 until 2030.

"The reform stipulates a number of measures that strengthen the EU-ETS and enable it to resume its place as the main driver of European decarbonization."

Since the global financial and economic crisis began unfolding in 2008, a structural surplus has been accumulating within the EU-ETS amounting to an aggregated figure of 2.2 billion allowances at its peak in 2013. A comprehensive reform to tackle this problem and also to make the system more resilient to potential future crises was adopted in 2015 with the establishment of the Market Stability Reserve—MSR[2] (for more details on the MSR please refer to our contribution to the ICAP Status Report 2015). From 2019 onwards, allowances will be transferred to the MSR and thus the surplus will be gradually removed.

The final reform package comprises not only one, but a whole set of measures aimed at strengthening the EU-ETS. Already in 2014, the Council of the European Union decided to increase the linear reduction factor (LRF), by which the cap is reduced each year from 1.74% to 2.2%,[3] in order to comply with the EU 2030 target of reducing emissions by 43% compared to 2005 in the sectors covered by the EU-ETS. The LRF is also subject to a review in light of the goals and the stocktaking process of the Paris Agreement.

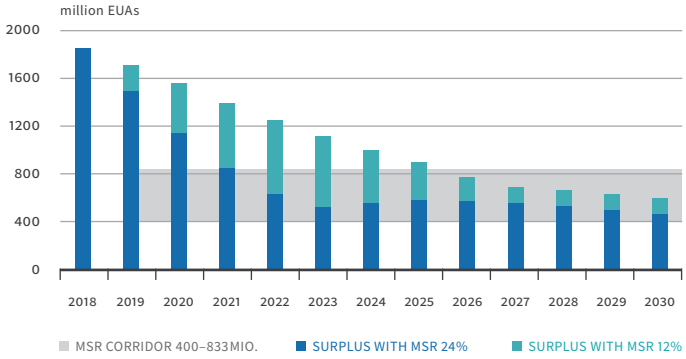


Figure 1: Projected Surplus Development 2018–2030

The effect of doubling the MSR intake rate on the projected surplus development indicating the timeframe for dropping below the upper threshold.[4,5]

Although the general architecture of the MSR is still considered to be a guarantee for long-term resilience and flexibility, it became increasingly obvious that the stipulated intake rate of 12% would not return scarcity to the system quickly enough. Therefore, it was agreed to reform the MSR so that the rate will be increased to 24% in the years 2019 to 2023. By doubling the intake rate, we now expect to reach scarcity[6] at the beginning of the next trading period (Figure 1).[7] The second reform measure aimed at the MSR guarantees that the withdrawal is sustainable and that not all allowances will eventually be returned to the market. As of 2023, the MSR will be capped at the number of allowances auctioned in the previous year; excess allowances will no longer be valid. Depending on the emissions forecast assumed, this will lead to an amount in the order of two billion allowances[8]—roughly the average cap for one year—being cancelled in 2023 (Figure 2).

1 European Parliament. "PROVISIONAL AGREEMENT RESULTING FROM INTERINSTITUTIONAL NEGOTIATIONS Subject: Proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments." europarl.europa.eu. http://www.europarl.europa.eu/RegData/commissions/envi/inag/2017/11-22/ENVI_AG(2017)615245_EN.pdf (accessed 12 December 2017).

2 EUR-Lex. "DECISION (EU) 2015/1814 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 October 2015 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC." publications.europa.eu. https://publications.europa.eu/en/publication-detail/-/publication/01c4f171-6e49-11e5-9317-01aa75ed71a1/language-en (accessed 12 December 2017).

3 The LRF is based on the average yearly cap of the 2nd trading period (2008–2012) and results in 38 million allowances being subtracted each year in the 3rd trading period. From 2021 onwards, the LRF will be increased to 48 million allowances per year.

4 If the surplus in a given year is above the threshold, it triggers the MSR to take up allowances in the two consecutive years: The surplus in 2021 therefore leads to allowances being removed in 2022 and 2023. By our projections, allowances will be taken into the MSR in the five years from 2019–2023.

5 The projected surplus development shown in the graph is the result of two effects—the uptake of allowances into the MSR and the annual structural surplus development. According to our estimations, emissions will remain below the cap until 2025, leading to a structural surplus increase in these years. Despite this structural increase, from 2019 until 2023 the MSR will take up enough allowances to ensure an overall decrease in the surplus. From 2023 onward, the MSR is not triggered anymore; thus the structural increase in the surplus becomes apparent. From 2026 onwards, emissions are projected to be above the cap, leading to an ongoing structural decrease in the surplus.

6 According to the MSR decision (cf. DECISION (EU) 2015/1814), scarcity is defined as the amount of allowances in circulation being below an upper threshold. Allowances in circulation are the balance between supply (allowances issued) and demand (verified emissions). The upper threshold (above which MSR intake is triggered) is currently set at 833 million, taking into account allowances needed for upfront hedging by power companies.

7 Based on calculations by BMUB.

8 Based on calculations by BMUB.

"Taken together, these two measures send a strong signal to industry and electricity generators: policymakers take the goal of long-term decarbonization seriously."

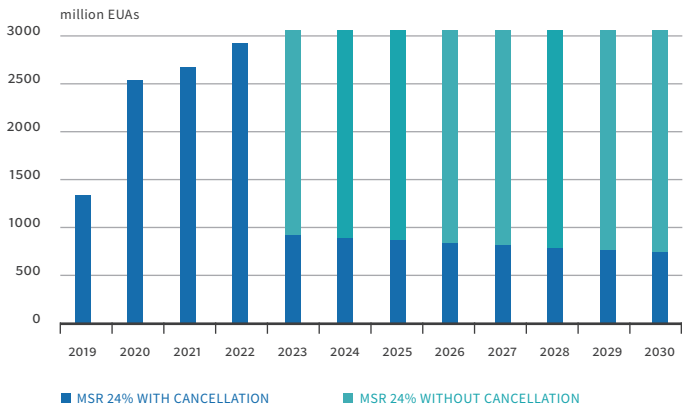


Figure 2: Capped Market Stability Reserve 2019–2030

Amount of allowances in the MSR with and without cancellation.[9]

In addition to strengthening the MSR, the regulation will now acknowledge the interplay between national and European climate policy: It allows member states to unilaterally cancel allowances in order to compensate for closures of electricity generation capacity in their territory due to additional national measures. The amount cancelled shall not exceed the average verified emissions of the installation concerned over a period of five years preceding the closure. The possibility to compensate for additional national measures acknowledges the fact that national climate targets and policies among member states differ. The effect of national climate policies on the EU ETS is also ameliorated by the MSR, but in order to account for significant structural changes, like the closure of coal power plants, additional compensatory measures may be necessary. Otherwise, additional mitigation efforts in one member state could be counteracted by more emissions in other member states—the so called 'waterbed effect'.

A strengthened system is expected to lead to a significant increase of the carbon price within the EU-ETS. This has to be counterbalanced by measures protecting the competitiveness of European industry, as well as solidarity mechanisms for lower-income Member States. Both are part of the final reform package.

To prevent unfair competition, industries at risk of carbon leakage will continue to receive free allocation of allowances in the fourth trading period. Benchmark values will be updated reflecting actual technological progress and will decrease at a minimum of 0.2% per year in order to incentivize innovation over time. A key component of the reform is designed to prevent across-the-board cuts to free allocation for industry, as was the case in the third trading period. With this aim in mind, 3% of the allowance cap will be put aside from the auctioning volume as a safety buffer, to be added to the free allocation volume if the amount of allowances applied for should exceed the amount reserved for free allocation. Furthermore, free allocation will be adjusted more dynamically in the case that significant production changes occur. In addition, an Innovation Fund was created that supports innovative low-carbon projects throughout the European Union. These measures will ensure that industries at risk of carbon leakage receive the amount of allowances they need, while maintaining incentives for innovation and avoiding over-allocation of allowances.

The reform package also includes a set of solidarity measures within the Union: The newly created Modernization Fund supports low-income Member States in modernizing their energy systems and introducing energy efficiency measures, as well as supporting a just transition to low-carbon economies in regions especially reliant on fossil fuels. No investments in coal-fired power plants are eligible under the fund, the only exception being the modernization of district heating generators in the poorest Member States. In addition, poorer Member States are still allowed to transitionally provide a limited amount of free allocation to their energy generators.

As with the first major reform of the EU-ETS in 2009, several lessons learned have been integrated in the recently agreed reform for the fourth trading period. The result will be an emissions trading system that is quickly returning to scarcity and able to react more flexibly to future imbalances between supply and demand, including those due to ambitious national climate policies. The reformed EU-ETS sets the EU on the right track to reach its 2030 target and provides incentives for reaching the EU's long-term decarbonization pathway.

9 From 2023 the MSR will be capped at the amount of allowances auctioned in the previous year; in the graph we use the gross amount foreseen for auctioning (before reductions by the MSR and auctioning of additional allowances for the Innovation Fund).

The New Zealand Emissions Trading Scheme
Getting Ready for Paris: Improving the NZ ETS

Eva Murray, Charlotte Berg, Sarah Deblock
Ministry for the Environment, New Zealand

Next year will mark ten years of operation for the New Zealand Emissions Trading Scheme (NZ ETS), and will be a critical year in the scheme's development as we implement the outcomes of the latest NZ ETS review. This review, concluded in 2017, allowed us to reflect on how the NZ ETS has had to evolve over the past ten years. This evolution has been due to a mix of changes in our domestic circumstances, governmental priorities and the international context.

> "An important conclusion of the review is that change is a constant—and we need to build in flexibility to respond to changing circumstances so the NZ ETS remains effective over time."

The NZ ETS followed the Kyoto Protocol model

The NZ ETS was designed in 2007 and launched in 2008. At that time, as a small country aiming to play its role in global climate action and with few examples of operating emissions trading schemes to draw on, our point of reference was the Kyoto Protocol (KP).

The original framework for the NZ ETS closely aligned with the rules applying to New Zealand under the Protocol. This meant the scheme was intended to cover all gases and all sectors of the economy, and be fully integrated with the KP carbon market. The NZ ETS was thereby designed to operate within the international cap that the KP set on developed country emissions, with full fungibility between New Zealand Units (NZUs) and Kyoto-compliant units such as RMUs, CERs, and ERUs.

In some ways, this approach was appropriate for New Zealand's national circumstances. For example, coverage of the forestry sector as a source of both carbon dioxide removals and emissions is an unusual feature of the NZ ETS drawn from the KP. Including forestry in the NZ ETS helps New Zealand manage a major sector that represents both a key risk and opportunity for achieving its emission reduction targets.

New Zealand's large forestry estate, which makes up approximately 37% of New Zealand's land cover, has a significant impact on the country's net emissions as illustrated in Figure 1. The carbon price can help encourage new forest planting, which increases carbon dioxide removals and supports the long-term investments needed for forestry's continued role as a key export sector. Importantly, it also discourages deforestation—which is critical for New Zealand as most plantation forests are privately owned. The NZ ETS acts as a brake on land use change, while still allowing forest owners flexibility to compensate for emissions if they choose to deforest.

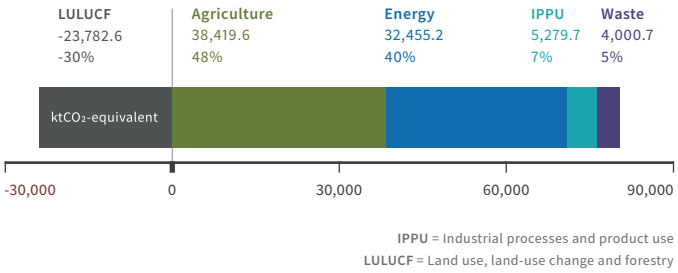


Figure 1: New Zealand's net emissions by sector in 2015[1]

With time, however, it became apparent that there were drawbacks to such strict alignment with the international framework. For example, full integration with the KP market meant that when international carbon prices collapsed from 2011 onwards, the carbon price in New Zealand plunged alongside them. A price differential between NZUs and KP units then arose when it became clear that the KP would be overtaken by a different regime. This encouraged NZ ETS participants to use many more international units for compliance than had been envisaged.

Responding to these developments in a timely and appropriate way was challenging. Although the NZ ETS legislation provided for regular and comprehensive policy reviews, the timeframes for these reviews did not coincide with when the government needed to address emerging problems. This resulted in necessary adjustments either taking longer than ideal to put in place, or being made in ways that were seen by market participants as ad hoc and unexpected.

Reviewing the NZ ETS

The most recent review of the NZ ETS began in 2015, to coincide with the Paris Agreement and the setting of New Zealand's first Nationally Determined Contribution (NDC). New Zealand's first NDC target, to reduce emissions 30% below 2005 levels by 2030, is more challenging than our previous targets, and it is expected that ambition should increase over time. The review provided an important opportunity to consider how the NZ ETS should develop to take this new context into account, as well as to learn from the experiences outlined above.

1 Source: New Zealand's Greenhouse Gas Inventory 1990–2015, Ministry for the Environment.

Consultation and engagement with NZ ETS stakeholders formed a critical part of the review and helped identify key issues and potential solutions. The strongest theme from stakeholder feedback was that the way the NZ ETS had been managed had created significant regulatory uncertainty for market participants. This has undermined confidence and reduced incentives for businesses to invest in low-emissions technology.

This feedback fed through into two key findings—the NZ ETS needs:

- New features to allow it to better align with the Paris Agreement and with the increasing ambition of our emission reduction targets; and
- A regulatory framework that provides both more predictability for market participants and more flexibility for the Government to be able to adjust the scheme to reflect changing circumstances.

Decisions resulting from the NZ ETS review

The review was conducted in two stages. The first stage resulted in a decision to phase out the 'one-for-two' measure, originally a transitional provision that allowed some participants to surrender one unit for every two tonnes of emissions, by 2019. This was the first step in aligning the NZ ETS with our targets, as it will reduce the current oversupply of NZUs in the market, another consequence of the extensive use of KP units outlined above.

Stage two of the review took a longer-term focus on making the NZ ETS more fit for purpose in light of the Paris Agreement and the increasing ambition of New Zealand's future targets. This stage concluded with several Government decisions in mid-2017, to:

- Introduce auctioning to the NZ ETS to align it with our emission reduction targets
- Develop an alternative price ceiling to replace the current NZD25 (~USD17.50) fixed price option
- Limit participants' use of international units in the 2020s
- Coordinate decisions on the supply of units in the NZ ETS over a five-year rolling period

Once implemented, these changes will provide the necessary components to give the NZ ETS its own overall cap on units, so that the Government can align the supply of units with our targets.

The rolling five-year period for setting unit supply volumes is arguably the key element of this package that will help to future-proof the NZ ETS. It is intended to provide a more predictable and transparent way to manage unit supply, improving regulatory predictability for participants by giving them visibility of NZ ETS settings for five years into the future. Its rolling nature, with settings extended by one year annually, is also expected to give the government sufficient flexibility to adjust the scheme as circumstances change.

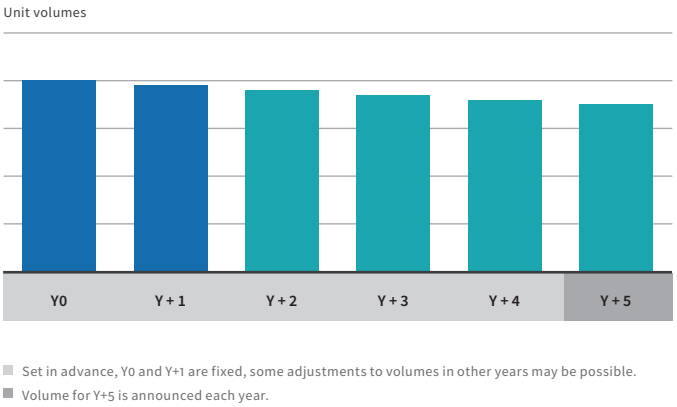


Figure 2: Illustration of how the five-year rolling period could work

Implementing the review decisions

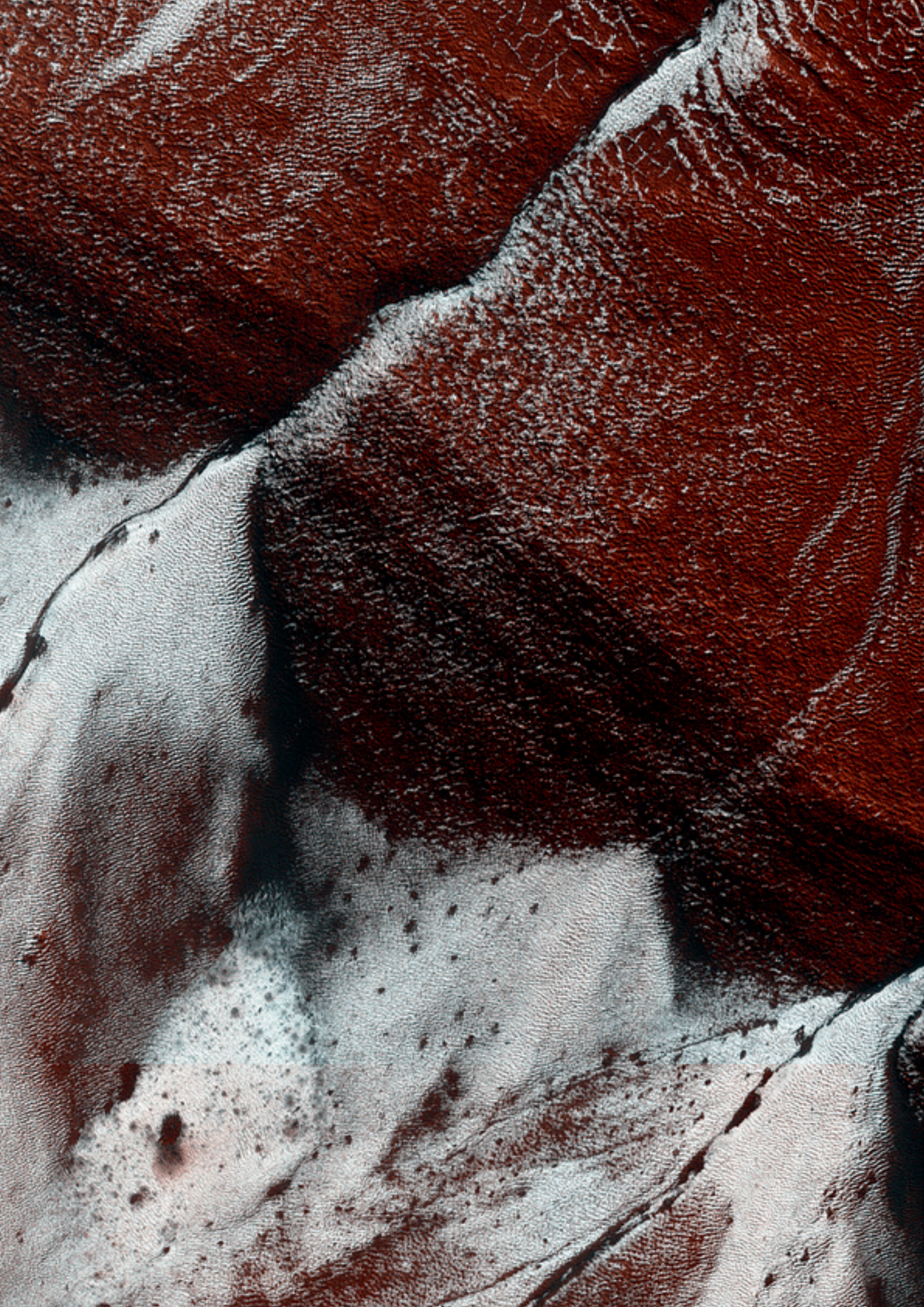
Our task now is to develop further advice on how these decisions can be implemented in practice. We are also looking at improving a range of other aspects of the NZ ETS. These include a package of changes relating to forestry, options for phasing out of free allocation, improvements to market information systems as well as other operational and technical elements. We expect to provide this advice to the government later this year. This will enable further consultation and engagement with stakeholders before legislative change, planned for 2019. New measures can then be in place ahead of 2021.

Conclusion

It will always be challenging to find the right balance in the design of an ETS.

> "On one hand, participants seek regulatory predictability and stability, while on the other hand policy makers need the tools to maintain enough flexibility to respond to changing circumstances."

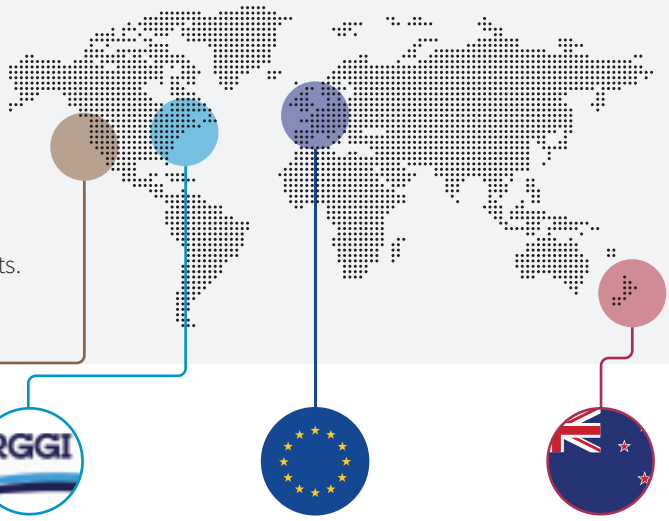
We expect that the new framework for the NZ ETS will put us in a much better position to manage this balancing act in a Paris Agreement world.



Getting Ready for the 2020s

An overview of key reforms in emissions trading in 2017

2017 has seen agreement on major ETS reforms in four long-running systems to make them fit for the post-2020 period. The table details the outcomes across four main design elements.



	CALIFORNIA	RGGI	EU	NEW ZEALAND
CAP TRAJECTORIES → *Cap trajectories are getting steeper to align with 2030 climate targets.*	The cap will **decline by about 4%** annually from 2021–2030, yielding a **40% cap reduction by 2030** compared to 2020 levels.	The cap will **decline by 3%** annually between 2021 and 2030, yielding a **30% cap reduction by 2030** compared to 2020 levels.	The cap will decline by **a linear reduction factor of 2.2%** from 2021–2030, in line with the target of **a 43% reduction** in ETS-sector emissions compared to 2005 levels.	Coordinated supply measures to **introduce a cap** on allowances from auctioning, free allocation and international offsets. Unit supply volumes are to be **decided five years in advance**.
ALLOCATION → *Improvements are being made to better target free allocation.*	**Free allocation** for industry (per unit of output) to **reduce in line with cap.**		**Free allocation** is to be **better targeted**. **Benchmark values** and **production factors** will be updated.	An **auctioning mechanism** is to be established by 2020.
MARKET STABILITY → *Novel instruments to manage price and quantity reflecting learnings from the past.*	A **new price ceiling** is to be determined at which allowances can be bought anytime. Revenues are to be reinvested in emissions reductions.	The newly established **Emissions Containment Reserve (ECR)** reduces the cap by permanently removing allowances if carbon prices fall below a set level.	The **Market Stability Reserve (MSR)** will begin operation in 2019 with a 24% intake rate for the first five years. Provisions are made to **permanently cancel allowances** to limit the size of the reserve.	The **one-for-two measure will be phased out** by 2019. A **new price ceiling measure** is to be developed.
OFFSETS → *Putting emphasis on domestic abatement, the trend is to limit the use of offsets and international credits.*	The **share of offsets** will be reduced **from 8% to 4%** for 2021–2025, and will **remain at 6%** thereafter. At least half of the offsets used for compliance must have a **direct environmental benefit** to California.		Covered entities will **not have access to international credits** after 2020.	**International credit limits** will be implemented when the NZ ETS once again opens to international markets.

China
China's National Carbon Market and the Roadmap Ahead

Qian Guoqiang and Huang Xiaochen
SinoCarbon Innovation & Investment Co. Ltd.

On the 19th of December 2017, China's National Development and Reform Commission (NDRC) announced the official launch of the much-anticipated national emissions trading system (ETS). The announcement met the ambitious timeline set by the Chinese leadership two years ago to launch the Chinese national ETS by the end of 2017.

"It also comes at a significant moment in history, when the overall political context in China more than ever favors green development and the ideals of an ecological civilization."

Just a few months ago these ideas were consolidated into China's new national development strategy, established by the 19th National Congress of the Communist Party of China.[1] This has tremendous and far reaching impact on how the government directs the country, and how laws, regulations and policies will be formulated and implemented.

Already, China is undergoing a massive social and economic transformation. The new round of deepening reform, underway since 2014, has the objective to transition the country from a phase of rapid growth to one of high-quality development, which underlines a more balanced and environmentally friendly economy driven by innovation. The national ETS, as a market-based policy instrument, is part of this new round of deepening reform. It is an integral part of the new national development strategy following the concepts of innovation, coordination, greening, opening up and inclusiveness.

State Council approves the Work Plan

The official announcement of the launch of the national ETS was marked by the release of the Work Plan for Construction of the National Emissions Trading System (Power Sector), (the "Work Plan"), approved by the State Council. The Work Plan outlines the targets and roadmap for the development of the national ETS, specifies the remaining work required to enable the start of trading activities, and confirms the plan to further improve and expand the carbon market. Trading activities under the newly established national ETS will not begin immediately, but plan to be phased in by 2020.

The power sector as the starting point

China's national ETS will eventually cover eight key emitting sectors, starting with the power sector[2], then including the chemical, petrochemical, iron and steel, non-ferrous metal, building materials, paper making, and aviation sectors. Enterprises in these sectors that exceed the annual threshold of 26,000 tons of CO_2 emissions (energy consumption of more than 10,000 tce) are already requested by the government to report and verify their historical CO_2 emissions, with the aim to collect and improve data quality. This data will then support the development and implementation of sound allocation plans. Starting with the power sector is still significant. Even with the power sector alone, the national ETS will cover more than 1700 enterprises with combined emissions of over 3.3 billion tons of CO_2.

A three-phase roadmap

The system will be developed and scaled up in three phases over the coming years.

(1) *The infrastructure completion phase:*
This will last about one year, in which the focus will be completing the legal foundation and market support systems, such as the trading, registry, and data reporting systems. In-depth capacity building will be carried out, targeting different types of carbon market actors, to enable them to administer or participate in the market.

(2) *The simulation trading phase:*
Expected to last an additional year, in which simulation trading for the power sector will take place. This phase will focus on testing the design and functionality of different elements of the national carbon market, gathering experiences, and further improving the system.

(3) *The deepening and expanding phase:*
Initially in this phase, only the compliance entities of the power sector will be expected to participate in allowance spot trading for compliance purposes. When the market is shown to perform well, with stable operation, the national ETS will be expanded to cover the seven other sectors on a step-by-step basis, depending on their readiness. Other types of trading products, market participants and transaction methods will then be explored. Domestic offsets that have also been used by the ETS pilots, known as Chinese Certified Emission Reductions (CCERs), are also expected to be made available during this phase.

Work to be completed in 2018

Building on the extensive preparations since 2015, further work remains to be completed in 2018 to enable the national carbon market to become fully operational:

1 The recently concluded 19th CPC National Congress is a twice-per-decade event to elect China's leadership, guide its development path, and set national policy goals.

2 Including combined heat and power as well as captive power plants in other sectors.

(1) A "1 plus 3" legal framework will be completed. The State Council is expected to pass the "Interim Regulation on Carbon Emissions Trading", which will serve as the constitution of the national ETS. NDRC is also expected to pass three supplementary technical regulations, including the "Management Decree on Emission Reporting and Verification", the "Management Decree on the Accreditation of Third Party Verifiers", and the "Management Decree of Trading Activities".

(2) The development of two key electronic systems will be finished—the national registry and trading system. Under the supervision of NDRC, the registry will be located and managed in Hubei, and the trading system will be located and managed in Shanghai. They are expected to work together with peer provinces and cities such as Beijing, Tianjin, Chongqing, Guangdong, Jiangsu, Fujian and Shenzhen.

(3) Reporting and verification of the most recent historical data for the eight sectors is to be completed. The objective is to collect and verify data for the years 2016 and 2017, to complement the 2013–2015 data already in place. Additionally, all enterprises subject to reporting are requested to implement motioning plans. The work is expected to be completed in the first half of 2018.

(4) The allowance allocation plan for the power sector will be further improved. The allocation plan will be updated based on the latest 2016–2017 data, and is expected to be finalized in the second half of 2018. If the above-mentioned work is completed smoothly, allowances could be distributed to power companies in the second half of 2018 to enable simulation trading. Allocation plans for other sectors are also under deliberation.

Some key uncertainties remain

Given the size and complexity of the Chinese national carbon market, the government is expected to take a cautious attitude towards its development and administration. In such a context, some uncertainties will need to be clarified in the coming years.

(1) It is still unclear when power companies will be required to surrender allowances for their first compliance. This depends on how long it will take to complete the first two phases outlined in the Work Plan. Under an ideal scenario, simulation trading could start by the end of 2018. In this situation, June 2020 could be the first deadline for covered entities to surrender allowances for compliance.

(2) There is no specific timeline for introducing other sectors. This depends on how the power sector ETS performs, the quality of data from the other sectors, as well as the progress made developing allocation methods for these sectors. Beyond these technical considerations, the decision is also a political matter. So far, it is estimated that the national ETS could be expanded to cover additional sectors after 2020.

(3) The role of CCERs in the national ETS is still to be clarified. In 2012, the NDRC issued the Interim Measures for the Management of Voluntary GHG Emission Reduction Transactions. These measures include guidelines for the issuance of domestically-produced CCER offsets. However, in March 2017, NDRC suspended all work relating to CCER registration and issuance, and the procedures and modalities are currently under review. It is not clear how the new CCER management system will look, or when it will start. NDRC has confirmed that CCERs will play a role in the national ETS, but without yet specifying the eligibility criteria of CCERs in the compliance market.

(4) It is unclear when China's carbon market will open to investors. China is taking a cautious approach to allow only compliance entities to participate in spot trading at the beginning. It plans to open the market to investors, and also allow trading of futures, forward allowances and other derivatives after 2020. But the timeline for introducing new market participants or trading products is not yet clear.

(5) Another key uncertainty is when and how exactly China's regional carbon markets would be integrated into the national ETS.

In conclusion, the official launch has demonstrated the strong political commitment of the Chinese government to employ the market-based mechanism of ETS to combat climate change and transform the economy. It also puts forward a concrete work plan to develop a fully-fledged carbon market after 2020.

> "It is pertinent for China to take a step-by-step approach, considering the complexity of designing and overseeing the world's largest carbon market and the learning-by-doing nature of such a journey."

So far, tremendous efforts and concrete progress have been made in preparing the infrastructure, developing the capacity and creating the enabling conditions for a national ETS to take root. On this basis, we have good reason to be optimistic.

Latin America
An Interview with Policymakers in Colombia, Chile and Mexico

Sebastian Carranza, Ministry of Environment, Colombia
Nicolás Westenenk, Technical Adviser, Partnership for Market Readiness, Chile
Victor Escalona, Ministry of Environment and Natural Resources (SEMARNAT), Mexico

Climate policy continues to take shape in Latin America. Colombia, Chile and Mexico have already implemented carbon taxes, and are either considering or actively planning an ETS. For this Status Report, ICAP conducted a series of informal interviews with policymakers and experts working closely within these jurisdictions. We here provide their personal insights into the latest developments and priorities in their countries, the role of ETS in their climate policy mix, and their international collaborations, as well as a timeline of major developments.

Sebastian Carranza – Ministry of Environment, Colombia

Could you give us an update on developments in your jurisdiction?
Colombia's National Climate Change Policy (NCCP) sets the framework for our activities. The NCCP bundles together many of the strategies developed over the last five years, including the REDD+ Strategy and the National Adaptation Plan. Deforestation is a major source of emissions in Colombia, so REDD+ and adaptation are certainly important aspects. In addition, in 2016 we adopted a national carbon tax of USD 5/tCO_2 as part of a broader tax reform and started implementing the tax in 2017. The tax includes a non-payment mechanism which allows for the use of project-based offsets, which has recently raised several questions about how this can fit with a national approach. Over the past five years we have also been working with the Partnership for Market Readiness (PMR) and currently we have been exploring the opportunities and challenges of a national ETS with Carbon Trust, MOTU, University of Los Andes, Fedesarrollo and Econometría.

What role do you see for ETS in your country's climate policy mix?
In 2017, we proposed a Climate Change Law, and the draft includes a provision that could form the legal basis for an ETS. We hope to have it passed by the end of this government's term in mid-2018. Although at the moment we do not have all the elements or the technical capacity to develop a framework for an ETS, the first step is to have a legal basis. However, climate policy development has slowed recently with the peace process taking priority. Our plan is to continue the analytical work with the PMR through studies on ETS administration, scope, regulation points and registry issues, among others. Within two years we will have more clarity on the necessary steps, and can potentially establish an ETS within the next four to five years. Although we believe it is a good option, there is a lot of work to be done before we can think of implementing an ETS in our country.

Can you tell us about your international climate collaborations?
Chile, Peru and Mexico have been cooperating through the Pacific Alliance[1], exploring opportunities for regional collaboration. The Pacific Alliance helps to set the political agenda, in addition to the Cali Declaration[2] and the Paris Declaration on Carbon Pricing in the Americas[3] promoting carbon market cooperation in the region. The collaboration is very interesting, yet challenging because Latin American countries are very particular in their approaches and contexts. At the technical level, it has allowed us to work together on aspects such as MRV, registries, information platforms, standards, and accreditation. This collaboration not only enables progress towards our political aspirations, but also helps with transparency, information tracking and building robust systems. However, it is hard to talk about regional carbon markets or the exchange of mitigation outcomes without a comprehensive national approach. We need to combine the elements of each country and work out how to provide not only new economic development but a whole new economic sector for our countries based on carbon pricing.

What key messages would you like to share?

> "The implementation of the peace process is one of the biggest upcoming challenges in Colombia, and carbon pricing must be part of the solution."

Currently, it is a top priority for policymakers, where many ministries, local government institutions and indigenous leaders are involved. People that used to belong to the FARC group live primarily in small towns in rural areas, and they will be searching for new ways to make a living. Therefore, the relationship between the peace process and drivers of deforestation is evident. We need to provide a sustainable livelihood for these communities. Carbon pricing, where it allows for the use of carbon credits from the forestry sector, can therefore be a part of a sustainable development solution.

1 https://alianzapacifico.net/en/what-is-the-pacific-alliance/

2 https://alianzapacifico.net/en/?wpdmdl=9850

3 https://www.gob.mx/cms/uploads/attachment/file/279823/Declaration_on_Carbon_Pricing.pdf

Nicolás Westenenk – Technical Adviser,
Partnership for Market Readiness, Chile

Could you give us an update on developments in your jurisdiction?
Although Chile does not have a climate law yet, we are now reviewing our NDC to 2020, and that should form the framework for Chile's official climate policy. There is a change of government soon, and the incoming party wants to move forward on developing a climate law. In any case, we have the carbon tax that came into effect last year, and although it is primarily a tax reform instrument, it is still relevant for climate policy. On another level, we have the energy policy, which states that it must be aligned with our climate goals, which is important because the energy sector is responsible for 77% of Chile's GHG emissions. More broadly, we have a climate change mitigation plan and we are working on an adaptation plan. The forestry sector also has a climate strategy, and is doing an interesting job to foster policies regarding native forestry and conservation. This sector is an important part of the conversation, as it could be a provider of certificates or offsets.

What role do you see for ETS in your country's climate policy mix?
A carbon tax is a very good starting point. It is certainly a good way to work on the MRV that is required anyway for an ETS. But an ETS could provide more flexibility and alternatives to the compliance sectors and give some certainty regarding emissions reductions. Also, you have greater acceptability with ETS given that you are providing entities with more flexibility. Obviously that depends on how you design the ETS, for example, which mechanisms you use for price management and to prevent carbon leakage - the provisions that are needed to give stakeholders the certainty to achieve our targets without damaging the economy.

Can you tell us about your international climate collaborations?
We all see that a robust MRV system is going to be required, either for a carbon tax or for the use of offsets or for an ETS—for any instrument we are considering, we are going to need a solid MRV basis. That has been the focus of our collaboration in the Pacific Alliance. Primarily we are examining how a regional MRV could look like, where countries have similar requirements, rules and procedures. We have a similar focus in our collaboration with Canada on MRV rules for the region.

"This is a good opportunity for us to come together and figure out how we can achieve emissions reductions as a regional group rather than as individual countries."

Our collaboration with the PMR has been very helpful. So far we have done technical capacity building as well as a lot of consultation whereby we gained feedback and involvement of stakeholders. The PMR has been crucial in enabling our proposed MRV for the carbon tax to be implemented. Looking ahead, we will continue working with the PMR on carbon markets and cost-effective carbon pricing instruments. The next stage will focus on further developing our MRV and also on consultation and participation processes. We are also considering building a climate policy simulation tool, which is an exercise intended to be shared with the international community.

Over the long term we are looking at the possibilities of linking. Things are moving in the right direction, though we have a lot of work to do. Definitely, MRV work is crucial for successful linking. It is also important that we look to what kind of policies would be linked. It would be hard to link carbon taxes, so we need to consider offsets or eventually ETS. We also need to analyze what other countries are looking for in a link—if we are only offering offsets to each other then we will not have a very successful market. If we could work towards cap setting with a view to broadening the market, that would be great in any scenario.

What key messages would you like to share?
I would say most of us are convinced that carbon pricing instruments are a way to correct market failures. But, I think we should give more focus on the co-benefits of the instruments. Most of the time we hear that carbon pricing would be good for emissions reductions but at net-costs for the country. I think that shouldn't be the way it is conceived. Carbon pricing instruments can also create jobs, reduce health impacts and bring a number of other benefits. If there is a way to better quantify and communicate these co-benefits, it would be of great impact in the policy making process.

Victor Escalona – Ministry of Environment and Natural Resources (SEMARNAT), Mexico

Could you give us an update on developments in your jurisdiction?
The last year has been very busy in Mexico. We have engaged with the private sector in discussions on ETS advantages and regulation. In parallel we have been conducting technical work, analyzing historical data for 2014–2016 in order to inform the cap-setting process, and conducting a study on competitiveness issues for a variety of sectors. In October, we launched our ETS simulation, one of our major capacity building exercises that will last for ten months. With over 100 companies registered, we hope to gain good experience and raise the level of knowledge of ETS. Looking ahead to this year, we hope to move fast with implementing the pilot phase of the Mexican ETS.

What role do you see for ETS in your country's climate policy mix?
The formal position of the Ministry is that the carbon tax and the ETS will coexist. From the technical aspect, I see them as complementary instruments. The carbon tax was the first carbon price signal set by Mexico, and even if the rate is low, it is almost universally applied. It does not target any specific sector, but rather all fuel consumers. The ETS could then work on top of the tax, as it is much easier to target specific sectors with an ETS. In this way, ETS is just one of many policy tools that we are considering, which is also the approach outlined in Mexico's NDC.

Can you tell us about your international climate collaborations?
We have been engaging with the WCI jurisdictions of California, Ontario and Québec purely on the technical side. Conversations started two and a half years ago between the National Forestry Commission of Mexico (CONAFOR), the California Air Resources Board (ARB) and SEMARNAT, on the basis of our MoU with California. It became a great opportunity for SEMARNAT to learn from ARB about many aspects of how they designed their system. Last year we invited Ontario and Québec to join. It has been a good chance for the technical teams to get to know each other and we have discussed many design elements of ETS. We know that each jurisdiction has a different path to follow, but with the same objective—to design a system that is as similar to each other as possible in order to be able to link. However, although there have been public expressions of interest in Mexico linking with the WCI, we are not naïve—we know we have a lot of work to do before we can even begin discussions. So far there has only been work done on the technical side, and the political process has yet to really begin.

We are also collaborating with colleagues from Latin America through the Pacific Alliance. There we are undertaking studies on MRV supported by the World Bank. We also have informal collaboration, for example, at every PMR event we get together with Peru, Colombia and Chile. We find that we have many similar positions, especially regarding Article 6 of the Paris Agreement. We are also hoping to collaborate with Chile on emissions trading.

What key messages would you like to share?
There are two key messages. The first is from the political perspective and a view shared by policymakers here. We strongly consider ETS to be the most cost effective option that we have for reducing emissions in the energy and industrial sectors. There are, however, different measures that we need to take for the other sectors such as transport, waste or agriculture. Secondly,

> "… our top priority now is to have the pilot ETS ready, and then to make it work. The pilot needs to be as robust and credible as possible."

We are learning from other jurisdictions in Europe and North America, and their main advice has been to 'make it simple'—start with a system that is easy and affordable to administer. Finally, the pilot will be a mandatory system, so building a consensus with the private sector is crucial.

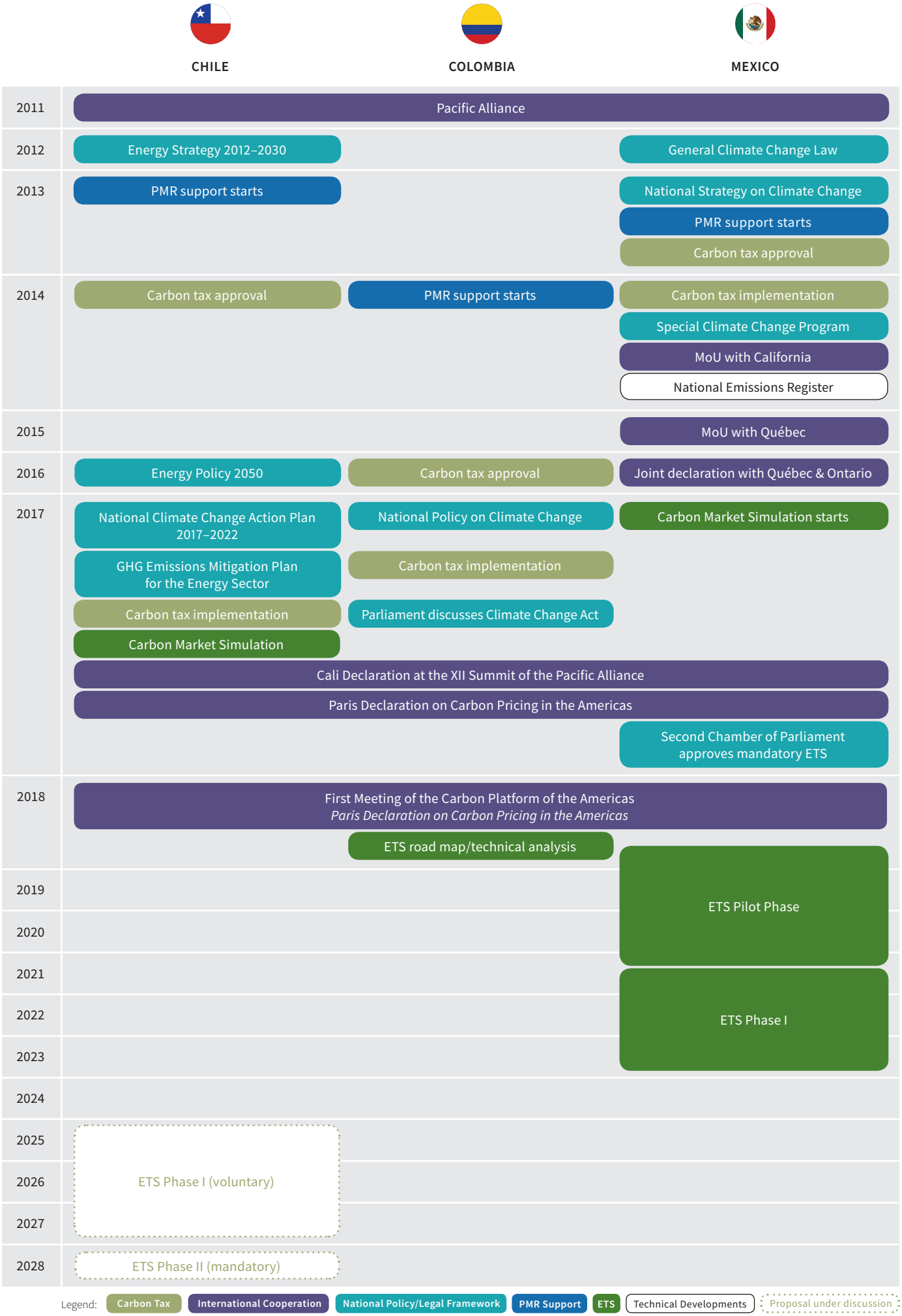
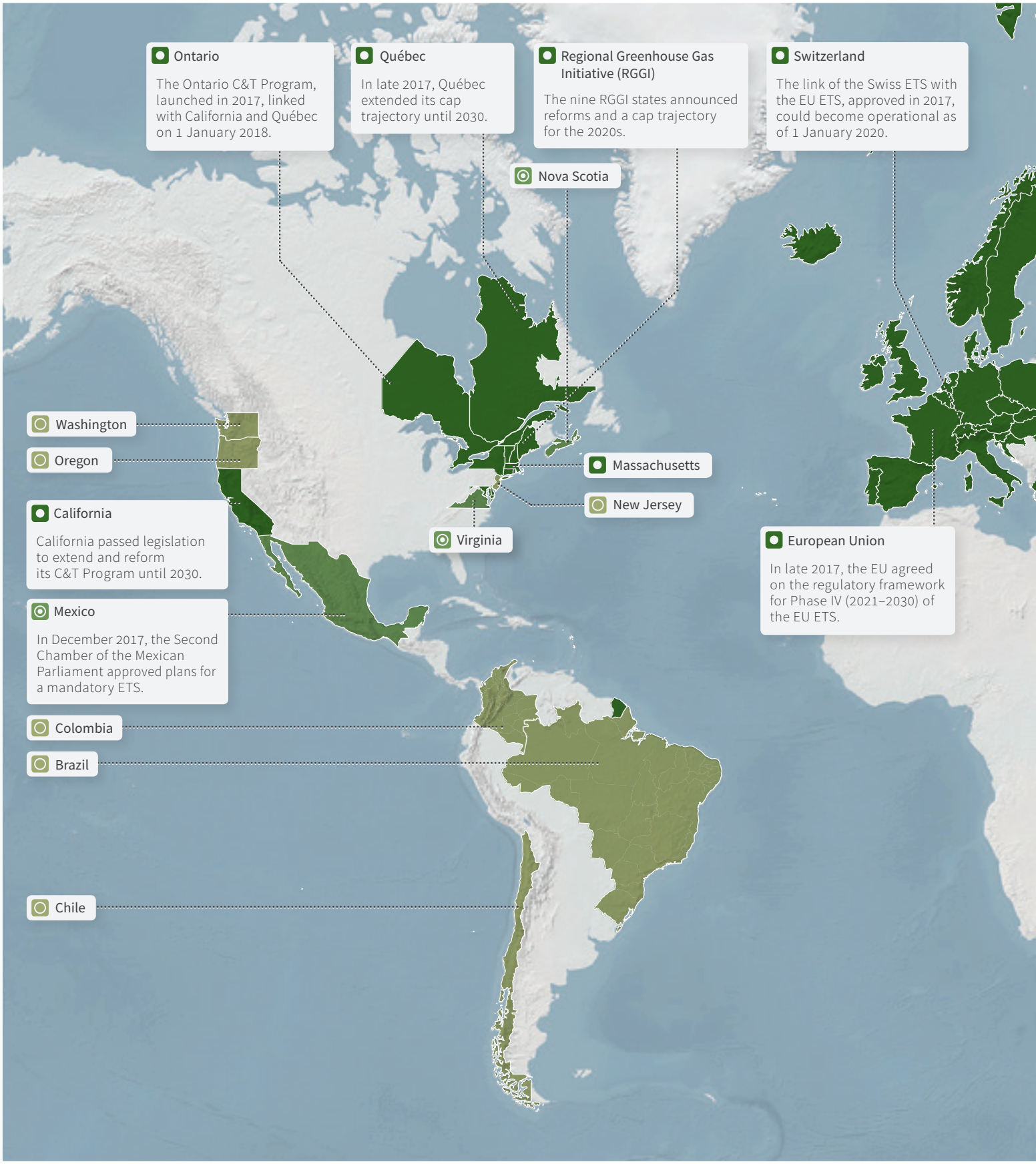


Figure 1: Timeline of Major Policy Developments and Regional **Collaborations**

Emissions Trading Worldwide

The state of play of cap-and-trade in 2018

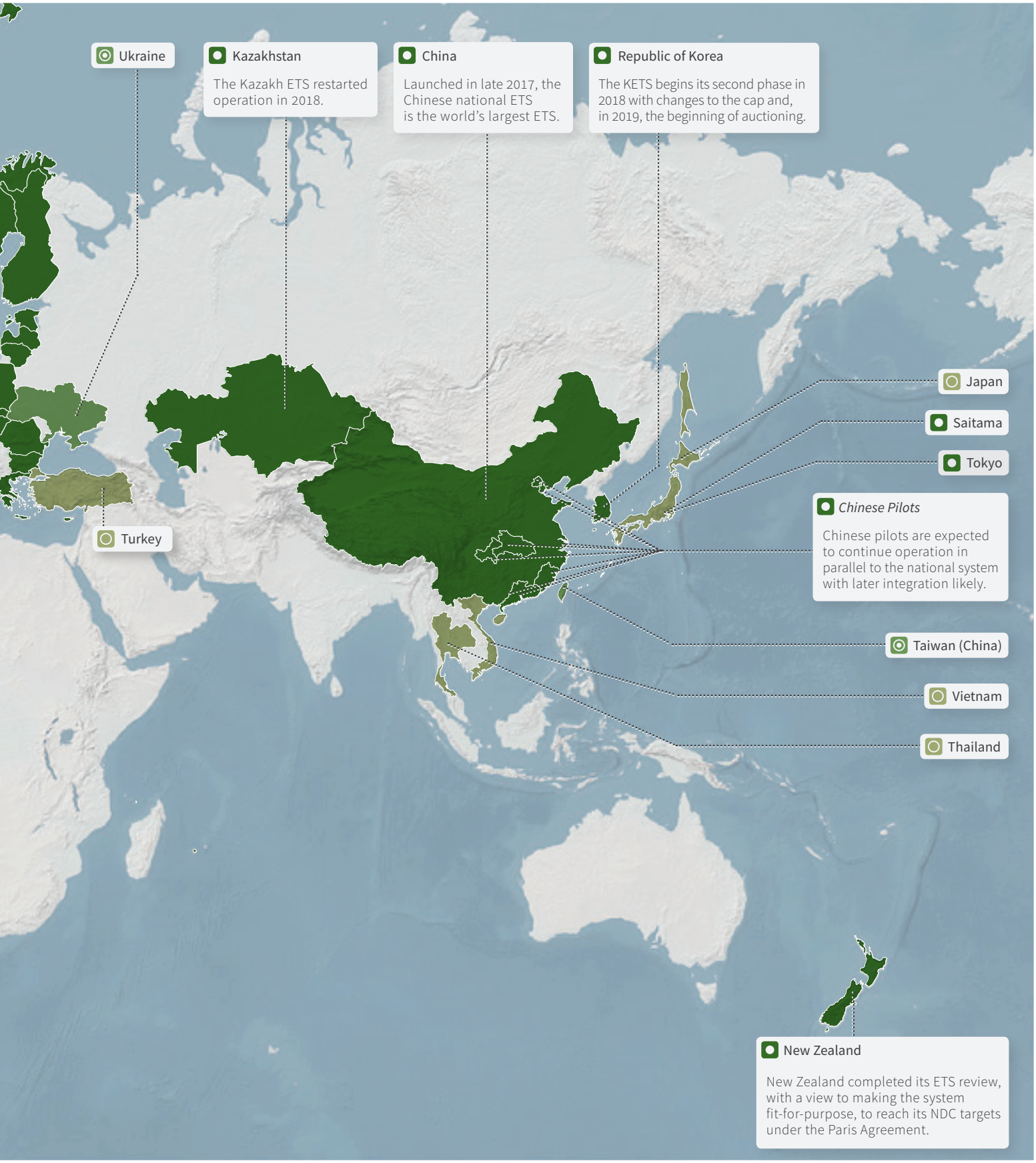
The ICAP ETS world map depicts emissions trading systems currently in force, scheduled or under consideration. After China launched its national carbon market in late 2017, there are now 21 systems covering 28 jurisdictions in force. Another five jurisdictions—Mexico, Nova Scotia, Taiwan (China), Ukraine and Virginia—have an ETS officially scheduled. Finally, ten governments at different levels are considering the implementation of an ETS as part of their climate policy strategy, amongst them Colombia, Washington State and Thailand.

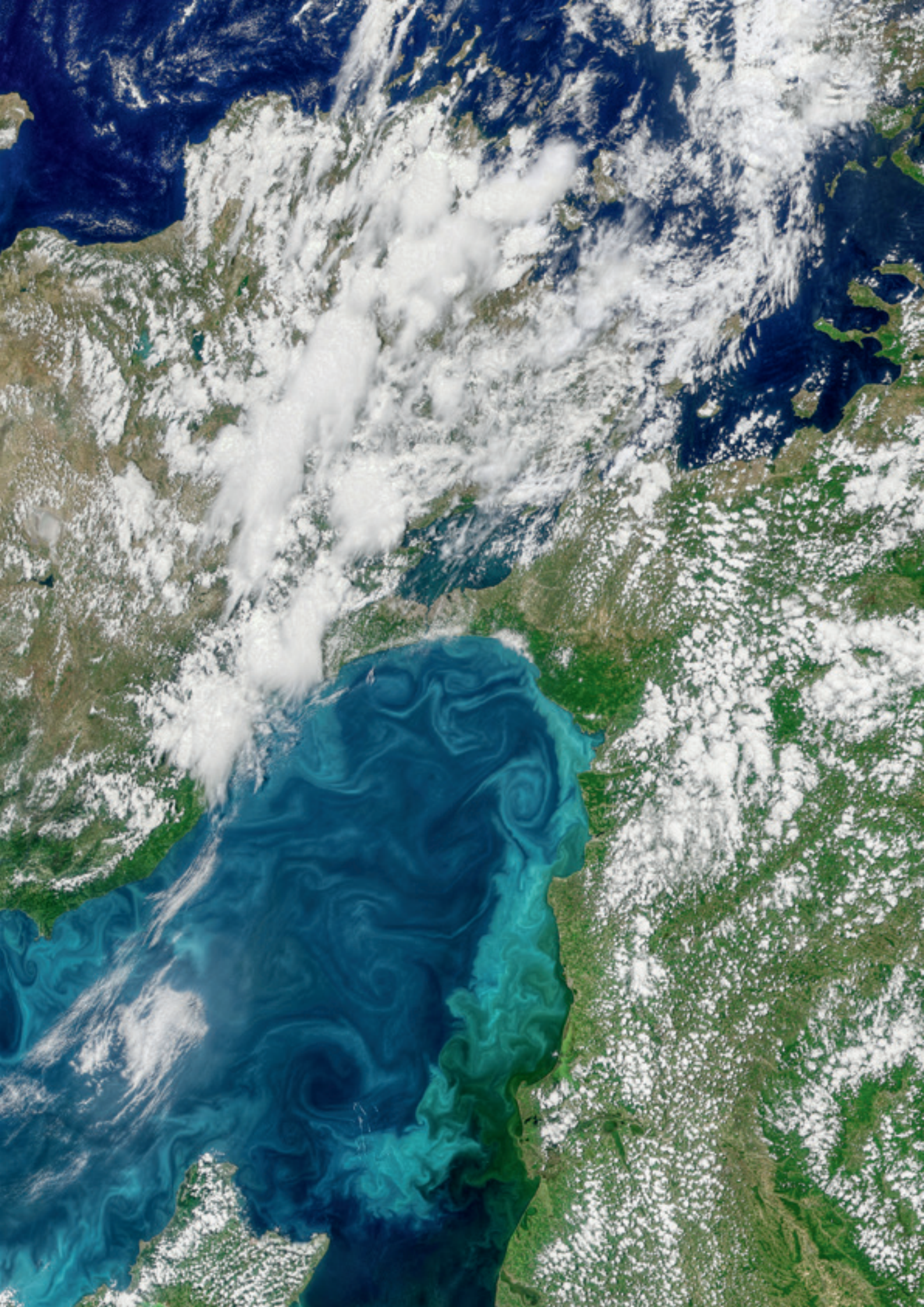


A regularly updated, interactive version of the ICAP ETS map with detailed information on all systems is available at:

www.icapcarbonaction.com

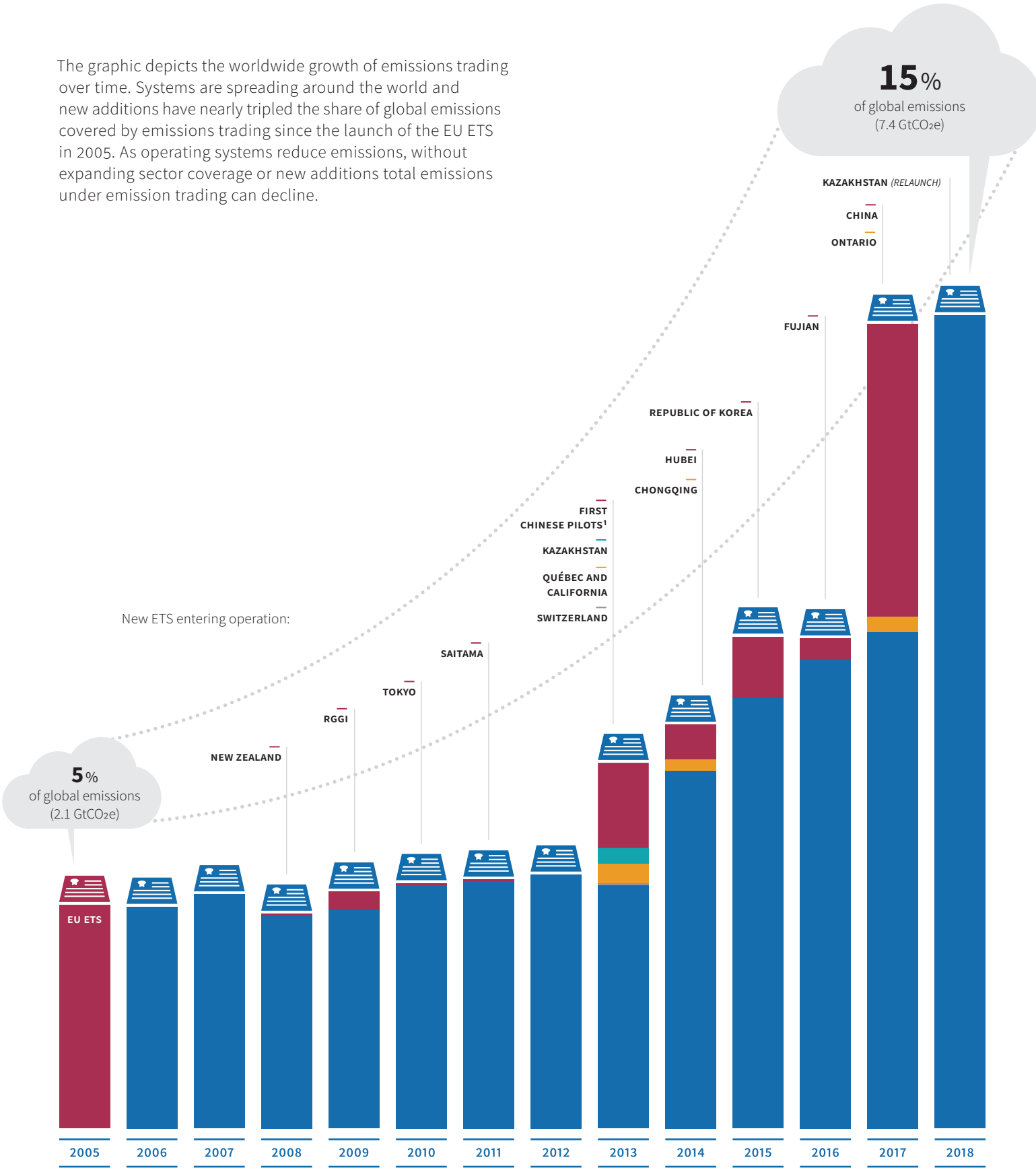
ETS in force
ETS scheduled
ETS considered





Tripling the Share
Emissions coverage over time

The graphic depicts the worldwide growth of emissions trading over time. Systems are spreading around the world and new additions have nearly tripled the share of global emissions covered by emissions trading since the launch of the EU ETS in 2005. As operating systems reduce emissions, without expanding sector coverage or new additions total emissions under emission trading can decline.



Share of global emissions covered in % as well as absolute amount in $GtCO_2e$.

1 First Chinese Pilots include Beijing, Guangdong, Shanghai, Shenzhen, Tianjin.

Systems are indicated in a different colour only when they are first implemented.

Sector Coverage

Sectors included in emissions trading across systems

EUROPE

- EU ETS
- Switzerland

NORTH AMERICA

- California
- Ontario
- Québec
- Massachusetts
- RGGI

ASIA & PACIFIC

- New Zealand
- Republic of Korea
- Beijing
- Shenzhen
- Shanghai
- Guangdong
- Fujian
- Chongqing
- Hubei
- Kazakhstan
- Tianjin
- China
- Saitama
- Tokyo

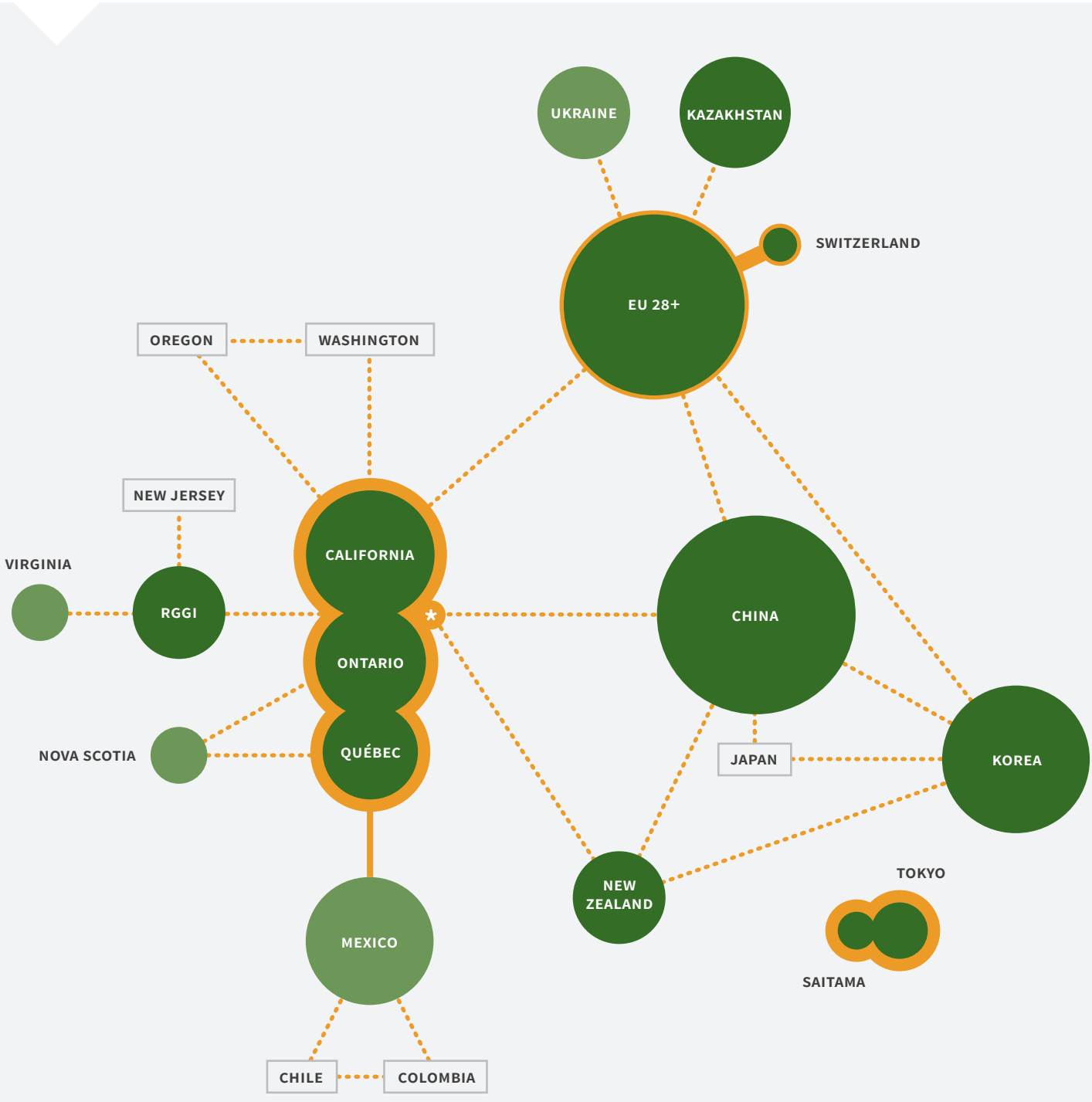
Sectors connected by emissions trading.

* Represents upstream coverage.

Carbon Market Connections

The state of linking and cooperation in emissions trading in 2018

Various jurisdictions are cooperating on carbon markets. The figure depicts three different levels of cooperation. Proximity and strength of connecting lines indicate the level of cooperation, while bubble sizes roughly correspond to the respective market volumes.



* In the case of WCI jurisdictions (California, Ontario, Québec), carbon market diplomacy is usually depicted here as connections to the WCI "halo" rather than to individual jurisdictions. This is because any linkage would apply to the entire system and agreements be concluded with all participating jurisdictions. Mexico has individual MoUs with California and Québec and a Joint Declaration with Ontario and Québec together.

Different Shapes of Cap-and-Trade

A comparative look at key metrics from carbon markets

This graphic depicts five well-established systems according to four key metrics. The price of allowances expresses the carbon price signal while the share of allowances not provided for free further impacts the cost imposed by the instrument. The cap reduction pathway indicates the rate of change guaranteed by the system, whereas the coverage characterizes the share of the economy over which the cap applies.

Systems:

- European Emissions Trading System (EU ETS)
- Korean Emissions Trading System (KETS)
- New Zealand Emissions Trading Scheme (NZ ETS)
- Regional Greenhouse Gas Initiative (RGGI)
- Western Climate Initiative (WCI)

Cap trajectory *[%]*

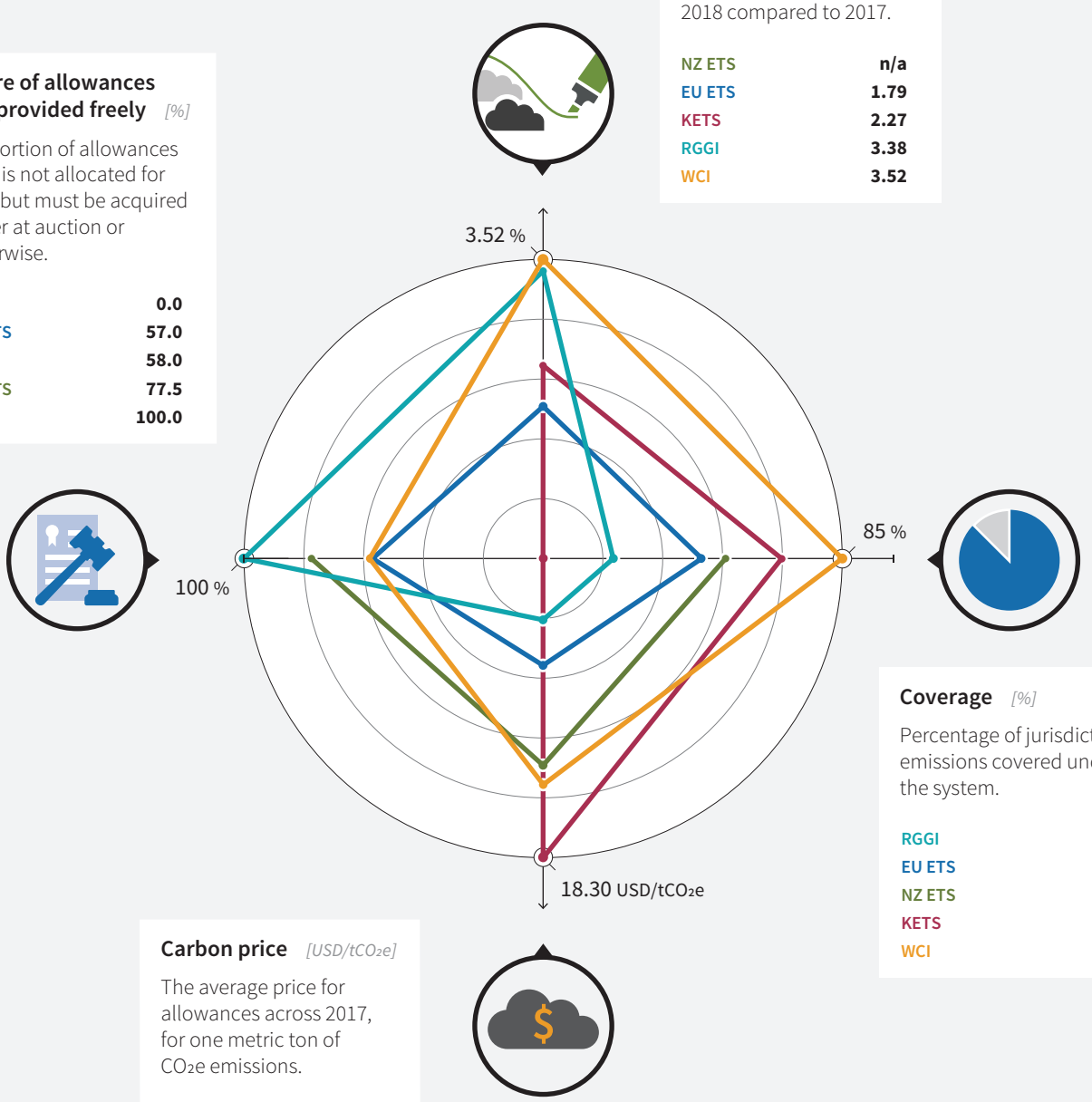
Rate of decline in newly available allowances in 2018 compared to 2017.

NZ ETS	n/a
EU ETS	1.79
KETS	2.27
RGGI	3.38
WCI	3.52

Share of allowances not provided freely *[%]*

Proportion of allowances that is not allocated for free, but must be acquired either at auction or otherwise.

KETS	0.0
EU ETS	57.0
WCI	58.0
NZ ETS	77.5
RGGI	100.0



Coverage *[%]*

Percentage of jurisdiction's emissions covered under the system.

RGGI	20
EU ETS	45
NZ ETS	52
KETS	68
WCI	85

Carbon price *[USD/tCO2e]*

The average price for allowances across 2017, for one metric ton of CO_2e emissions.

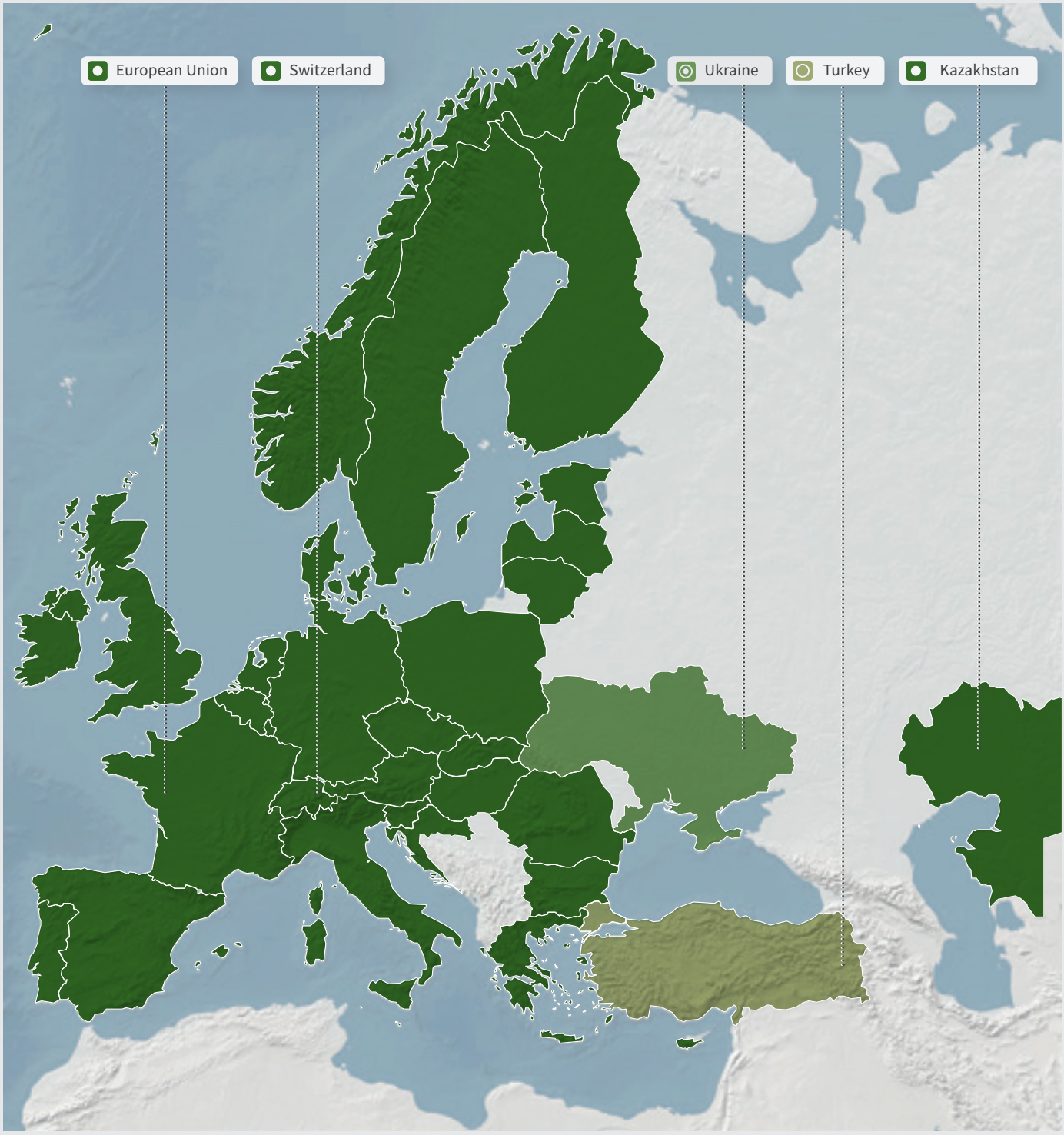
RGGI	3.76
EU ETS	6.54
NZ ETS	12.64
WCI	14.27
KETS	18.30

Diving into the Details

Planned and Operating Emissions Trading Systems Around the World

Europe and Central Asia

In November 2017, a provisional deal was reached by European co-legislators (Council and European Parliament) for Phase Four reforms of the EU ETS (2021–2030). In November, the EU and Switzerland signed an agreement to link their carbon markets. After a temporary suspension in 2016, Kazakhstan restarted its ETS on 1 January 2018. Turkey also completed the first year of mandatory emissions reporting and Ukraine published a draft law outlining the MRV provisions that will underpin their future ETS.



European Union Emissions Trading System

in force

28 EU MEMBER STATES, ICELAND, LIECHTENSTEIN AND NORWAY

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
1,839	11,000 +

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	AUCTIONING & FREE ALLOCATION	INTERNATIONAL OFFSETS

The European Union Emissions Trading System (EU ETS) is the world's first GHG ETS and represents the central pillar of the European Union's (EU) climate change policy.

After more than two years of negotiations on the legislative proposal to revise the EU ETS for Phase four (2021–2030), a provisional deal has been reached by the EU co-legislators (Council and European Parliament). The revisions include a faster annual decrease of the cap (2.2%, compared to 1.74% currently), in order to contribute to the EU's 2030 target to reduce GHG emissions by at least 40% domestically by 2030. Furthermore, the agreed changes will further strengthen the EU ETS, by doubling the pace at which surplus allowances are removed from the market and placed in the Market Stability Reserve (MSR) until 2023; provide free allowances to industries at risk of carbon leakage under robust rules; and strongly support low-carbon innovation, as well as modernization of the energy sector in lower-income EU countries.

Alongside the Phase four negotiations, the EU ETS Directive has also been amended to maintain limitations to the geographic scope of aviation coverage to flights within the European Economic Area (EEA) until 2023, while the rules for a global deal on mitigation from the aviation sector are drafted under the International Civil Aviation Organization (ICAO). A new review should take place in the light of the international developments, with a view to implement the global scheme in Union Law.

Furthermore steps have been taken to ensure the stability of the EU ETS, should the United Kingdom exit the EU without an agreement (so-called "Hard Brexit").

In late 2017, the EU and Switzerland came closer to linking their carbon markets. In November, an agreement was signed between the EU and Switzerland. The link will be operational once the linking agreement has been ratified by both sides, and all criteria of the linking agreement have been met. This is likely to be by 1 January 2020.

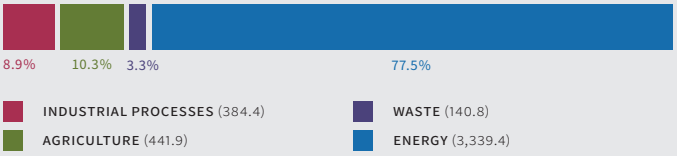
BACKGROUND INFORMATION

OVERALL EU GHG EMISSIONS (EXCL. LULUCF)

4,367 $MtCO_2e$ (2015)

OVERALL EU GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



OVERALL EU GHG REDUCTION TARGETS

BY 2020: 20% below 1990 GHG levels. **BY 2030:** At least 40% below 1990 GHG levels. **BY 2050:** EU leaders have committed to reducing emissions by 80–95% below 1990 GHG levels.

ETS SIZE

CAP

PHASES ONE AND TWO (2005–2012): Decentralized cap-setting, the EU cap resulted from the aggregation of the National Allocation Plans of each Member State.

PHASE THREE (2013–2020): Single EU-wide cap for stationary sources: 2,084 $MtCO_2e$ in 2013, which will be annually reduced by a constant linear reduction factor (currently 1.74% or around 38.3 million allowances).

AVIATION SECTOR CAP: 210 $MtCO_2e$/year for 2013–2020 (not decreasing). However, following the temporary derogation of obligations related to flights to and from third countries until the end of 2023, the issuance of allowances has been adjusted accordingly.

PHASE FOUR (2021–2030): A Linear Reduction Factor of 2.2% annually for both stationary sources and the aviation sector. The linear reduction factor does not have a sunset clause and as such the cap will continue to decline beyond 2030.

EMISSIONS COVERAGE

GHG COVERED

CO_2, N_2O, PFCs

SECTORS & THRESHOLDS

PHASE ONE (2005–2007): Power stations and other combustion installations with >20MW thermal rated input (except hazardous or municipal waste installations), industry (various thresholds) including oil refineries, coke ovens, iron and steel plants and production of cement, glass, lime, bricks, ceramics, pulp, paper and board.

PHASE TWO (2008–2012): In addition to Phase one sectors, aviation was introduced in 2012 (>10,000 tCO_2/year for commercial aviation; >1,000 tCO_2/year for non-commercial aviation since 2013) (see below).

PHASE THREE (2013–2020): In addition to Phase two sectors, Carbon Capture and Storage installations, production of petrochemicals, ammonia, non-ferrous and ferrous metals, gypsum, aluminum, nitric, adipic and glyoxylic acid (various thresholds) were included—see Annex I of the EU ETS Directive.

PHASE FOUR (2021–2030): No changes to the scope are envisaged for Phase four compared to Phase three.

INTERNATIONAL AVIATION: Emissions from international aviation have been included in the EU ETS since 2012. In November 2012, the EU temporarily suspended enforcement of the EU ETS requirements for extra-EU flights operating from or to non-European countries (so-called "stop the clock"), while continuing to apply the legislation to flights within and between countries in the EEA. Exemptions for operators with low emissions have also been introduced.

In light of the progress made under ICAO towards a global measure to reduce emissions from the aviation sector (the Carbon Offsetting and Reduction Scheme (CORSIA)), the EU has maintained the intra-EEA scope for the ETS Aviation until 31 December 2023. A further review and assessment will be carried out once there is clarity surrounding the content and nature of CORSIA as well as the extent of participation by Europe's international partners.

POINT OF REGULATION

Downstream

NUMBER OF LIABLE ENTITIES

More than 11,000 power plants and manufacturing installations. Aircraft operators are covered for all flights. However, a temporary exemption applies to flights between the EEA and a third country.

PHASES AND ALLOCATION

TRADING PERIODS

PHASE ONE: Three years (2005–2007) **PHASE TWO:** Five years (2008–2012)
PHASE THREE: Eight years (2013–2020) **PHASE FOUR:** Ten years (2021–2030)

ALLOCATION

PHASE ONE (2005–2007): Nearly 100% free allocation through grandfathering. Some Member States used auctioning and some used benchmarking.

PHASE TWO (2008–2012): Similar to Phase one with some benchmarking for free allocation and some auctioning in eight EU Member States (about 3% of total allowances).

PHASE THREE (2013–2020): Over the entire trading period (2013–2020), 57% of allowances will be auctioned, while the remaining allowances are available for free allocation.

ELECTRICITY SECTOR: 100% auctioning with optional derogation for the modernization of the electricity sector in certain Member States. In line with the 2030 framework for climate and energy, Member States with a GDP per capita in 2013 below 60% of the EU average may continue to make use of this optional free allocation in Phase four.

MANUFACTURING SECTOR: Free allocation is based on benchmarks. Sub-sectors deemed at risk of carbon leakage will receive free allocations at 100% of the pre-determined benchmarks. Sub-sectors deemed not at risk of carbon leakage will have free allocation phased out gradually from 80% of the benchmarks in 2013 to 30% by 2020.

AVIATION SECTOR: In 2012, 85% of allowances were allocated for free based on benchmarks. For Phase three: 15% of allowances are auctioned and 82% allocated for free based on benchmarks. The remaining 3% constitutes a special reserve for new entrants and fast growing airlines. As a consequence of the temporary derogation applying to flights with third countries, the allocation is adjusted to the intra-EEA scope.

BACK-LOADING: Taken as a short term measure to address a growing surplus in the EU ETS, it was agreed to postpone the auctioning of 900 million allowances from 2014–2016 to 2019–2020. Auction volumes were reduced by 400 million allowances in 2014, 300 million in 2015, and by 200 million in 2016. In line with the decision to create an MSR, the back-loaded allowances will not be auctioned but be placed directly in the MSR.

NEW ENTRANTS RESERVE: Five percent of the total allowances are set aside to assist new installations coming into the EU ETS or covered installations whose capacity has significantly increased since their free allocation was determined.

PHASE FOUR (2021–2030): One of the central components of the Phase four revision package is to ensure the declining number of free allowances is distributed in the most effective and efficient way. To this end, in Phase four:

- Benchmark values will be updated twice during the phase to reflect technological progress in the different sectors.
- Free allocation may be updated annually to mirror sustained changes in production (if the change is more than 15% compared to the initial level, on the basis of a two-year rolling average).
- Carbon leakage rules will be more robust, as the number of sectors classified at risk of carbon leakage will be reduced, and the free allocation for other sectors will be discontinued by 2030 (except district heating).
- As an additional safeguard for industry, the agreement foresees a "free allocation buffer" of over 450 million allowances initially earmarked for auctioning, to be made available if the initial free allocation is fully absorbed (thereby avoiding or reducing a correction factor).

In addition, two new multi-billion Euro funds will be established to help the industry and the power sectors meet the innovation and investment challenges of the transition to a low-carbon economy.

THE INNOVATION FUND: For the demonstration of innovative technologies to breakthrough innovation in industry, as well as carbon capture and storage/use and renewable energy.

THE MODERNIZATION FUND: Facilitating investments in modernizing the energy systems and supporting energy efficiency in ten lower-income

Member States, including investments to support a socially just transition to a low-carbon economy (such as retraining for affected workers).

COMPLIANCE PERIOD

From 1 January until 30 April the following year (16 months)

FLEXIBILITY

BANKING AND BORROWING

Unlimited banking is allowed since 2008. Borrowing is not allowed.

OFFSETS AND CREDITS

PHASE ONE (2005–2007): Unlimited use of Clean Development Mechanism (CDM) credits and Joint Implementation Credits (JI) was provided for in the Directive. In practice, no credits were used in Phase one.

PHASES TWO (2008–2012) AND THREE (2013–2020):

QUALITATIVE LIMIT: Most categories of CDM/JI credits are allowed (restrictions vary across different EU Member States), no credits from LULUCF and nuclear power sectors. Strict requirements apply for large hydro projects exceeding 20 MW. Since the start of Phase three (1 January 2013), additional restrictions apply for CDM: newly generated (post-2012) international credits may only come from projects in Least Developed Countries (LDCs). Projects from industrial gas credits (projects involving the destruction of HFC-23 and N_2O) are excluded regardless of the host country. Credits issued for emission reductions that occurred in the first commitment period of the Kyoto Protocol are no longer accepted as of 31 March 2015.

QUANTITATIVE LIMIT: In Phase two (2008–2012), operators were allowed to use JI and CDM credits up to a certain percentage limit determined in the respective country's National Allocation Plans. Unused entitlements were transferred to Phase three (2013–2020). The total use of credits for Phase two and three may amount up to 50% of the overall reduction under the EU ETS in that period (approximately 1.6 billion tons CO_2e).

PHASE FOUR (2021–2030): No offsets are envisaged.

MARKET MANAGEMENT PROVISIONS

In 2015, a decision to create an MSR was adopted, a structural measure addressing the large accumulated allowance surplus, which depressed the allowance price in recent years. The MSR, which will start operating in January 2019, aims to neutralize the negative impacts of the existing allowance surplus and to improve the system's resilience to future shocks. Allowances will be added to the reserve if the total number of allowances in circulation is higher than 833 million allowances and re-injected to the market if the number of allowances in circulation falls below 400 million. As part of the decision, the 900 million back-loaded allowances, which were withdrawn from auctions from 2014–2016, and for the time being an unknown amount of unallocated allowances, will be placed directly into the reserve.

Revisions to the MSR have also been agreed as part of the Phase four reform. Specifically, the feeding rate will increase from 12% to 24% for the first five years of operation. Additionally, the number of allowances that can accrue in the MSR will be limited to the previous year's auction volume from 2023 onwards.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual self-reporting based on harmonized electronic templates prepared by the European Commission.

VERIFICATION: Verification by independent accredited verifiers is required before 31 March each year.

FRAMEWORK: For Phase three onwards, European Commission Regulations have been published for monitoring and reporting, and for verification and accreditation of verifiers. A monitoring plan is required for every installation and aircraft operator (approved by competent authority).

ENFORCEMENT

Entities must pay an "excess emissions penalty" of EUR 100/tCO_2 (USD 113/tCO_2) emitted for which no allowance has been surrendered in due time. The name of the non-compliant operator is also published. Different penalties exist at the national level for other forms of non-compliances.

OTHER INFORMATION

INSTITUTIONS INVOLVED

The European Commission and the relevant authorities of the 28 Member States, Iceland, Liechtenstein and Norway.

LINKS WITH OTHER SYSTEMS

The European Commission has concluded negotiations with Switzerland on linking the EU ETS with the Swiss ETS. In November 2017, the European Union and Switzerland signed the Agreement to link their ETS. The link will become operational on 1 January of the year following ratification and completion of all requirements under the linking agreement.

Switzerland Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
5.1	56

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	AUCTIONING & FREE ALLOCATION	INTERNATIONAL OFFSETS

The Switzerland (Swiss) ETS started in 2008 with a five-year voluntary phase as an alternative option to the CO_2 levy on fossil fuels. Revised regulations entered into force on 1 January 2013. The system subsequently became mandatory for large, energy-intensive entities, while medium-sized entities may join voluntarily. It now covers about 10% of the country's total GHG emissions. In the 2013–2020 mandatory phase, participants in the ETS are exempt from the CO_2 levy.

In January 2016, Switzerland and the EU concluded negotiations on linking their ETSs. Through the bilateral agreement, the two systems will mutually recognize each other's emissions allowances. Once the link is operational, prices should converge resulting in a level playing field for Swiss- and EU-based industry. While many elements of the Swiss ETS were designed to match provisions in the EU ETS (e.g. allocation benchmarks), the linked Swiss ETS will now also cover aviation as a result of the negotiations. Switzerland has identified lower cost emission reductions, enhanced liquidity, clearer price formation and price stability as expected benefits from the link.

The Swiss Federal Council approved the signing of the linking agreement on 16 August 2017. In November 2017, the Council of the European Union adopted a decision authorizing the signing of the linking agreement. The agreement was signed on 23 November 2017. Following approval by the Parliaments of Switzerland and the EU, and when all criteria within the agreement are met (for this, amendments to Swiss legislation are necessary), the link will become operational the following year. This could occur as of 1 January 2020.

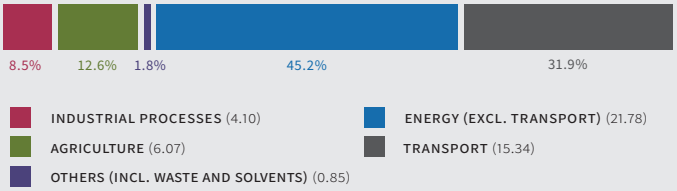
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

48.14 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: At least 20% reduction from 1990 GHG levels (unconditional, domestic target). **BY 2025:** 35% reduction from 1990 GHG levels (NDC). **BY 2030:** 50% reduction from 1990 GHG levels (NDC).

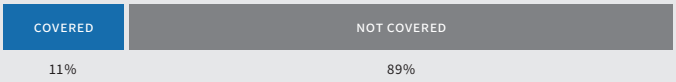
ETS SIZE

CAP

VOLUNTARY PHASE (2008–2012): Each participant received its own entity-specific reduction target.

MANDATORY PHASE (2013–2020): Overall cap of 5.63 $MtCO_2e$ (2013), to be reduced annually by a constant linear reduction factor (currently 1.74%), to 4.9 $MtCO_2e$ in 2020.

EMISSIONS COVERAGE



GHG COVERED

CO_2, NO_2, CH_4, HFCs, NF_3, SF_6 and theoretically PFCs. (In principle all these gases are covered in accordance with the CO_2 Ordinance. In practice, monitoring is only required for CO_2, NO_2 and PFCs.)

SECTORS & THRESHOLDS

MANDATORY PARTICIPATION: Industries listed under Annex 6 of the revised CO_2 Ordinance (25 sub-sectors) must participate in the Swiss ETS.

INCLUSION THRESHOLDS: Industries in Annex 6 that generally have a total rated thermal input of > 20MW.

POSSIBLE VOLUNTARY OPT-IN: Industries a) listed under Annex 7 of the revised CO_2 Ordinance (21 sub-sectors) and b) with a total rated thermal input of > 10MW. One-time binding notification must be given before 1 June 2013 for industries currently above the threshold. Industries that may become eligible for participation in the future must then register within six months after they have reached the threshold.

POSSIBLE OPT-OUT: Industries with a total rated thermal input of > 20MW, but yearly emissions < 25,000 tCO_2e/year in each of the past three years. Should their future emissions rise above the threshold during at least one year, they must start participating in the ETS the following year and cannot opt out anymore for the remainder of the compliance period.

AVIATION: Coverage of aviation is a requirement of the linking agreement between Switzerland and the EU. In July 2017, to prepare for the inclusion of aviation in the Swiss ETS, Switzerland introduced the legislation for mandatory reporting of ton-kilometer data for aircraft operators that are likely to fall within the scope of the Swiss ETS, when linked with the EU ETS.

Aircraft operators submitted their monitoring plans by September 2017. Mandatory reporting began 1 January 2018 and verified monitoring reports are required by 31 March 2019. On the basis of the reported ton-kilometer data, free allocation to aircraft operators and the cap for aviation activities in the Swiss ETS will be calculated.

POINT OF REGULATION

Downstream

NUMBER OF LIABLE ENTITIES

56 (2016)

In the Swiss ETS, liable entities are defined at the installation level.

PHASES AND ALLOCATION

TRADING PERIODS

VOLUNTARY PHASE: 2008–2012 **MANDATORY PHASE:** 2013–2020

ALLOCATION

VOLUNTARY PHASE (2008–2012): Each participant was granted free allocation of allowances covering emissions up to their own entity-specific emissions target.

MANDATORY PHASE (2013–2020): Free allocation is based on industry benchmarks using a similar methodology to the EU ETS. Free allocation for sectors not exposed to the risk of carbon leakage will be phased out gradually: in 2013, 80% free allocation and in 2020 this will be reduced to 30% free allocation. An overarching correction factor is applied given the benchmarked allocation exceeds the overall emissions cap.

Allowances that are not allocated for free are auctioned. Auctions take place two or three times a year, depending on available auction volumes. 5% of the allowances are set aside in the New Entrants Reserve (NER).

COMPLIANCE PERIOD

One year (1 January to 31 December). Covered entities have until April 30 of the following year to surrender allowances.

FLEXIBILITY

BANKING AND BORROWING

Banking within compliance periods is allowed. Banking from one compliance period to the next is also allowed without limit.

Valid certificates (CERs, ERUs) from the 2008–2012 commitment period could be carried over and surrendered until 30 April 2015. Valid certificates from the 2008–2012 commitment period that have not been requested to be carried over within the deadline have been canceled.

OFFSETS AND CREDITS

QUALITATIVE LIMIT: Exclusion criteria are listed in Annex 2 of the revised CO_2 Ordinance. Most categories of credits from CDM projects in Least Developed Countries (LDCs) are allowed. Credits from CDM and JI projects from other countries are eligible only if registered and implemented before 31 December 2012.

QUANTITATIVE LIMIT: Industries that already participated in the voluntary phase (2008–2012): for 2013–2020, the maximum amount of offsets allowed into the scheme equals 11% of five times the average emissions allowances allocated in the voluntary phase (2008–2012) minus offset credits used in that same time period.

Industries entering the Swiss ETS in the mandatory phase and newly covered emission sources (2013–2020): 4.5% of their actual emissions in 2013–2020.

In exceptional cases, companies may submit a request to the Federal Office of the Environment to increase this limit. They must prove that they would otherwise not be able to comply with their liability without major economic impairment and commit to acquiring as many European allowances as the additional international ones. This provision is limited until 31 December 2018.

COMPLIANCE

MRV

Monitoring plans are required for every installation (approved by a competent authority) no later than three months after the registration deadline.

REPORTING FREQUENCY: Annual monitoring report, based on self-reported information (by 31 March).

VERIFICATION: The Federal Office for the Environment may order third party verification of the monitoring reports.

ENFORCEMENT

The penalty for failing to surrender sufficient allowances is set CHF 125/tCO_2 (USD 127/tCO_2). In addition to the fine, entities must surrender the missing allowances and/or international credits in the following year.

OTHER INFORMATION

INSTITUTIONS INVOLVED

The Federal Office of the Environment

LINKS WITH OTHER SYSTEMS

Switzerland has concluded negotiations with the European Commission on linking the Swiss ETS to the EU ETS. An agreement has been initialed in January 2016. For the agreement to enter into force, it must be signed and ratified by both sides. Both the Swiss Federal Council and the Council of the European Union approved the signing of the linking agreement in 2017. The link will become operational on 1 January the year following ratification and completion of all requirements under the linking agreement.

Kazakhstan Emissions Trading Scheme

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
161.9	129

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

Kazakhstan launched an ETS (KAZ ETS) in January 2013. The groundwork for the development of the ETS was laid out in 2011 through amendments and additions to Kazakhstan's environmental legislation. The system was temporarily suspended in 2016. Soft MRV obligations applied during the suspension time. Amendments to the Environmental Code were passed in 2016 to improve the MRV system, as well as the overall GHG emissions regulation and KAZ ETS operation. Further amendments to the Environmental Code, which came into force in 2017, lay the groundwork for the introduction of benchmarking as one of the allocation methods. The KAZ ETS restarted operation on 1 January 2018 with new allocation methods and trading procedures for all market participants.

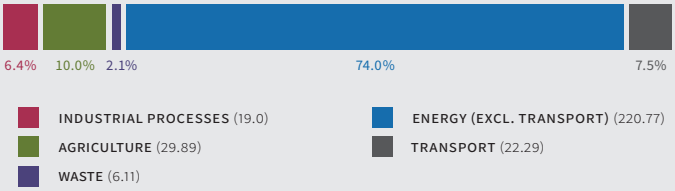
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

298.06 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: 5% reduction from 1990 GHG levels. **BY 2030:** 15% (unconditional) -25% (conditional) reduction from 1990 GHG levels (NDC).

ETS SIZE

CAP

PHASE ONE (2013): 147 $MtCO_2$ (plus a reserve of 20.6 $MtCO_2$). This equals a stabilization of the capped entities' emissions at 2010 levels.

PHASE TWO (2014–2015): 2014: 154.8 $MtCO_2$; 2015: 152.7 $MtCO_2$. This represents reduction targets of 0% and 1.5% respectively, compared to the average CO_2 emissions of capped entities in 2011–2012.

PHASE THREE (2018–2020): 485.9 $MtCO_2$ (161.9 $MtCO_2$ for each year). The cap is set at a 5% reduction by 2020 from 1990 levels.

The cap is allocated for the 2018-2020 period. There is no annual allocation in Kazakhstan in phase three.

EMISSIONS COVERAGE

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Energy sector (including oil and gas), mining, metallurgy and chemical industry, processing (production of building materials: Cement, lime, gypsum and brick)(> 20,000tCO_2/year).

INCLUSION THRESHOLDS: For phase one (2013) and phase two (2014–2015), thresholds were based on 2010 and 2012 emission levels. For phase three (2018–2020), 2013–2015 emission levels will be used.

POINT OF REGULATION

Downstream

NUMBER OF LIABLE ENTITIES

130 companies (2018)

PHASES AND ALLOCATION

TRADING PERIODS

PHASE ONE (PILOT PHASE): 2013 **PHASE TWO:** 2014–2015 **PHASE THREE:** 2018–2020

In 2016 and 2017 the system was temporarily suspended.

ALLOCATION

PHASE ONE (2013): 100% free allocation based on emissions data from 2010.

PHASE TWO (2014–2015): Free allocation (0% and 1.5% below 2011/2012 average emissions).

PHASE THREE (2018–2020): Free allocation based on grandfathering and benchmarking.

COMPLIANCE PERIOD

One year

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed within one trading period; banking between trading periods is prohibited.

OFFSETS AND CREDITS

QUALITATIVE LIMIT: The system allows domestic offsets. International credits may be allowed in the future.

PRICE MANAGEMENT PROVISIONS

Current legislation does not contain any carbon price control measures.

COMPLIANCE

MRV

Reporting is required for businesses or financial facilities above the 20,000 tCO_2/year threshold.

Aside from CO_2, reporting is also required for CH_4, N_2O and PFCs emissions.

REPORTING FREQUENCY: Annually, with reporting due on 1 April.

VERIFICATION: Emission data reports and their underlying data require accredited third-party verification.

OTHER: Installations below the compliance threshold must submit non-verified inventory reports.

ENFORCEMENT

In 2013, penalties for non-compliance were waived. The current non-compliance penalty is approximately EUR 30/tCO_2 (USD 18).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Energy; JSC Zhasyl Damu

Turkey

under consideration

In April 2012, Turkey adopted a new regulatory framework for a comprehensive, mandatory MRV system. Monitoring started in 2015 and reporting (of 2015 emissions) began in 2017.

As an implementing country under the Partnership for Market Readiness (PMR), Turkey received funding in May 2013 to enhance the implementation of the MRV regulation through pilot studies in the energy, cement and refinery sectors, and to explore options for market-based instruments. This includes a series of analytical reports on using emissions trading and other market-based instruments for the MRV sectors. A synthesis report outlining carbon market policy options for Turkey will be submitted to the Climate Change and Air Management Coordination Board in June 2018. Turkey also receives additional funding from the PMR to prepare draft legislation and improve technical and institutional capacity towards piloting a suitable carbon pricing policy, which will be determined by the first implementation phase.

Turkey is also a candidate to EU accession and thereby aims to complete the environmental obligations of the EU accession (including the EU ETS directive).

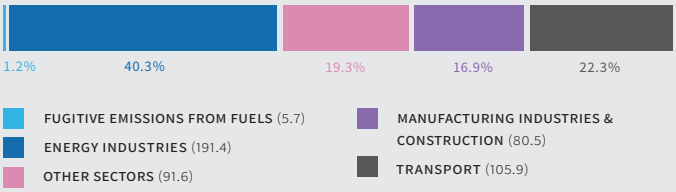
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

475.1 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGET

BY 2030: Up to 21% reduction from the BAU scenario (INDC).

COMPLIANCE

MRV

The Turkish MRV legislation establishes an installation-level system for CO_2 emissions for roughly 1,000 entities. Sector coverage includes the energy sector (combustion fuels >20MW) and industry sectors (coke production, metals, cement, glass, ceramic products, insulation materials, paper and pulp, chemicals over specified threshold sizes/production levels).

Entities had until October 2014 to submit their first monitoring plans and submitted verified emissions reports for 2015 and 2016 to the Ministry of Environment and Urbanization in October 2017. Verifiers will be accredited by the Turkish Accreditation Organization by 2019. During 2016–2018, the Ministry of Environment and Urbanization will provide training, examination and licensing services.

ENFORCEMENT

Entities that fail to comply with the Turkish MRV regulation are subject to the generic data reporting requirements and related sanctions under the Turkish Environmental Law No. 2872.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Environment and Urbanization and further ministries.

Ukraine

scheduled

Ukraine plans to establish a national ETS in line with obligations under the Ukraine-EU Association Agreement, which entered into force on 1 September 2017. In accordance with Article 365 (c) Title V and Annex XXX to the Agreement, the country has to prepare for the ETS implementation, including:

- Adopt national legislation and designate competent authority/ies;
- Establish a system for identifying relevant installations and greenhouse gases (Annexes I and II);
- Develop a national allocation plan to distribute allowances to installations (art. 9);
- Establish a system for issuing greenhouse gas emission permits and issuance of allowances to be traded domestically among installations in Ukraine (art. 4 and 11–13);
- Establish monitoring, reporting, verification and enforcement systems and public consultations procedures (art. 9, 14–17, 19 and 21).

Ukraine is currently developing the main elements of the national MRV system to provide for a solid basis for the upcoming ETS.

Separate legislation is being drafted to establish the MRV system, transpose the relevant EU Directives, regulate GHG emissions and establish the ETS.

Ukraine is working on its MRV plans and the plans for ETS development under the Ukraine-EU Association Agreement with the assistance of the PMR, the European Bank for Reconstruction and Development (EBRD), the United Nations Development Program, the European Commission, the United States Agency for International Development (USAID), German Development Agency (GIZ) and other institutions.

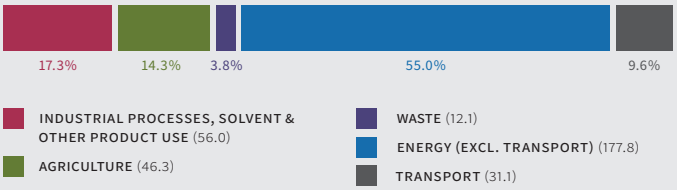
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

323.4 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



OVERALL GHG REDUCTION TARGET

BY 2020: Voluntary target of 20% reduction from 1990 GHG levels (Copenhagen Accord). **BY 2030:** GHG emissions will not exceed 60% of 1990 GHG levels (NDC). **BY 2035:** Domestic target to reduce GHG emissions from final energy consumption by 20% from 2010 levels (Energy Strategy 2035). **BY 2050:** Voluntary target of 50% reduction from 1990 GHG levels.

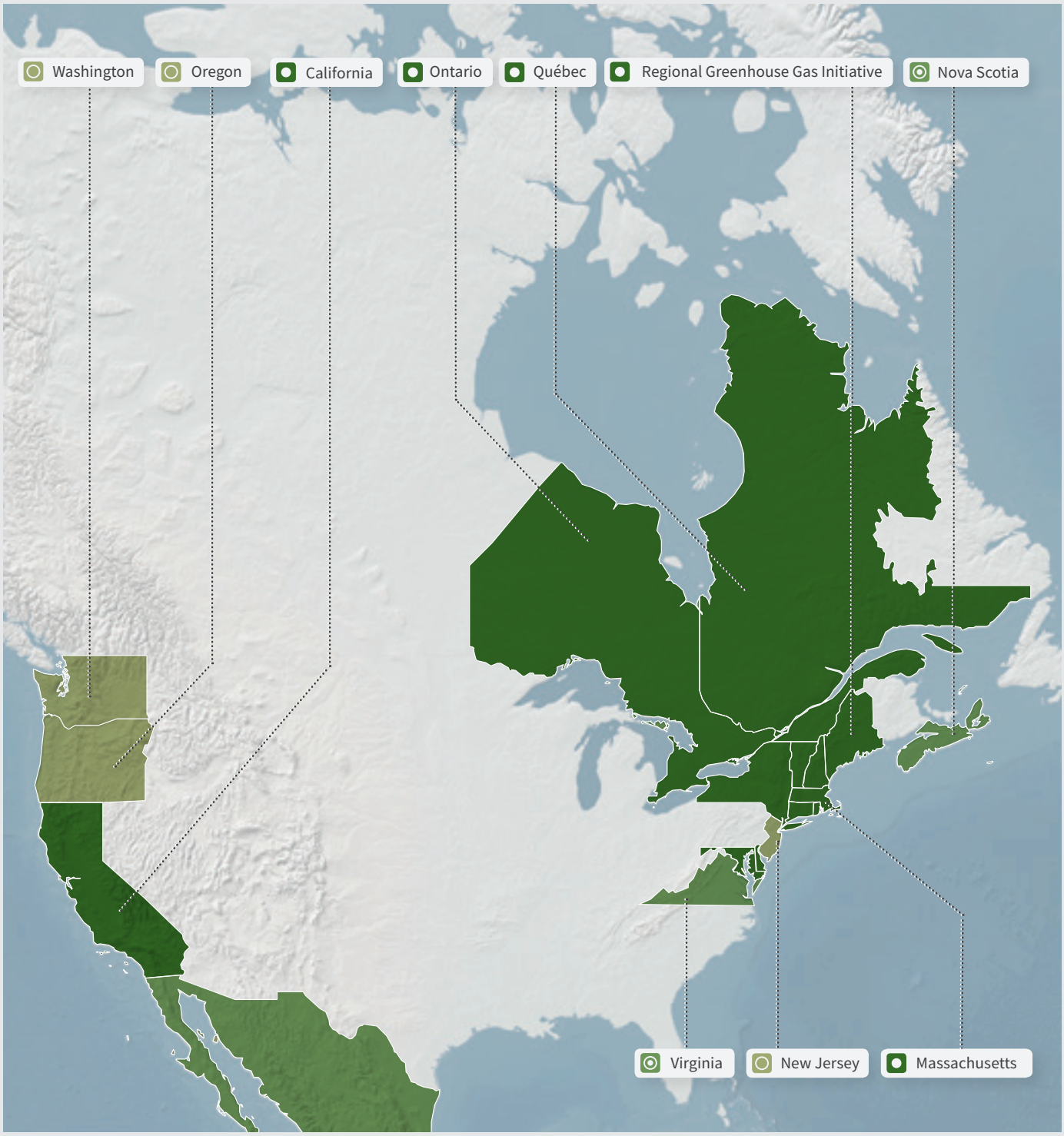
OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Ecology and Natural Resources; Cabinet of Ministers of Ukraine

North America

In 2017, California passed legislation extending and reforming their Cap-and-Trade Program for the next decade. Beginning this year, Ontario linked with the Californian and Québec Cap-and-Trade Programs. RGGI also concluded its Second Program Review in 2017, updating its Model Rule. In September 2017, amendments to Nova Scotia's Environment Act were introduced, which lay the foundations for the introduction of an ETS later in 2018. In November 2017, Virginia also approved a regulation for emissions trading that forms the basis for a possible future link with RGGI.



Western Climate Initiative

CALIFORNIA, QUÉBEC, MANITOBA, ONTARIO, BRITISH COLUMBIA

The WCI is an initiative of American state and Canadian provincial governments that aims to develop a joint strategy to reduce GHG emissions via a regional Cap-and-Trade Program. Currently, British Columbia, California, Manitoba, Ontario, and Québec are members of the initiative. California and Québec independently established cap-and-trade systems; their first compliance periods started on 1 January 2013. One year later, on 1 January 2014, California and Québec linked their systems creating the first international Cap-and-Trade System consisting of sub-national jurisdictions. Ontario launched its Cap-and-Trade Program in 2017, which was linked to the California-Québec carbon market on 1 January 2018. British Columbia and Manitoba are not officially considering an ETS.

California Cap-and-Trade Program

in force

* Sectors represent upstream coverage

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
358.3	450

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	AUCTIONING & FREE ALLOCATION	DOMESTIC OFFSETS

Initiated in 2012, the California Cap-and-Trade Program began its compliance obligation on 1 January 2013. California has been part of the Western Climate Initiative (WCI) since 2007 and formally linked its system with Québec's on 1 January 2014 and with Ontario's on 1 January 2018. The program covers sources responsible for approximately 85% of California's GHG emissions.

In 2017, legislation (Assembly Bill (AB) 398) was passed to extend the cap-and-trade system until 2030 to help achieve California's climate goals.

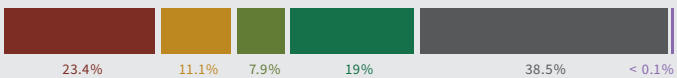
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

440.4 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



- INDUSTRIAL (102.97)
- COMMERCIAL AND RESIDENTIAL (49.10)
- AGRICULTURE & FORESTRY (34.65)
- ELECTRIC POWER (84.09)
- TRANSPORTATION (169.38)
- OTHER (0.17)

GHG REDUCTION TARGETS

BY 2020: Return to 1990 GHG levels. **BY 2030:** 40% reduction from 1990 GHG levels. **BY 2050:** 80% reduction from 1990 GHG levels.

ETS SIZE

CAP

The caps are listed below in $MtCO_2e$ allowances.

FIRST COMPLIANCE PERIOD (2013–2014): 2013: 162.8; 2014: 159.7.

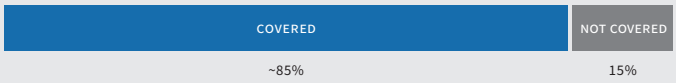
SECOND COMPLIANCE PERIOD (2015–2017): 2015: 394.5; 2016: 382.4; 2017: 370.4.

THIRD COMPLIANCE PERIOD (2018–2020): 2018: 358.3; 2019: 346.3; 2020: 334.2.

FROM 2021 TO 2031, THE ANNUAL CAPS ARE: 2021: 320.8; 2022: 307.5; 2023: 294.1; 2024: 280.7; 2025: 267.4; 2026: 254.0; 2027: 240.6; 2028: 227.3; 2029: 213.9; 2030: 200.5; 2031: 193.8

Beyond 2020, compliance periods will be between two and three years long (2021–2022, 2023–2024, 2025–2027, 2028–2029, and 2030–31), if US Environmental Protection Agency (EPA) approves California's plan for compliance with the federal Clean Power Plan by 1 January 2019. Otherwise, the fourth compliance period will start on 1 January 2021, and end on 31 December 2023, and each subsequent compliance period will be three years long.

EMISSIONS COVERAGE



GHG COVERED

CO_2, CH_4 and N_2O, SF_6, HFCs, PFCs, NF_3 and other fluorinated GHGs.

SECTORS & THRESHOLDS

FIRST COMPLIANCE PERIOD (2013–2014): Covered sectors include those which have one or more of the following processes or operations: large industrial facilities (including cement, glass, hydrogen , iron and steel, lead, lime manufacturing, nitric acid, petroleum and natural gas systems, petroleum refining, pulp and paper manufacturing, including cogeneration facilities co-owned/operated at any of these facilities), electricity generation, electricity imports, other stationary combustion, and CO_2 suppliers.

SECOND COMPLIANCE PERIOD (2015–2017) AND BEYOND: In addition to the sectors listed above, suppliers of natural gas, suppliers of reformulated blendstock for oxygenate blending (RBOB) and distillate fuel oil, suppliers of liquid petroleum gas in California and suppliers of liquefied natural gas (LNG).

INCLUSION THRESHOLDS: Facilities ≥ 25,000 tCO_2e/data year.

POINT OF REGULATION

Mixed

NUMBER OF LIABLE ENTITIES

Approximately 450 entities (2015–2017)

PHASES AND ALLOCATION

TRADING PERIODS

California's trading period is referred to as a "compliance period" (see "compliance period" below). Allowances are allocated and auctioned with calendar year vintages. Some allowances from future vintages are offered at each auction and may be traded but not used for compliance until the compliance date for the vintage year.

ALLOCATION

Allowances are distributed via auction and/or free allocation.

ELECTRICAL DISTRIBUTION UTILITIES AND NATURAL GAS SUPPLIERS: Receive allowances on behalf of their ratepayers (consignment allowances). All natural gas and electrical utilities must use the allowance value for ratepayer benefit and for emissions reductions.

INDUSTRIAL FACILITIES: Receive allowances for transition assistance and to prevent leakage. The amount of free allocation is determined by leakage risk (measured through emissions intensity and trade exposure, used to define assistance factors), sector-specific benchmarks and production volumes as well as a general cap-adjustment factor.

In the third compliance period, the assistance factor is differentiated across sectors based on leakage risk. For the post-2020 period, assistance factors for allocation will be part of a new rulemaking to reflect the direction provided in (AB) 398, which specifies an assistance factor of 100% in the post-2020 period.

The majority of industrial allocation is based on production benchmarks and is updated annually based on verified production data. There is no cap on the total amount of industrial allocation.

OTHER ALLOCATION: Other categories of transition assistance are provided for public wholesale water entities, legacy contract generators, universities, and public service facilities.

The remainder of allowances is auctioned. In 2017, almost 70% of allowances were available through auction, including allowances from Air Resources Board (ARB) as well as consigned allowances to utilities.

COMPLIANCE PERIOD

Between two to three years. Allowances for emissions of the whole compliance period must be surrendered by 1 November (or the first business day thereafter) of the year following the last year of a compliance period.

NOTE: California's trading period is referred to as a "compliance period", though a portion (30%) of allowances must be submitted for each year's emissions depending on the year of the trading/compliance period.

FIRST COMPLIANCE PERIOD: 2013–2014 **SECOND COMPLIANCE PERIOD:** 2015–2017 **THIRD COMPLIANCE PERIOD:** 2018–2020 ***FOURTH COMPLIANCE PERIOD:** 2021–2022 ***FIFTH COMPLIANCE PERIOD:** 2023–2024 ***SIXTH COMPLIANCE PERIOD:** 2025–2027 ***SEVENTH COMPLIANCE PERIOD:** 2028–2029 ***EIGHTH COMPLIANCE PERIOD:** 2030–2031

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed but the emitter is subject to a general holding limit. Borrowing of future vintage allowances is not allowed.

OFFSETS AND CREDITS

UP TO 2020:

QUANTITATIVE LIMIT: Up to 8% of each entity's compliance obligation.

QUALITATIVE LIMIT: Currently six domestic offset types are accepted as compliance units originating from projects carried out according to six "protocols": **(1)** U.S. forest projects; **(2)** Urban forest projects; **(3)** Livestock projects (methane management); **(4)** Ozone depleting substances projects; **(5)** Mine methane capture (MMC) projects; **(6)** Rice cultivation projects.

FROM 2021: AB 398 lays out two significant changes to the offset program from 2021 onwards: **(1)** The share of offsets that can be used to fulfill the compliance obligation will reduce to 4% between 2021–2025 and will remain reduced at 6% thereafter (from 8% now). **(2)** In addition, half of the compliance obligation will have to stem from offsets creating direct environmental benefits in California.

PRICE MANAGEMENT PROVISIONS

AUCTION RESERVE PRICE: USD 14.53 in 2018 per allowance. The auction reserve price increases annually by 5% plus inflation, as measured by the Consumer Price Index.

An Allowance Price Containment Reserve will be allocated to allowances from various budgets (1% from budget years 2013–2014; 4% from budget years 2015–2017; and 7% from budget years 2018–2020). AB 398 requires two-thirds of the reserve allowances that remain on December 31, 2017

* If U.S. EPA has not approved California's plan for compliance with the Clean Power Plan by 1 January 2019, then the fourth compliance period starts on 1 January 2021 and ends on 31 December 2023, and each subsequent compliance period will be three years long.

to be used to populate the two price containment points starting in 2021. The reserve sale administrator can sell accumulated allowances on a regular basis in three equal price tiers. For 2017, these prices are USD 50.69, 57.04, and 63.37 (EUR 48.61, 54.70 and 60.77). Tier prices increase by 5% plus inflation (as measured by the Consumer Price Index).

If the allowances in the reserve are all sold, allowances from future years are transferred to the reserve and made available for sale.

AB 398 reforms the price management provisions starting in 2021: Two price containment points triggered at increasing price levels will be filled with remaining APCR allowances. A third price level, yet to be determined, will be a price ceiling. At this level, allowances can be bought in unlimited quantities, with the revenues having to be invested in real, permanent, quantifiable, verifiable, enforceable, and additional emissions reductions on at least a metric ton for metric ton basis.

COMPLIANCE

MRV

REPORTING FREQUENCY: One year

VERIFICATION: Emission data reports and their underlying data require independent third-party verification annually for all entities covered by the program (generally defined as entities with emissions that equal to or exceed 25,000 tCO_2e per year).

OTHER: Reporting is required for most operators at or above 10,000 tCO_2e per year. Operators must implement internal audits, quality assurance and control systems for the reporting program and the data reported.

ENFORCEMENT

Penalties may be assessed pursuant to Health and Safety Code section 38580 (misdemeanor, fines, and possibly imprisonment).

There are separate and substantial penalties for mis- or non-reporting under the Mandatory GHG Reporting Regulation.

OTHER INFORMATION

INSTITUTIONS INVOLVED

California Air Resources Board (CARB)

LINKS WITH OTHER SYSTEMS

California linked with Québec's ETS on 1 January 2014. The two extended their joint market by linking with Ontario on 1 January 2018.

Québec Cap-and-Trade System

in force

* Sectors represent upstream coverage

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
58.96	132

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	AUCTIONING & FREE ALLOCATION	DOMESTIC OFFSETS

Québec's Cap-and-Trade System for GHG emissions was introduced in 2012. The program's enforceable compliance obligation began on 1 January 2013. Compliance periods are three years long.

Québec has been a member of the Western Climate Initiative (WCI) since 2008 and formally linked its system with California on 1 January 2014 and with Ontario on 1 January 2018.

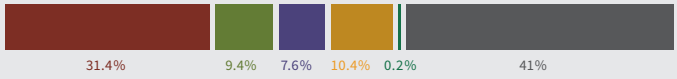
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

82.1 $MtCO_2e$ (2014)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2014)



- INDUSTRY (25.8)
- AGRICULTURE (7.7)
- WASTE (6.2)
- RESIDENTIAL & COMMERCIAL (8.5)
- ELECTRICITY (0.2)
- TRANSPORT (33.7)

GHG REDUCTION TARGETS

BY 2020: 20% reduction from 1990 GHG levels. **BY 2030:** 37.5% reduction from 1990 GHG levels. **BY 2050:** 80–95% reduction from 1990 GHG levels.

ETS SIZE

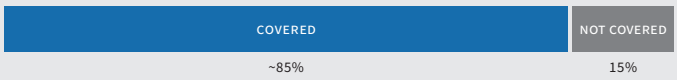
CAP

The following caps are given in millions of allowances:

FIRST COMPLIANCE PERIOD (2013–2014): 23.20 each year **SECOND COMPLIANCE PERIOD (2015–2017):** 2015: 65.30; 2016: 63.19; 2017: 61.08 **THIRD COMPLIANCE PERIOD (2018–2020):** 2018: 58.96; 2019: 56.85; 2020: 54.74 **FOURTH COMPLIANCE PERIOD (2021–2023):** 2021: 55.26; 2022: 54.02; 2023: 52.79 **FIFTH COMPLIANCE PERIOD (2024–2026):** 2024: 51.55; 2025: 50.31; 2026: 49.08 **SIXTH COMPLIANCE PERIOD (2027–2029):** 2027: 47.84; 2028: 46.61; 2029: 45.37

After a slight increase in the cap in 2021 (due to an adjustment of the global warming potential of different GHGs), the cap will reduce by about 1.24 million allowances per year. This will result in a cap of 44.14 million allowances in 2030.

EMISSIONS COVERAGE



GHG COVERED

CO_2, CH_4, N_2O, SF_6, HFCs, PFCs, NO_3 and other fluorinated GHGs.

SECTORS & THRESHOLDS

FIRST COMPLIANCE PERIOD (2013–2014): Electricity, Industry (>25,000 tCO_2e/year).

SECOND COMPLIANCE PERIOD (2015–2017) and **THIRD COMPLIANCE PERIOD (2018–2020):** Sectors of first compliance period as well as distribution and importation of fuels used for consumption in the transport and building sectors, and in small and medium-sized businesses.

INCLUSION THRESHOLDS: >25,000 tCO_2e/year. As of 2016, fuel distributors that have distributed 200L or more of fuel (in 2015) are also subject to inclusion even if the combustion of their fuel have resulted in the emission of less than 25,000 tCO_2e.

VOLUNTARY EMITTERS (OPT-IN COVERED ENTITIES): Starting in 2019, emitters from capped sectors that reported emissions between 10,000 tCO_2e/year and 25,000 tCO_2e/year may voluntarily register to the Cap-and-Trade System as a covered entity.

POINT OF REGULATION

Mixed

NUMBER OF LIABLE ENTITIES

132 (2017)

PHASES AND ALLOCATION

TRADING PERIODS

In Québec's Cap-and-Trade System, a trading period is referred to as a "compliance period" (see below). Allowances are allocated and auctioned with calendar vintage years.

ALLOCATION

AUCTIONS: Generally, electricity and fuel distributors have to buy 100% of their allowances at auction (or on the market). Allowances are auctioned quarterly.

As of 1 January 2018, Québec had held a total of 17 auctions, 13 held jointly with California. All auction revenues go to the Québec Green Fund, which is dedicated to the fight against climate change through Québec's 2013–2020 Climate Action Plan.

Unsold allowances in past auctions are removed and will gradually be released for sale at auction after two consecutive auctions are held in which the sale price is higher than the minimum price.

FREE ALLOCATION: Emission-intensive sectors subject to international competition receive a portion of free allowances. These include: Aluminum, lime, cement, chemical and petrochemicals, metallurgy, mining and pelletizing, pulp and paper, petroleum refining, and others (manufacturers of glass food containers, electrodes, gypsum products, and some agro-food products).

FIRST COMPLIANCE PERIOD (2013–2014): Historical emission intensity adjusted for production level and by type of emission, with 100% allocation for process emissions, 80% for combustion emissions and 100% for emissions from other sources.

SECOND (2015–2017) AND SUBSEQUENT PERIODS: Allocation of free allowances is based on increasingly strict intensity targets (declining emissions intensity per activity) and production levels. Since production volumes can vary, increasing intensity targets do not guarantee an absolute reduction in free allocation.

As of 2019, allocation of free allowances is made available to voluntary emitters (also known as *opt-in covered entities*) in alignment with what has been established for regulated entities.

COMPLIANCE PERIOD

FIRST COMPLIANCE PERIOD: 1 January 2013–31 December 2014.

SUBSEQUENT COMPLIANCE PERIODS: Three calendar years as of 1 January 2015 (2015–2017, 2018–2020, and so forth).

Allowances must be surrendered by 1 November following the end of the compliance period.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed but the emitter is subject to a general holding limit. Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: Up to 8% of each entity's compliance obligation.

QUALITATIVE LIMIT: Currently four domestic (non-Kyoto) offset types are accepted as compliance instruments originating from projects carried out according to five protocols in Québec: **(1)** CH_4 destruction as part of projects to cover manure storage facilities; **(2)** Capture of gas from specified landfill sites; **(3)** Destruction of certain ozone depleting substances contained in insulating foam and of certain refrigerant gases recovered from domestic appliances in Canada; **(4)** Capture and destruction of CH_4 from a CH_4 drainage system at an active underground or surface coal mine, except a mountaintop removal mine; **(5)** Capture and destruction of CH_4 from the ventilation system of an active underground coal mine.

A number of new offset-protocols, co-commissioned with Ontario, are under development. Information on the timing of their adoption is not yet available. Offsets issued by jurisdictions linked with Québec are recognized for compliance.

The Minister may require the offset promoter (developer) to replace any offset credit issued to the buyer for a project, in the event that: **(1)** Due to omissions, inaccuracies or false information in the documents provided by the promoter, the GHG emissions reductions for which the offset credits were issued were not eligible; **(2)** Offset credits were applied for under another program for the same reductions as those covered by the application for credits under this regulation.

In the instance that credit recovery is not possible, an equivalent number of credits will be retired from the Minister's environmental integrity account. The Minister takes three percent of issued offset credits as a contingency reserve to fill that account.

PRICE MANAGEMENT PROVISIONS

AUCTION RESERVE PRICE: Minimum auction (reserve) price for joint auction with California and Ontario in 2018: The highest of Québec's (CAD 14.35; USD 18.63), Ontario's (CAD 14.68; USD 19.05) or California's (USD 14.53) annual price; increasing annually by 5% plus inflation until 2030.

Reserve emission units held in the Allowance Price Containment Reserve account may be sold at CAD 53.37 (USD 69.27), 60.04 (USD 77.93), 66.71 (USD 86.59)/t CO_2e in 2018.

Only covered entities in Québec are eligible to purchase allowances from the Reserve, as long as they do not have valid compliance instruments for the current period in their general account. Reserve prices increase annually by 5% plus inflation.

COMPLIANCE

MRV

REPORTING FREQUENCY: One year. Report to be submitted by 1 June of each year.

VERIFICATION: Emitters (and voluntary emitters) participating in ETS (higher threshold than those with regulatory reporting requirement) must send a verification report carried out by an organization accredited to ISO 14065.

FRAMEWORK: Regulation on the mandatory reporting of certain emissions of contaminants into the atmosphere is outlined in the Environment Quality Act.

ENFORCEMENT

For non-compliance, entities can be fined CAD 3,000–500,000 (USD 3,894–649,000) and spend up to 18 months in jail in the case of a natural person, and CAD 10,000–3,000,000 (USD 12,980–3,894,000) in the case of a legal person.

Fines are doubled in the case of a second offense. In addition, the Minister of Sustainable Development, the Environment and the Fight against Climate Change may suspend the allocation to any emitter in case of non-compliance.

A covered entity that fails to cover its real and verified GHG emissions with enough allowances on 1 November following the end of a compliance period, must remit each missing allowance and will have to remit three additional allowances for each allowance it failed to remit to the Minister. The person with legal responsibility for that entity would also be committing an infraction, subject to financial penalties, for each compliance instrument not surrendered as part of the compliance obligation.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (Ministry of Sustainable Development, the Environment and the Fight Against Climate Change); Direction générale de la Réglementation carbone et des données d'émission (Carbon Market Directorate).

LINKS WITH OTHER SYSTEMS

On 1 January 2014, Québec linked with California. On 1 January 2018, Québec and California linked with Ontario.

Ontario Cap-and-Trade Program

in force

* Sectors represent upstream coverage

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
136	247 including voluntary opt-ins

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	AUCTIONING & FREE ALLOCATION	DOMESTIC OFFSETS

On 18 May 2016, Ontario passed legislation and introduced regulations establishing a cap-and-trade program with a first compliance period of 2017–2020. The program covers facilities generating more than 25,000 tons of GHG, as well as natural gas distributors, fuel suppliers and electricity importers. Facilities with emissions between 10,000–25,000 tons may opt in to the program.

Ontario has been a member of the Western Climate Initiative (WCI) since 2008. In 2017, Ontario signed an agreement linking its carbon market with California and Québec starting in 2018, forming a three-jurisdictional carbon market.

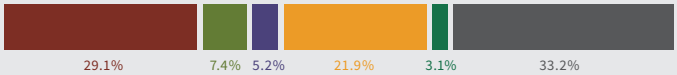
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

166.2 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



- INDUSTRY (48.3)
- AGRICULTURE (12.3)
- WASTE (8.6)
- BUILDINGS (36.8)
- ELECTRICITY GENERATION (5.2)
- TRANSPORT (55.0)

GHG REDUCTION TARGETS

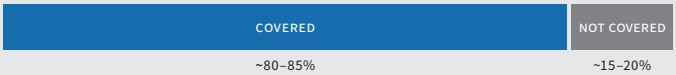
BY 2020: 15% reduction from 1990 GHG levels. **BY 2030:** 37% reduction from 1990 GHG levels. **BY 2050:** 80% reduction from 1990 GHG levels.

ETS SIZE

CAP

FIRST COMPLIANCE PERIOD (2017–2020): 2017: 142.3 $MtCO_2e$, set to decline by 4.17% per year until 2020. **2018:** 136.4 $MtCO_2e$ **2019:** 130.6 $MtCO_2e$ **2020:** 124.7 $MtCO_2e$. **FUTURE COMPLIANCE PERIODS (2021–2030):** Cap declines by 3.6 Mt (2.9%) annually to 88.5 Mt in 2030.

EMISSIONS COVERAGE



GHG COVERED

All major greenhouse gases such as CO_2, CH_4, SF_6, N_2O, NF_3 and other fluorinated GHGs.

SECTORS & THRESHOLDS

PHASE I (2017–2020): Industrial and large commercial operators including manufacturing, base metal processing, steel, pulp and paper, food processing and facilities, with annual emissions > 25,000 tCO_2e.
Domestic electricity generation based on fuel combustion covered at the fuel distribution level, while the compliance obligation for electricity imports rests with the importer.

Transportation fuel distributors (including propane and fuel oil) for those entities that first place more than 200L of fuel annually into the Ontario market. Natural gas distributors with annual emissions greater than 25,000 tCO_2e and operating at the point where the gas is moved from the pipeline into the distribution network for Ontario consumers.
Other large emitters with annual emissions > 25,000 tCO_2e. Facilities emitting between 10,000–25,000 tCO_2e per year may voluntarily opt in.

POINT OF REGULATION
Mixed

NUMBER OF LIABLE ENTITIES
247, including voluntary opt-ins (in December 2017).

PHASES AND ALLOCATION

TRADING PERIODS
After the first compliance period (2017–2020), compliance periods are three years long; 2021–2023 is the first 3-year compliance period.

ALLOCATION
Electricity sector (electricity generators, or those involved in electricity importation and transmission), petroleum producers and suppliers and natural gas distributors: Electricity and fuel distributors have to buy 100% of their allowances at auctions or on the secondary market. Allowances are auctioned quarterly.
OTHER SECTORS (INDUSTRY, INSTITUTIONS AS DEFINED ABOVE (SECTORS)): Emitters outside the electricity, natural gas and fuel sectors are eligible to receive free allowances in Phase I.

COMPLIANCE PERIOD
FIRST COMPLIANCE PERIOD: 2017–2020
SUBSEQUENT COMPLIANCE PERIODS: Three calendar years. Allowances must be surrendered by 1 November (or the first business day thereafter) following the end of the compliance period.

FLEXIBILITY

BANKING AND BORROWING
Banking is allowed but the emitter is subject to a general holding limit.

OFFSETS AND CREDITS
PHASE I (2017–2020): In the first phase, offset credits and early reduction credits will be available for use. Early reduction credits will be offered to facilities that have taken early mitigation action in the four years preceding approval of the final cap-and-trade regulation. The regulations do not currently provide details on the creation and distribution of Early Reduction Credits, but Ontario has indicated intent to amend the regulation to do so.
Ontario finalized its first offset protocol (Landfill Gas Capture and Destruction) at the end of 2017. Ontario is working to finalize additional offset protocols together with Québec by the end of 2018. The protocols are consistent with offset project criteria developed together with Québec, California and other WCI members in 2010.
QUANTITATIVE LIMITS: Offset credits can be used to meet up to 8% of an entity's compliance obligation.

PRICE MANAGEMENT PROVISIONS
RESERVE PRICE AT AUCTION: In 2017, the minimum price at Ontario auctions was the higher of the annual action reserve prices in either Québec or California (USD 13.57 (CAL) or 13.56 (QC)) adjusted to CAD based on the exchange rate on the day prior to the auction. In 2018, Ontario's reserve price will be CAD14.68 (USD 11.31), increasing annually by 5% plus inflation, as measured by the Consumer Price Index for Ontario.
Starting in February 2018, Ontario will hold joint auctions with California and Québec where the auction reserve price will be the highest of the three jurisdictions.
COST CONTAINMENT RESERVE: Ontario also has a strategic allowance reserve for Ontario entities. Allowances released from this reserve can only be used for compliance. Ontario's prices are closely aligned with Québec's.

COMPLIANCE

MRV
REPORTING FREQUENCY: Annually. Facilities and natural gas distributors emitting more than 10,000 tCO_2e, fuel suppliers that sell more than 200 L of fuel annually, and electricity importers must report their emissions.
VERIFICATION: Third party verification is required for covered entities.

ENFORCEMENT
If an entity fails to surrender sufficient allowances to cover their emissions, they must surrender four times the number of missing allowances (three times the shortfall plus the original shortfall).
Failure to surrender allowances also renders the entity liable to a minimum fine of CAD 25,000/day (USD 19,260/day) until the remaining allowances are surrendered (with a maximum fine of CAD 6 million [USD 4.62m]). Subsequent offences attract higher fines.
Individuals (persons) are liable for at least CAD 5,000/day (USD 3,852) with a maximum fine of CAD 4 million (USD 3.08m) and imprisonment for up to five years. Subsequent offences attract higher fines. Penalties apply for other violations.

OTHER INFORMATION

INSTITUTIONS INVOLVED
Ministry of the Environment and Climate Change; Western Climate Initiative

LINKS WITH OTHER SYSTEMS
Ontario linked its system with California and Québec in January 2018.

Regional Greenhouse Gas Initiative (RGGI)

in force

CONNECTICUT, DELAWARE, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW YORK, RHODE ISLAND, VERMONT

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
82.3 (short-tons)	165

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	AUCTIONING	DOMESTIC OFFSETS

RGGI is the first mandatory GHG ETS in the United States. As foreseen by the original MOU between the participating states, a RGGI program review was conducted in 2012. Based on the program review, each of the states updated their regulations so that a tighter cap and other program changes went into force on 1 January 2014.

RGGI concluded its Second Program Review in 2017 and a new Model Rule has been prepared. Between 2021 and 2030, the cap will reduce by 30% compared to 2020. Furthermore, an Emissions Containment Reserve (ECR) will be established to achieve greater emission reductions if the cost is lower than anticipated.

Virginia has recently released a draft regulation that could eventually lead to an expansion of the RGGI allowance market.

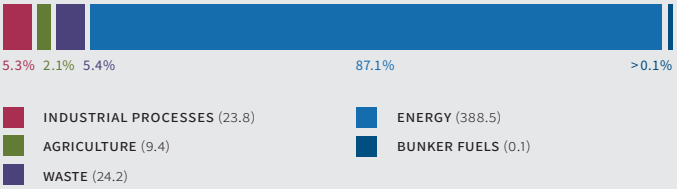
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

446.0 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2012)



OVERALL GHG REDUCTION TARGET

BY 2020: RGGI states have committed to a regional cap of a more than 50% reduction of CO_2 emissions from electricity generation from 2005 CO_2 emissions. **BY 2030:** States propose to implement a reduction of 30% compared to 2020 CO_2 emissions cap, with a constant reduction of 2.275 million short tons/year between 2021 and 2030.

NOTE: The participating states have their own emission targets, economy-wide targets are not defined at the level of RGGI.

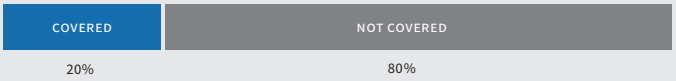
ETS SIZE

CAP

The original cap was stabilized at 165 million short tons CO_2 (2009–2014) with a 2.5% annual reduction factor from 2015 through 2018, totaling 10%. However, by 2012, RGGI had experienced more than a 40% reduction in emissions from the original cap. Because of these reduced emissions, the states lowered the cap to 91 million short tons in 2014. The revised regulations extended the 2.5% annual reduction factor through 2020, with a 2020 cap of approximately 78 million short tons.

Following the most recent program review, the proposed reduction factor between 2021 and 2030 is about 3% of the 2020 cap resulting in a 2030 regional cap of about 55 million short tons.

EMISSIONS COVERAGE



GHG COVERED

CO_2

SECTORS & THRESHOLDS

Fossil Fuel Electric Generating Units.

INCLUSION THRESHOLDS: Capacity equal to or greater than 25MW.

POINT OF REGULATION

Downstream (at installation level)

NUMBER OF LIABLE ENTITIES

165 entities (as of November 2017)

PHASES AND ALLOCATION

ALLOCATION

The vast majority of CO_2 allowances issued by each RGGI state are distributed through quarterly, regional CO_2 allowance auctions using a "single-round, sealed-bid uniform-price" format. Auctions are open to all parties with financial security, with a maximum bid of 25% of auctioned allowances per quarterly auction.

TRADING/COMPLIANCE PERIOD

RGGI's trading period is referred to as a control period.

FIRST CONTROL PERIOD: 2009–2011 **SECOND CONTROL PERIOD:** 2012–2014

THIRD CONTROL PERIOD: 2015–2017 * **FOURTH CONTROL PERIOD:** 2018–2020 *

* RGGI introduced an interim control period with the 2014 revisions. An affected source must cover 50% of its emissions with allowances in each of the first two years of a control period. The affected source must cover 100% of the remaining emissions at the end of the three-year control period.

FLEXIBILITY

BANKING AND BORROWING

Banking of allowances is allowed without restrictions, but regulations include adjustments to the cap to address the aggregate bank by reducing the amount of allowances available in future years by the amount of allowances not used for compliance in previous control periods. Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: 3.3% of an entity's liability may be covered with offsets. This percentage share will remain equal between 2021 and 2030 according to the Model Rule.

QUALITATIVE LIMIT: Currently the program allows offset allowances from five offset types located in RGGI states, although only one offset project (landfill methane capture and destruction) has been approved since the program's inception: **(1)** Landfill methane capture and destruction; **(2)** Sequestration of carbon due to reforestation, improved forest management, or avoided conversion; **(3)** Avoided methane emissions from agricultural manure management operations; **(4)** Reduction or avoidance of CO_2 emissions from natural gas, oil, or propane end-use combustion due to end-use energy efficiency; and **(5)** Reduction in SF_6 emissions.

According to the Model Rule, the offset protocols 4 and 5 above will be discontinued from 2021.

PRICE MANAGEMENT PROVISIONS

MINIMUM AUCTION PRICE: USD 2.20 in 2018, increasing by 2.5% per year (to reflect inflation).

As of 2014, RGGI states created a Cost Containment Reserve (CCR), where allowances are released to the market when certain trigger prices are reached. Trigger Prices: USD 10 in 2017. Between 2018 and 2020, the CCR trigger price will increase annually by 2.5%.

In 2021, under the Model Rule, the trigger price will be set at USD 13 and will increase by 7% compared to the previous year thereafter.

In addition, the Model Rule envisages the establishment of an Emissions Containment Reserve (ECR): Allowances would be withheld from circulation (from auction) to secure emissions reductions if the emission reduction costs are lower than projected. In 2020, this trigger price will be set at USD 6, increasing by 7% compared to the previous year thereafter.

COMPLIANCE

MRV

FRAMEWORK: Emissions data for emitters are recorded in the United States Environmental Protection Agency's (US EPA) Clean Air Markets Division database in accordance with state CO_2 Budget Trading Program regulations and US Environmental Protection Agency (EPA) regulations. Provisions are based on the US EPA monitoring provisions. Data are then automatically transferred to the electronic platform of the RGGI CO_2 Allowance Tracking System, which is publicly available.

ENFORCEMENT

Penalties for non-compliance are set by each state; in case of excess emissions, compliance allowances for three times the amount of excess emissions have to be surrendered in future periods.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Each RGGI State has its own statutory and/or regulatory authority. In addition, RGGI's development and implementation is supported by RGGI Inc., a non-profit cooperative.

LINKS WITH OTHER SYSTEMS

Virginia has recently released a draft regulation that could eventually lead to an expansion of the RGGI allowance market.

Massachusetts Limits on Emissions from Electricity Generators

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
8.96	21

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	NONE

In 2016, a ruling by the Massachusetts Supreme Court established that the government would need to take additional action to guarantee that the state's climate targets, a 25% reduction in 2020 and an 80% reduction by 2050 (compared to 1990), are met. In response, several regulations were released, among them the Massachusetts' Department of Environmental Protection's (MassDEP) 310 CMR 7.74. This regulation is structured as a cap-and-trade program, but is intended to ensure that emissions reductions associated with other clean energy programs occur in Massachusetts, not to provide a significant independent incentive to reduce emission. The system began operation in January 2018. The first program review will be in 2021, with a review every ten years thereafter. The system exists in parallel to, but does not directly interact with, the Regional Greenhouse Gas Initiative.

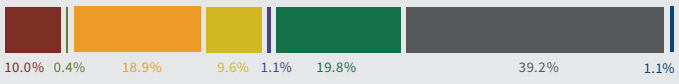
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

74.8 $MtCO_2e$ (2014)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



- INDUSTRY (7.5)
- AGRICULTURE (0.3)
- RESIDENTIAL (14.1)
- COMMERCIAL (7.2)
- WASTE (0.8)
- ELECTRICITY (14.8)
- TRANSPORT (29.3)
- NATURAL GAS SYSTEMS (0.8)

GHG REDUCTION TARGETS

BY 2020: 25% reduction compared to 1990 **BY 2050:** 80% reduction compared to 1990 (Interim targets to be set)

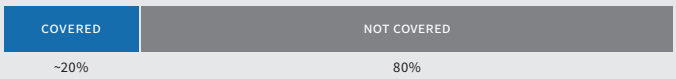
ETS SIZE

CAP

8.96 $MtCO_2e$ (2018)

The cap declines annually by 2.5% of the 2018 cap, which corresponds to 223,876 tCO_2e per year until it reaches a cap of 1.8 $MtCO_2e$ by 2050.

EMISSIONS COVERAGE



GHG COVERED

CO_2

SECTORS & THRESHOLDS

Large electricity generators subject to RGGI (25 MWe).

POINT OF REGULATION

Downstream (at installation level)

NUMBER OF LIABLE ENTITIES

21 (2018)

PHASES AND ALLOCATION

ALLOCATION

In 2018, allowances are allocated freely based on prior production volumes (electricity generation). A reserve for new entrants also exists to allocate allowances to facilities beginning operation in 2018.

From 2019 onwards, allowances will be auctioned. Auction proceeds will be paid to a segregated account and shall be used to further reduce GHG emissions. There will be at least one auction per year; with a default of quarterly auctions (that can be adjusted by the Executive Office of Energy and Environmental Affairs and its Massachusetts Department of Environmental Protection (MassDEP).

TRADING/COMPLIANCE PERIOD

The compliance period is yearly: Compliance has to be demonstrated by 1 March of the subsequent year. Allowances can be traded year-round except for the month of March.

Exceptions exist for emergencies occurring in the last 45 days of the calendar year, for which deferred compliance is available. Emergencies are defined as situations where the regional transmission organization has issued an alert that abnormal conditions affect the reliability of the power system exist or are anticipated.

MASSACHUSETTS LIMITS ON EMISSIONS FROM ELECTRICITY GENERATORS

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed but restricted such that it is guaranteed that emissions in any year cannot exceed the emission limit of the prior year. This means that the total amount of allowances banked is, at maximum, the differential between last year's and this year's emission limit.

This constraint is implemented by multiplying held allowances by a factor expressing the reduction between years (e.g. reduction of emission limit (223,876 tons)/emission limit from last year).

Borrowing is not allowed, but the possibility of emergency deferred compliance exists (see "Trading/Compliance Period").

OFFSETS AND CREDITS

There are no offsets.

PRICE MANAGEMENT PROVISIONS

AUCTION RESERVE PRICE: The possibility of an auction reserve price is mentioned in the regulation. At this point, no reserve price is published as auctions will only start in 2019.

Other provisions for price management are not mentioned.

COMPLIANCE

MRV

REPORTING FREQUENCY: Regulated entities have to submit emission reports (by 1 February) and compliance certification reports (by 1 March) indicating emissions and the holding of sufficient allowances, respectively.

VERIFICATION: Documents (i.e. emissions reports and compliance certification reports) have to be certified and MassDEP may choose to verify compliance.

OTHER: Regulated entities are mandated to keep records and to grant access to information.

ENFORCEMENT

If the MassDEP establishes a violation of compliance, this will be presumed to constitute "a significant impact to public health, welfare, safety or the environment". Apart from additional penalties, the regulated entity has to submit three additional allowances for each ton of non-compliance.

OTHER INFORMATION

INSTITUTIONS INVOLVED

The Executive Office of Energy and Environmental Affairs and its Massachusetts Department of Environmental Protection (MassDEP).

Virginia

scheduled

On 16 November 2017, the Virginia State Air Pollution Control Board approved for public comment a proposal rule drafted by the state's Department of Environmental Quality (DEQ) to link to RGGI by 2020. On 8 January 2018, the proposal was published for a 60-day public comment period. Following the public comment period, DEQ will prepare a draft final rule for the Air Board to consider for promulgation later in the year.

The regulation would be in line with many of RGGI's major design features, including a statewide cap starting at 33–34 $MtCO_2e$, declining annually by three percent to 2030. The program would distribute 95% allowances via consignment auctions and 5% will be allocated to the Department of Mines, Mineral and Energy to help the department reduce and control CO_2 emissions. Virginia's proposal also adopts RGGI's Cost Containment Reserve to deal with higher than expected carbon prices and Emissions Containment Reserve that would withhold allowances in the event prices are lower than expected.

This proposal is in line with an Executive Order from Governor McAuliffe in May 2017 for the DEQ to draft a proposed "trading ready" regulation to limit CO_2 emissions from the fossil fuel power sector that would be similarly stringent to measures in other states participating in CO_2 trading programs. The order envisioned that the "trading ready" CO_2 emissions reduction program created by the proposed rule would be likable to RGGI or to similar multi-state CO_2 trading programs.

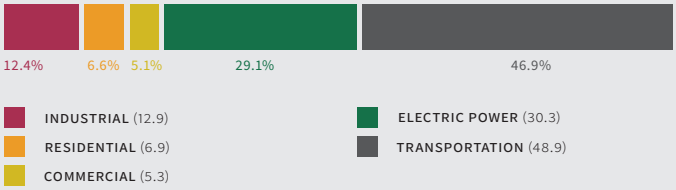
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

104 $MtCO_2e$ (2014)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2014)



GHG REDUCTION TARGETS

BY 2025: 30% reduction below BAU projection of GHG emissions.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Virginia Department of Environmental Quality (DEQ)

LINKS WITH OTHER SYSTEMS

Virginia and RGGI have held discussions about the possibility of Virginia participating in the RGGI Cap-and-Trade Program.

Oregon

under consideration

In February 2017, the Oregon Department of Environmental Quality (DEQ) published a study on designing a cap-and-trade program in Oregon that would be compatible to link with the Western Climate Initiative (WCI) jurisdictions. The study was mandated by Senate Budget Bill 5701.

In addition, On 8 January 2018 two bills were proposed that would establish a cap-and-trade program in Oregon closely modelled on the Californian system to start in 2021. They are currently under consideration by the lead Senate and House committees. In January 2017, a bill was introduced in the Senate to require DEQ to adopt a GHG Cap-and-Invest Program, as well as to set statewide GHG emissions goals for 2025, and limits for 2035 and 2050. No vote has been taken on this bill yet.

An annual GHG emissions reporting program is in place since 2008, mainly covering industry and waste, as well as fuel distributors and electricity suppliers.

Oregon has been a member of the Pacific Coast Collaborative (PCC) since 2008. In 2013, Oregon signed a non-binding agreement with the other members of the PCC (the Federal States of Washington and California, and the Canadian province of British Columbia) to work together for climate protection.

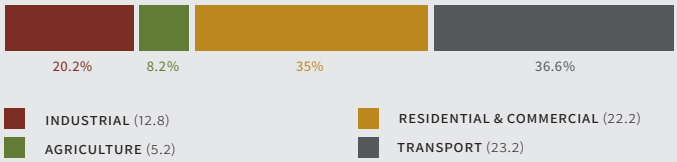
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

63.4 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2010)



GHG REDUCTION TARGETS

BY 2020: 10% reduction from 1990 GHG levels. **BY 2050:** At least 75% reduction from 1990 GHG levels.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Oregon Department of Environmental Quality (DEQ)

Washington

under consideration

In 2008, the State of Washington adopted GHG reduction targets for 2020, 2035 and 2050.

In 2017, the Washington Department of Ecology began implementing the Clean Air Rule to reduce emissions from industrial sources, petroleum fuel producers and importers, and natural gas distributors. Those responsible for at least 100,000 metric tons of GHG per year are affected.

Covered facilities must reduce a cumulative 1.7% of their baseline emissions annually. They can comply by reducing their own emissions, buying credits from other regulated parties or from projects that reduce emissions, or by acquiring allowances from approved ETS programs. However, the Clean Air Rule is currently facing a legal challenge that is delaying implementation of the program.

Recent changes to the legislature have renewed interest in putting a carbon pricing policy into law. On 9 January 2018, Governor Inslee proposed a USD 20 carbon tax for fossil fuels and electricity starting in July 2019, increasing 3.5% annually plus inflation.

In addition, environmental NGOs have announced their intent to put a carbon pricing policy to a vote of the people in 2018 if the state legislature does not act.

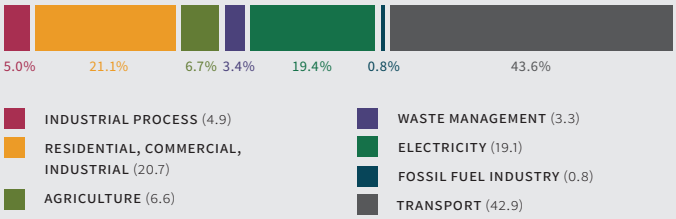
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

98.3 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: Reduce emissions to 1990 GHG levels. **BY 2035:** 25% reduction from 1990 GHG levels. **BY 2050:** 50% reduction from 1990 GHG levels or 70% reduction from the state's expected emissions for that year.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Washington Department of Ecology

Canada

Carbon pricing systems are already in place in four Canadian provinces (Alberta, British Columbia, Ontario, and Québec) which together represent over 80% of the Canadian population.

In December 2016, the Government of Canada released the Pan-Canadian Framework on Clean Growth and Climate Change, the federal government's plan to meet its emissions reduction target. A central part of the Framework is the commitment to pricing carbon pollution across Canada in 2018.

In late December 2017, the Canadian Environment and Climate Change Minister Catherine McKenna and Finance Minister Bill Morneau announced that provinces and territories that choose the federal backstop should confirm this by 30 March 2018, to allow the federal government to implement the federal backstop in those jurisdictions in the fall of 2018. Those provinces or territories opting to establish or maintain a provincial or territorial carbon pricing system will have until 1 September 2018 to outline their carbon pricing plan. The federal government will review each system and intends to implement the federal backstop on 1 January 2019 in any province or territory that does not have a carbon pricing system that aligns with a set of criteria outlined in the pan-Canadian benchmark. From 2019 onwards, the national government will annually verify all pricing systems to ensure they meet the national benchmark.

Provinces and territories that choose to implement their own carbon pricing systems have the flexibility to either put a direct price on carbon or implement a cap-and-trade system. For jurisdictions that choose to implement a direct price, the carbon price should start at CAD 10 per ton (USD 7.70) in 2018, rising by CAD 10 annually to reach CAD 50 (USD 38.50) per ton in 2022.

If jurisdictions decide on cap-and-trade, their system must meet two conditions: a 2030 emissions reduction target equal to or greater than Canada's national target of 30% below 2005

levels by 2030; and annual caps set to decline until 2022 or further, which deliver projected emissions reductions at least equivalent to the direct carbon price. All carbon pricing revenues will remain in the province/territory of origin.

In May 2017, the Government of Canada released a "Technical paper on the federal carbon pricing backstop" outlining the proposed design of the federal carbon pricing backstop. The federal backstop will be composed of two key elements: 1) a carbon pricing levy applied to fossil fuels; and 2) an output-based pricing system (baseline-and-credit-system) for industrial facilities above a certain emissions threshold. Draft legislative proposals for the federal backstop were released in early January 2018.

An interim report will be completed in 2020, including as an early deliverable an assessment of approaches and best practices to address the competitiveness of emissions-intensive, trade-exposed sectors.

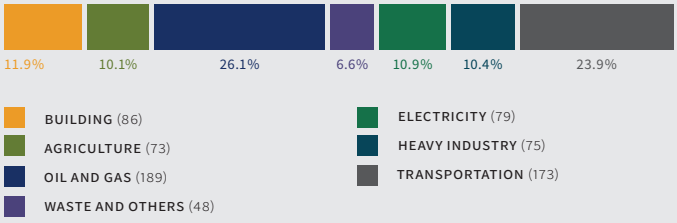
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

722 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: 17% below 2005 levels. **BY 2030:** 30% below 2005 levels.

Nova Scotia

scheduled

On 21 November 2016, the Nova Scotia Premier announced the implementation of a cap-and-trade program in 2018, in line with Canada's federal carbon pricing policy.

In September 2017, amendments to Nova Scotia's Environment Act were introduced, which lay the foundations for the program. This legislation will enable the government to set caps, distribute emissions allowances and enable the trading of the allowances within the province. Companies will be required to monitor and report their GHG emissions. In order to ensure market stability, a small number of allowances will be kept for a strategic reserve and can be sold when market prices rise above a given threshold. Proceeds from these sales will be put in a Green Fund, which will then support climate change initiatives and innovations.

The legislation will also enable the government to set a new GHG target for 2030 for Nova Scotia. The province has already met Canada's 2030 target of a 30% cut below 2005 levels.

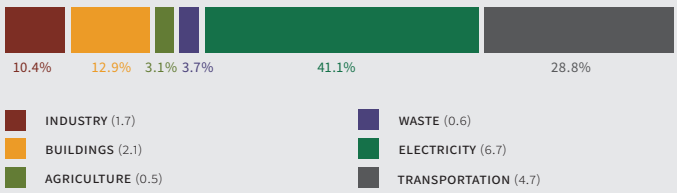
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

16.2 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: At least 10% reduction from 1990 GHG levels.
Nova Scotia will set a 2030 GHG emission target in 2018.

Latin America and the Caribbean

At the end of 2017, Mexico approved the legal basis for a mandatory ETS. Together with the launch of an ETS simulation back in October 2017, the new legal framework brings Mexico a step closer to ETS implementation. In 2017 a carbon tax was implemented in Chile and Colombia. These countries together with Mexico and Peru are discussing regional cooperation on MRV under the context of the Pacific Alliance. Over the medium term, ETS is under consideration in Chile, Colombia and Brazil.

Brazil

under consideration

Brazil's National Climate Change Policy (PNMC), which was enacted in December 2009, aims to promote the development of a Brazilian market for emissions reductions.

As part of its activities under the Partnership for Market Readiness (PMR), the Brazilian government is considering the implementation of market instruments to meet Brazil's voluntary GHG reduction commitment and reduce overall mitigation costs. Brazil is currently assessing different carbon pricing instruments including an ETS and a carbon tax. The Ministry of Finance is developing design options and conducting comprehensive economic and regulatory impact assessments for both instruments. A proposal of a policy package (policy scenarios for carbon tax and ETS) is under development with the support of the PMR. Depending on the impact assessment, the work stream is expected to culminate in a White Paper with design recommendations for a carbon pricing instrument for Brazil. In addition, the Ministry of Finance has launched a strategy to strengthen the understanding of carbon pricing instruments among stakeholders through engagement, communication, and consultation.

Currently, the Brazilian government is working on the regulatory impact assessment of a National GHG Reporting Program and a national GHG emissions/removals registry with support from the German Development Agency (GIZ), thus developing the fundamentals of a central building block for carbon pricing.

RenovaBio, the National Policy for Biofuels, has been approved in 2017 (Federal Law 13,576 of 26 December 2017), establishing mandatory goals for the reduction of GHG emissions from avoiding fossil fuels. The policy provides for a trading mechanism for emissions reduction units that have been generated from switching from fossil fuels to biofuels, relative to a 100% fossil fuel use scenario.

Since 2013, a group of leading companies have been participating in a voluntary ETS simulation. The initiative offers a platform to gain experience and develop proposals for a wide-ranging and robust approach towards cap-and-trade in Brazil with the purpose of promoting the reduction of national GHG emissions at the lowest possible cost. In 2015, 23 companies from diverse sectors of the Brazilian economy took part in this exercise. The allocation process and trading is managed by the Rio de Janeiro Green Stock Exchange (BVRio) and the ETS design of the simulation is coordinated by the Centro de Estudos em Sustentabilidade da Fundação Getúlio Vargas (GVCes/FGV).

Brazilian states are also actively engaging in climate policy. In 2012, both Rio de Janeiro and São Paulo considered the implementation of a state-wide ETS.

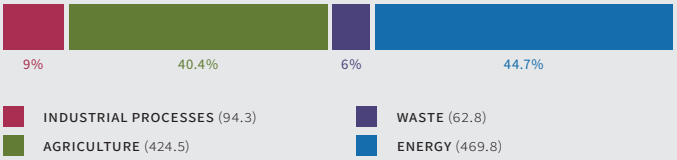
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

1,051.4 $MtCO_2e$ (2014)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2014)



GHG REDUCTION TARGETS

BY 2020: Voluntary commitment to reduce GHG emissions by 36.1–38.9% compared to BAU projections. **BY 2025:** 37% reduction from 2005 GHG levels (NDC). **BY 2030:** Indicative contribution of 43% reduction from 2005 GHG levels (NDC).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Environment; Ministry of Finance (General Coordination of Environment and Climate Change); Ministry of Mines and Energy

Chile

under consideration

In March 2013 under the Partnership for Market Readiness (PMR), Chile received funding to develop a roadmap for the design and eventual implementation of an ETS for GHG mitigation in the energy sector. The roadmap includes necessary institutional arrangements, regulatory options, economic impacts and technical requirements for an MRV framework to track GHG emissions that would fit both a carbon tax and an ETS.

However, it subsequently shifted policy priorities towards the implementation of a carbon tax. In September 2014, as part of a broader fiscal reform, Chile approved the implementation of a carbon tax for fixed emission sources consisting of turbines or boilers with a thermal input equal to or above 50 MW (exempting biomass power plants), beginning on 1 January 2017. For the same emitting sources, a tax on local pollutants (SO_2, NO_x and particulate matter) must also be paid by emitters. Hence, from 2018, emitters will have to pay USD 5 for related 2017 CO_2 emissions, as well as the tax on local pollutants whose amount will vary depending on the location of each source. A tax on NO_x has been operating since 2015 as a one-time payment for the purchase of new lightweight vehicles based on the purchase price, fuel efficiency, and NO_x emissions/km.

In the long run, Chile is considering deepening the use of carbon pricing instruments with the aim of facilitating the transition to a low carbon economy and achieving its NDC commitments. In order to assist in this process, the current work plan under the PMR is considering the required participatory and consultation processes with stakeholders and policymakers in the enhancement of the current carbon tax, the use of offsets as complementary and carbon leakage measures, and the possibility to transition to or supplement the carbon tax with an ETS. The PMR project will continue its support on MRV infrastructure required to make this transition possible—with carbon pricing as a cornerstone of the country's climate policy.

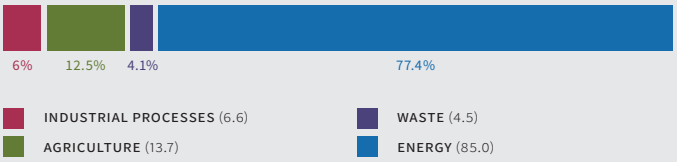
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

109.9 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: Under the UNFCCC and conditional to external support, Chile has pledged to reduce projected BAU emissions by 20% (as projected from 2007).

BY 2030: 30% reduction of emissions intensity compared to 2007, in terms of CO_2/unit of GDP. Conditional to international funding, 35–45% reduction of emissions intensity compared to 2007, in terms of CO_2/unit of GDP (NDC).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Energy; Ministry of the Environment; Ministry of Finance; Inter-Ministerial Committee on Climate Change; PMR Chile (Precio al carbono Chile)

Colombia

under consideration

In 2017, the Colombian Ministry of Environment published the National Policy on Climate Change (Política Nacional de Cambio Climático) with the objective of articulating, coordinating and mainstreaming climate change in all public and private decisions. This document sets the vision, objective, strategies, instruments and action plan of climate change policy in Colombia.

In the medium term, Colombia is considering implementing an ETS. Currently, the macroeconomic impacts of different design options for an ETS are being assessed. Simultaneously, the basis for an ETS (a program of carbon credits and allowances) is currently discussed in Congress as one element of the Climate Change Law.

Efforts to establish a voluntary carbon market are underway. The Colombian Stock Exchange (Bolsa Mercantil de Colombia) is in the process of establishing a platform of registry and transactions of verified emissions reductions.

In 2016, as part of a broader fiscal reform, Colombia approved the implementation of a carbon tax on the carbon content of fossil fuels. The tax is levied on sales and imports of fuels and charges 5 USD/tCO_2. It allows compensating emission liability through the surrender of offset credits. In the first semester of 2017, approximately 2 $MtCO_2$ of offsets were surrendered, compensating covered entities' tax liabilities. Colombia has committed to spend the CO_2 tax revenues on environmental and rural development projects.

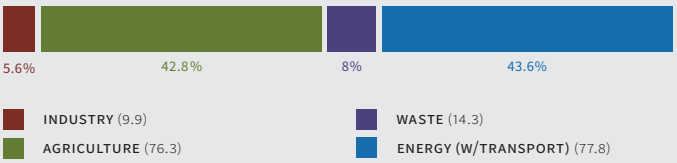
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

178.3 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2013)



GHG REDUCTION TARGETS

BY 2030: Under the UNFCCC, Colombia has pledged to reduce projected BAU emissions by 20%. Conditional to external support, Colombia could increase its ambition to a 30% reduction with respect to BAU (NDC).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Environment and Sustainable Development; Department of National Planning; Ministry of Mines and Energy; Ministry of Finance

Mexico

scheduled

The General Law on Climate Change (GLCC) of April 2012 provides the basic framework for the establishment of a voluntary ETS in Mexico. Subsequently, in June 2013, the government released its National Strategy on Climate Change, outlining the country's transition to a low-carbon economy. In April 2014, the Special Climate Change Program (2014–2018) was released. On 12 December 2017, the Cámara de Diputados, the second Chamber of the Mexican Parliament, amended the GLCC requiring the establishment of a mandatory ETS. With the latest amendments, which still need to be approved by the Senate (first chamber of Parliament), there is now the basis to introduce a mandatory system.

Already in October 2014, a mandatory reporting system (the National Emissions Register, or RENE for the Spanish acronym) for both direct and indirect GHG emissions for facilities with annual emissions above 25,000 tCO_2e was established (as mandated by the GLCC). Emitters in the energy, industrial, transport, agricultural, waste, commercial, and services sectors are required to report the six GHGs identified by the UNFCCC as well as black carbon. The National Emissions Register also includes the voluntary registration of mitigation or reduction certificates obtained from projects and activities carried out in Mexico.

In October 2017, the Ministry of Environment and Natural Resources (SEMARNAT), the Mexican Stock Exchange (Grupo BMV), and MÉXICO$_2$ (the voluntary carbon platform at the BMV) announced the start of a national carbon market simulation. The simulation is implemented through CarbonSim, a software developed by the Environmental Defense Fund (EDF). Over 100 enterprises, which are responsible for two-thirds of the Mexican GHG emissions, will participate in the simulation. The simulation will last 10 months, with three phases. Together with the development of a registry for national emissions, the ETS simulation is consistent with Mexico's objective to implement a national ETS by 2018.

SEMANART has announced that the market rules for an ETS and updated rules for the National Emissions Register will be published in the first half of 2018. The market will then officially start operating in two phases in August 2018. The first phase (pilot phase) will last for three years until August 2021. Subsequently, the rules will be updated for the start of the second phase (formal phase), which will also be in line with the start of the first accounting period under the Paris Agreement in 2021.

Mexico is actively seeking to link its future ETS to markets in North America. To this end, in October 2015, Mexico signed an MOU with Québec that includes cooperation on ETS. In August 2016, Mexico, Québec, and Ontario issued a joint declaration on carbon markets collaboration. Additionally, in December 2017, Mexico, together with four countries and seven subnational governments, issued the Paris Declaration on Carbon Pricing in the Americas for carbon pricing implementation.

In 2014, Mexico introduced a USD 3.50 carbon tax on fossil fuel sales and imports (natural gas exempted). Firms may use offset credits from domestic projects to fulfill their tax liability. The rules for the optional use of offset credits, published in December 2017, allow for the use of CERs issued after January 2014 from projects developed in Mexico. During 2018, the use of CERs will be restricted to 20% of an entities carbon tax liability. In addition, authorities are currently discussing options for allowing the use of future ETS allowances to fulfill CO_2 tax obligations.

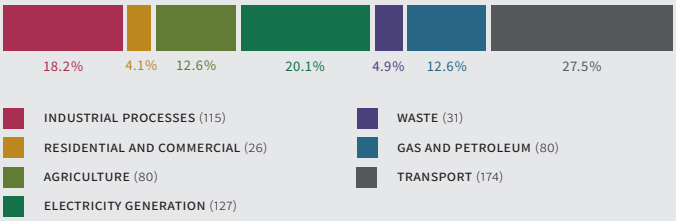
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

633 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2013)



GHG REDUCTION TARGETS

BY 2030: 22% reduction compared to BAU scenario and 36% conditional reduction, subject to a global mitigation agreement (NDC). **BY 2050:** 50% reduction from 2000 GHG levels (Climate Change Law aspirational goal).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Environment and Natural Resources (SERMANAT); Ministry of Energy (SENER); Ministry of Finance (SHCP)

Asia-Pacific

At the end of 2017, China launched its much-anticipated national ETS, which is now the world's largest carbon market. The Korean ETS entered its second phase, which will see the introduction of auctioning and the expansion of benchmark-based allocation. New Zealand concluded their second system review with four in-principal decisions for future ETS reform.

China

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
3,300	~ 1,700

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

Through a video conference call on 19 December 2017, including both national ministries and provincial governments, China launched its much-anticipated national ETS, which is now the world's largest carbon market. The provisions for the launch and incremental development of the ETS are laid out in the Work Plan for Construction of the National Emissions Trading System (Power Sector) (the "Work Plan"), which was approved by the State Council late in 2017.

The ETS regulates around 1,700 companies from the power sector (including combined heat and power as well as captive power plants of other sectors), which emit more than 26,000 tons GHG per year, or consume more than 10,000 tons of standard coal equivalent (tce) per year. The Chinese system covers more than three billion tons of CO_2e in its initial phases, accounting for about 30% of national emissions.

A three-phase roadmap has been adopted (Article 3, Work Plan). Phase one is on the development of market infrastructures (roughly one year); phase two foresees simulation trading (roughly another year); and phase three will be the deepening and expanding phase with allowances spot trading for compliance purposes (roughly starting from 2020).

Supplementary technical rules on MRV, allowance management, and market trading will be further developed (Article 10–12, Work Plan). So too will the market infrastructure and supporting systems (Article 15–18, Work Plan) e.g. national registry (led by Hubei) and trading platform (led by Shanghai). While detailed allocation rules are yet to be published, allowances are expected be initially handed out for free based on sub-sector benchmarks with ex-post adjustments that reflect actual production volumes (based on the draft allocation methods for the trial allocation in 2017). Domestic offsets that have also been used by the ETS pilots, known as Chinese Certified Emission Reductions (CCERs), are also expected to be available in the national carbon market post-2020 (Article 3, Work Plan).

While a uniform rule will be in place for all provinces, provincial governments may be able to extend the scope of the ETS and apply stricter allocation methods within their regions (Article 2, Work Plan). Under the oversight of the National Development and Reform Commission (NDRC), which will operate the national carbon market jointly with the provincial governments (Article 8, Work Plan), the Chinese carbon market is expected to see continuous improvement over the coming years, such as strengthening domestic capacity and improving data quality. The market will also gradually expand to cover additional sectors (Article 7, Work Plan).

This step-wise approach is also reflected by a notice by NDRC in December 2017 requiring all local DRCs to begin the MRV process for 2016 and 2017 emissions from eight sectors of the economy (including heat and power, petrochemical, chemical, building materials, steel, nonferrous metals, paper and aviation). The notice also includes new data collection, categorization and verification requirements. These sectors had previously submitted their historical data for 2013–2015 emissions.

The launch of China's national ETS in 2017 has been a goal set in 2015 at China's highest political level, which were reaffirmed by its Nationally Determined Contribution under the Paris Agreement, and the "13th Five-Year Work Plan for Greenhouse Gas Emission Control". Other key documents throughout the preparation phase are "Interim Administrative Measures on Emissions Trading" (December 2014), the 24 "Guidelines for GHG Monitoring and Reporting" for various sectors (2013, 2014, 2015), and the "Notice on Key Works in Preparation for the Launch of the National ETS" ('NDRC 2016 No. 57', January 2016).

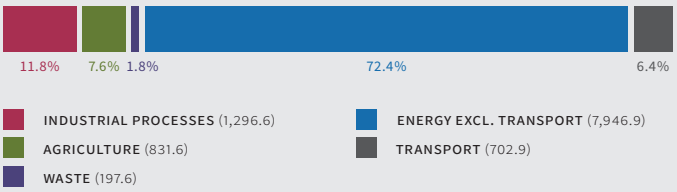
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

10,976 $MtCO_2e$ (2012)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2012)



GHG REDUCTION TARGETS

BY 2020: 40–45% reductions in carbon intensity compared to 2005 levels (voluntary commitment under the Copenhagen Accord of 2009).

FURTHER DETAILED TARGET FOR 2016–2020: Reduction in carbon emissions per unit GDP by 18% compared to 2015 level (13th Five-year plan).

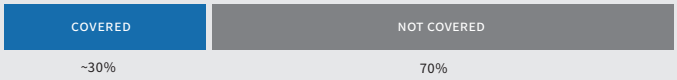
BY 2030: Peak CO_2 emissions around 2030, with best efforts to peak earlier. China has also committed to lowering CO_2 emissions per unit of GDP by 60–65% from 2005 levels (NDC).

ETS SIZE

CAP

~3,300 $MtCO_2e$/year

EMISSIONS COVERAGE



GHG COVERED

CO_2

SECTORS & THRESHOLDS

ARTICLE 7, WORK PLAN: Power sector (including combined heat and power as well as captive power plants of other sectors).
Scope is expected to be gradually expanded to finally cover eight sectors including: petrochemical, chemical, building materials, steel, nonferrous metals, paper and aviation.
INCLUSION THRESHOLDS: Entities with annual emissions of ~26,000 t/CO_2 (energy consumption of more than 10,000 tce) in any year over the period 2013–2015.

POINT OF REGULATION

ARTICLE 3 AND 7, WORK PLAN: Downstream **IN THE LONG RUN:** Mixed. Both direct emissions from the power sector and indirect emissions from electricity (and heat) consumption are expected to be included.

NUMBER OF LIABLE ENTITIES

~1,700

PHASES AND ALLOCATION

TRADING PERIODS

ARTICLE 3, WORK PLAN: FIRST PHASE (ROUGHLY A YEAR): Development of market infrastructures **SECOND PHASE (ROUGHLY ANOTHER YEAR):** Simulation trading **THIRD PHASE (ROUGHLY FROM 2020 ON):** Deepening and expanding
The following trading periods are to be further defined.

ALLOCATION

Detailed allocation rules are yet to be developed by NDRC in cooperation with energy sector authorities (Article 13, Work Plan). However, based on officially released documents during trial allocation, free allocation is ex-pected based on sub-sector benchmarks with ex-post adjustments for changes in actual production.
Based on the national cap setting and allocation framework approved by the State Council in December 2016, draft allocation plan for three sectors (power, cement and electrolytic aluminum) were developed and trial allocation work carried out in two provinces in May 2017, which will feed into the finalization of the allocation rules.

COMPLIANCE PERIOD

One year (Article 14, Work Plan)

FLEXIBILITY

BANKING AND BORROWING

Expected to allow banking across compliance phases but not borrowing (Article 3, Work Plan).

OFFSETS AND CREDITS

The use of CCER credits is expected to be allowed at certain time during the third phase (Article 3, Work Plan).
In 2012, the NDRC issued the "Interim Measures for the Management of Voluntary GHG Emission Reduction Transactions". These measures include guidelines for the issuance of domestically-produced offsets, known as CCER. They are expected to be used in national ETS with re-vision of the Interim Regulation and development of "Administration Measure of Offset Scheme for National ETS" (incoming), to regulate the quality and limit the use of CCER for compliance market. Specific time-line and detailed rules are yet to be published.

PRICE MANAGEMENT PROVISIONS

NDRC in cooperation with other ministries are to develop adjustment mechanism to prevent abnormal price fluctuations as well as risk pre-vention and control mechanism to prevent market manipulations (Arti-cle 12, Work Plan).

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual. The NDRC is currently drafting MRV regu-lations for the national ETS (Article 10, Work Plan). Before this is final-ized, local DRCs are asked to select suitable institutions and personnel to carry out the verification tasks according to suggested requirements by the NDRC.
FRAMEWORK: From 2013–2015, the NDRC has released a series of MRV guidelines covering a total of 24 sectors. In 2015, the NDRC further pro-vided supplementary data sheets on GHG MRV for the 8 ETS covered sec-tors as well as "Reference Guidance on Third-party Verification of China ETS" and "Reference Qualification on Third-party Verification Body and Verifiers of China ETS".
In December 2017, NDRC published another notice, requiring all local DRCs to begin the MRV process for 2016 and 2017 emissions from eight sectors of the economy (power, petrochemical, chemical, building ma-terials, steel, nonferrous metals, paper and aviation). The notice also in-cludes new data collection, categorization and verification requirements.

ENFORCEMENT

Non-compliance will result in punishment (details are yet to be devel-oped); relevant information will also be included in the national credibil-ity information sharing platform (Article 11, Work Plan).

OTHER INFORMATION

INSTITUTIONS INVOLVED

NDRC, and provincial/autonomous regional/municipal Development and Reform Commissions (DRCs). Overall, NDRC, in cooperation with other relevant ministries, is in charge of policy design and rule making while the Local DRCs are in charge of policy and rule implementation (Article 8, Work Plan).

Beijing (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2016)	LIABLE ENTITIES
46	947

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

The Beijing pilot ETS was launched on 28 November 2013 and has finished four compliance years so far. It covers about 45% of the city's total emissions, including both direct and indirect emissions from electricity providers, heat, cement, petrochemicals, other industrial enterprises, manufacturers, the service sector and public transport.

On 28 November 2013, Beijing signed the Framework Agreement for Cooperation on the Study of Cross-regional Carbon Emissions Trading with Tianjin, Hebei, Inner Mongolia, Shaanxi and Shandong. To test interregional cooperation, several cement companies from Hebei province and Inner Mongolia were included voluntarily in the Beijing pilot system in 2015 and 2016 but not for vintage 2016 compliance in 2017.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

188.1 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS

BY 2020 (13th Five Year Plan): 20.5% reduction in carbon intensity compared to 2015 levels.

ETS SIZE

CAP

46 $MtCO_2e$ (2016, existing facilities only)

EMISSIONS COVERAGE

COVERED	NOT COVERED
45%	55%

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Industrial and non-industrial companies and entities, including electricity providers, heating sector, cement, petrochemicals, other industrial enterprises, manufacturers, service sector, and public transport.

INCLUSION THRESHOLDS: 5,000t CO_2/year, considering both direct and indirect emissions.

MANDATORY REPORTING: 2,000 tons of standard coal equivalent (tce) energy consumption/year.

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity and heat consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

AS OF 2016: 947 (Beijing), 26 (Inner Mongolia), 6 (Hebei)

MANDATORY REPORTING: 582 entities (2016, Beijing)

PHASES AND ALLOCATION

TRADING PERIODS

Five years (2013–2017)*

ALLOCATION

Mainly free allocation through grandfathering based on emissions or emissions intensity in the years 2009–2012 (stationary sources) or 2011–2014 (mobile sources). Benchmarking for new entrants and entities with expanded capacity.

COMPLIANCE PERIOD

One year (15 June)

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed during the pilot phase. Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—Chinese Certified Emission Reduction (CCER) credits—are allowed. The use of CCER credits is limited to 5% of the annual allocation.

QUALITATIVE LIMIT: Out of the 5% annual allocation limit, at least 50% must come from projects within the jurisdiction of the city of Beijing. Credits from hydropower, HFC, PFC, N_2O and SF_6 projects are not eligible

* In the short-term, the existing Chinese regional carbon markets are expected to operate in parallel to the national Chinese carbon market. Over the medium to long-term, they are expected to be integrated into the national market, once it is fully operational.

and all reductions have to be achieved after the beginning of 2013. Verified carbon emission reductions from energy saving projects and forest carbon sink projects from within the city of Beijing are also allowed.

PRICE MANAGEMENT PROVISIONS

The Beijing Development and Reform Commission (DRC) can auction extra allowances if the weighted average price exceeds CNY 150 (USD 22) for ten consecutive days, and buy back allowances from the market if the price is below CNY 20 (USD 3).

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of CO_2 emissions.
VERIFICATION: Third-party verification is required.
FRAMEWORK: The Beijing DRC has released guidelines for monitoring and reporting for the following seven sectors: heat production and supply, thermal power generation, cement, petrochemicals, transport, other industrial enterprises, and the service sector.

OTHER: In addition to the ETS participants, all legal entities with energy consumption of more than 2,000 tce have to report their emissions. Verification is not required.

ENFORCEMENT

Penalties for failing to submit emissions or verification reports on time can result in fines up to 50,000 CNY (USD 7,398). Furthermore, companies failing to surrender enough allowances to match their emissions are fined three to five times the average market price over the past six months for each missing allowance.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Beijing DRC (Competent authority); China Beijing Environment Exchange (Trading platform and registry)

Chongqing (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2016)	LIABLE ENTITIES
100.4	237

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	FREE ALLOCATION	DOMESTIC OFFSETS

Chongqing launched its pilot ETS on 19 June 2014. The system covers enterprises from seven sectors: power, electrolytic aluminum, ferroalloys, calcium carbide, cement, caustic soda, and iron and steel. The 237 enterprises covered by the system account for around 40% of the city's total emissions.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

250 $MtCO_2e$ (2014)

GHG REDUCTION TARGETS

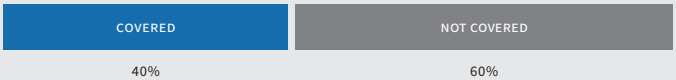
BY 2020: (13th Five Year Plan): 19.5% reduction in carbon intensity compared to 2015 levels.

ETS SIZE

CAP

100.4 (2016)

EMISSIONS COVERAGE



GHG COVERED

CO_2, CH_4, N_2O, HFCS, PFCS, SF_6

CHONGQING (PILOT) EMISSIONS TRADING SYSTEM

SECTORS & THRESHOLDS

Power, electrolytic aluminum, ferroalloys, calcium carbide, cement, caustic soda, iron and steel.

INCLUSION THRESHOLD: 20,000t CO_2e/year.

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity and heat consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

237 (2016)

PHASES AND ALLOCATION

TRADING PERIODS

Five years (2013–2017)*

ALLOCATION

Free allocation through grandfathering based on historic emissions (highest number in period 2008–2012). If the sum of allocation for all enterprises exceeds the cap, a reduction factor is applied. Different from other pilots, the covered companies are asked to submit their allocation quotas on a yearly basis of which free allocation is based on. Ex-post adjustments based on production data are also possible.

COMPLIANCE PERIOD

Due to the late start, compliance for 2013 and 2014 were combined in one phase. A one year compliance period is in place since 2015 (20 June theoretically while in practice there have been some delays). For vintage 2015, the compliance deadline was postponed to 18 November 2016 and for vintage 2016 the verification deadline has been set as 31 October 2017. Compliance is expected to be completed by end 2017.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed during the pilot phase.
Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—Chinese Certified Emission Reductions (CCERs)—are allowed with a maximum amount of 8% of the compliance obligation.

QUALITATIVE LIMIT: Reductions have to be achieved after 2010 with the exception of carbon sink projects. Credits from hydro projects are not allowed.

* In the short-term, the existing Chinese regional carbon markets are expected to operate in parallel to the national Chinese carbon market. Over the medium to long-term, they are expected to be integrated into the national market, once it is fully operational.

PRICE MANAGEMENT PROVISIONS

In case of market fluctuations, the Chongqing Carbon Emissions Exchange can take price stabilization measures. Compliance entities must not sell more than 50% of their free allocation.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of GHG emissions.

VERIFICATION: Third-party verification is required.

FRAMEWORK: The Chongqing Development and Reform Commission (DRC) released a guiding document for monitoring and reporting that includes methods for different emissions sources, including: Combustion, industrial processes and electricity consumption.

ENFORCEMENT

According to the "Interim Administrative Measures for the Chongqing ETS" published in May 2014, there are no financial penalties for non-compliance. The punishments may include media reporting and public reporting, disqualification from the energy saving and climate subsidies and associated awards for three years, and a record entered on the State Owned Enterprise (SOE) performance assessment system.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Chongqing DRC (Competent authority); Chongqing Carbon Emissions Trading Center (Trading platform and registry)

Fujian (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2016)	LIABLE ENTITIES
~200	277

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

On 30 September 2016, the Fujian Province government released the "Interim Measures for the Management of Emissions Trading in Fujian Province" and the "Implementation Plan of Emissions Trading Market in Fujian Province", to introduce the eighth regional ETS in China (besides the seven existing regional pilots already operating since 2013). The mandate for Fujian ETS came from the National Ecological Civilization Pilot Area (Fujian) Implementation Plan endorsed by the State Council in August 2016.

Further regulatory rules and guidelines were released late in 2016 regarding GHG emissions reporting; carbon offset projects, market stability management, administration of the third-party verifiers and allowance allocation. This was followed by the first auction for vintage 2016 allowances on 15 December 2016 with the volume of 50,000 allowances.

The Haixia Equity Exchange in Fujian was approved in July 2016 by the National Development and Reform Commission (NDRC) to be one of the nine dedicated trading platforms for trading China's domestic project-based carbon offset credits.

Given the prominence of the forestry sector in Fujian, its ETS pilot has a special focus on carbon sinks. On 25 May 2017, Fujian provincial government released a notice on its forestry emission reduction and trading piloting, outlining the types and targets of promoting forestry offsets projects in Fujian. By the end of 2017, each of the 20 selected counties is required to develop at least one project, altogether covering more than 500,000 acres of forests and producing more than one million tons of emission reduction; by 2020 to develop forestry projects covering two million acres.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

240 $MtCO_2e$

GHG REDUCTION TARGETS

BY 2020 (13th Five Year Plan): 19.5% reduction in carbon intensity compared to 2015 levels.

ETS SIZE

CAP

~200 $MtCO_2e$

EMISSIONS COVERAGE

COVERED	NOT COVERED
~60%	~40%

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Electricity, petrochemical, chemical, building materials, iron and steel, nonferrous metals, paper, aviation, and ceramics.

INCLUSION THRESHOLDS: Energy consumption 10,000 tons of coal equivalent (tce)/year for any year between 2013–2015

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity (and heat) consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

277 (2016)

PHASES AND ALLOCATION

TRADING PERIODS

One year (2016) before the national carbon market is launched in 2017.* The pilot may extend its coverage to smaller emitters who would continue trading after the launch of national ETS.

ALLOCATION

Mainly free allocation on an annual basis, and to increase auctioning when it is appropriate over time. Up to 10% of the total cap will be reserved for market intervention (when necessary). Free allowances to be allocated to new entrants.

In order to increase market liquidity and price discovery, on 15 December 2016, Fujian DRC organized a discriminatory (non-uniform price) allowance auction. The 50,000 allowances from the government reserve

* In the short-term, the existing Chinese regional carbon markets are expected to operate in parallel to the national Chinese carbon market. Over the medium to long-term, they are expected to be integrated into the national market, once it is fully operational.

were auctioned, with the settlement prices ranging from CNY 26.5 (USD 3.9) to around CNY 30 (USD 4.4).

COMPLIANCE PERIOD

One year (30 June)

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed during the pilot phase. Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—Chinese Certified Emission Reduction (CCER) and Fujian Forestry Certified Emission Reduction (FFCER)—are allowed. The use of CCER credits is limited to 5% of the annual compliance obligation, which is increased to 10% for companies that use both FFCER and CCER credits.

QUALITATIVE LIMIT: Eligible offsets will be restricted to those generated in Fujian province, from CO_2 or CH_4 projects. Hydro power related credits are not eligible. FFCERs projects, with three project types (afforestation, forest management, and bamboo management) need to start implementation after 16 February 2005 and the project developers need to have independent legal personality.

PRICE MANAGEMENT PROVISIONS

According to the (trial) "Implementation Rules of Emissions Trading Market Management in Fujian Province", in case of market fluctuations (i.e. if the cumulative increase or decrease of allowance prices for 10 consecutive trading days reach a certain percentage), severe imbalances between supply and demand, or liquidity issues, the Fujian Economic and Information Center under the guidance of the Fujian Development and Reform Commission (DRC)—in consultation with an advisory committee—can buy or sell allowances in order to stabilize the market. More specifically, when price is too high, the Center may sell allowances from government reserves via auction through Haixia Equity Exchange; and when the price is too low, the Center may buy allowances back using special funds from the government.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of CO_2 emissions before end of February and submission of the verified report by end of April.

VERIFICATION: Third-party verification is required.

FRAMEWORK: The Fujian DRC and Fujian Statistical Bureau have jointly released a guiding document on monitoring and reporting that includes a monitoring plan template, using national measuring and reporting guidelines. In addition, the Fujian DRC and Fujian Quality and Technical Supervision Bureau also jointly released a measure for the administration of third-party verifiers, which specifies criteria for the verifiers and their staff.

ENFORCEMENT

Penalties for failing to submit an emissions or verification report on time, providing false information, or disturbing the verification process range from CNY 10,000 (USD 1,480) to CNY 30,000 (USD 4,439). Companies failing to surrender enough allowances to match their emissions are fined between one to three times the average market price of the past 12 months, with the maximum limit of CNY 30,000 (USD 4,439). Twice the amount of the missing allowances can be withdrawn from the account of the company or deducted from next year's allocation. Penalties for the misconduct of trading entities and their staff, such as not publishing relevant trading info or leaking commercial secrets, could range from CNY 10,000 (USD 1,480) to CNY 30,000 (USD 4,439).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Fujian DRC (Competent authority, hosting the Provincial ETS Coordination Group Office); Fujian Provincial Forestry Department (FFCER projects management); Fujian Huaxia Equity Exchange (Trading platform); Fujian Economic and Information Center (Registry, market management, MRV administration).

Guangdong (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2017)	LIABLE ENTITIES
422	296

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	AUCTIONING & FREE ALLOCATION	DOMESTIC OFFSETS

On 19 December 2013, Guangdong was the fourth Chinese region, after Shenzhen, Shanghai and Beijing, to start its pilot ETS.

Guangdong is the largest of the Chinese ETS pilots. Covered sectors account for more than half of the province's emissions. The third compliance period was completed on 20 June 2016 (with 100% compliance rate) for 2015 vintage.

In 2016, Guangdong expanded its scope for the first time since implementation. As well as introducing three new sectors (aviation, paper and white cement), allocation methods were also further adjusted. In 2017, it saw further inclusion of 50 new entrants.

Being the only pilot (among the seven NDRC mandated pilots) with regular auctioning, Guangdong ETS has one of the most active markets among the Chinese pilots. Guangdong and Shenzhen are the only two markets open to foreign investors. In November 2016 Guangdong further increased the maximum position of institutional and individual investors from three to eight million allowances. Guangdong also allows unincorporated organizations such as funds and trusts to trade in its carbon market.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

610.5 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS

BY 2020: (13th Five Year Plan): 20.5% reduction in carbon intensity compared to 2015 levels.

ETS SIZE

CAP

422 $MtCO_2e$ (2017 including 23 $MtCO_2e$ kept as government reserves for new entrants and market stability)

EMISSIONS COVERAGE

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Six sectors: Power, iron and steel, cement, papermaking, aviation and petrochemicals.

Reporting sectors: Ceramics, textiles, non-ferrous metals, and chemicals.

INCLUSION THRESHOLDS: 20,000 tCO_2/year or energy consumption 10,000 tons coal equivalent (tce)/year. Guangdong plans to expand its coverage while taking the developments of the local and national carbon markets into consideration.

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity and heat consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

TOTAL (2017): 296 **EXISTING ENTITIES (2017):** 246 **NEW ENTRANTS (2017):** 50

PHASES AND ALLOCATION

TRADING PERIODS

Five years (2013–2017) before the national carbon market is launched in 2017.*

ALLOCATION

Mainly free allocation through grandfathering or historical intensity reduction method based on 2014–2016 emissions for 2017 vintage allocation. Annual emissions reduction factor of one is applied to sectors using grandfathering (the reduction factor was 0.99 in 2016). Benchmarking is applied for coal or gas fired electricity generators (including heating, combined heat and power), aviation, cement, paper and steel industrial processes. For those using benchmarking, the pre-issuance of allowance is based on 2016 production, and the final number will be updated based on 2017 production.

In 2016 and 2017, the proportion of free allocation (95% for the power sector and 97% for remaining sectors) remained the same as in 2015. The allowance auction plan was also the same as for the vintage 2015, with a total of two million allowances available for auction. Different from 2015

* In the short-term, the existing Chinese regional carbon markets are expected to operate in parallel to the national Chinese carbon market. Over the medium to long-term, they are expected to be integrated into the national market, once it is fully operational.

and 2016 where auctions were held on quarterly basis, for vintage 2017 auctions will be ad hoc. During the first compliance year (2013) participation in auctions i.e. purchasing allowances was mandatory for entities to be eligible to receive or trade their freely allocated allowances. This requirement has been terminated since 2014.

COMPLIANCE PERIOD

One year (20 June)

FLEXIBILITY

BANKING AND BORROWING

Banking allowed during the pilot phase. Borrowing is not allowed.

OFFSETS AND CREDITS

QUALITATIVE LIMITS: Domestic project-based carbon offset credits—Chinese Certified Emission Reduction (CCER)—are allowed. The use of CCER credits is limited to ten percent of the annual compliance obligation. As a mechanism that encourages the public to reduce carbon emissions, Pu Hui Certified Emission Reduction (PHCER) is also allowed for offsets. For 2017 a general limit of 1.5m tons has been set.

QUANTITATIVE LIMITS: Of the annual compliance obligation met by offsets, at least half must be from CO_2 or CH_4 reduction projects. At least 70% of CCERs need to come from within Guangdong. Pre-CDM credits are not eligible, as are credits from hydropower or most fossil fuel projects.

Guangdong also indicated the potential for further CCER restrictions depending on the fundamental supply/demand situation of the market and further national restrictions—details have yet to be released.

PRICE MANAGEMENT PROVISIONS

Guangdong has an auction floor price. Initially in 2013, it was set at CNY 60 (USD 9), and then it was lowered to CNY 25 (USD 4) and increased to CNY 40 (USD 6) in steps of CNY 5 (USD 1) with each quarterly auction. In the third year, the floor price is set at 80% of the weighted average price for allowances over the previous three months.

In 2016, there was no restriction on the declared price, but a so-called policy reserve price was set, as an effective price floor. During the first auction for vintage 2016 allowances, half a million allowances were on offer and cleared above the floor price of 9.37 CNY/ton (USD 1.39) with a settlement price of 9.88 CNY/ton (USD 1.46).

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of CO_2 emissions. **VERIFICATION:** Third-party verification is required. **FRAMEWORK:** The Guangdong Development and Reform Commission (DRC) have released guidelines for monitoring and reporting for the compliance and reporting sectors.

ENFORCEMENT

Penalties for failing to submit emissions or verification reports on time range from CNY 10,000 (USD 1,480) to CNY 50,000 (USD 7,398). Furthermore, companies failing to surrender enough allowances to match their emissions will be deducted twice the amount of allowances from the following year's allocation and are fined CNY 50,000 (USD 7,398).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Guangdong DRC (Competent authority); China Emissions Exchange Guangzhou (Trading platform and registry)

Hubei (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2017)	LIABLE ENTITIES
257	344

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

On 2 April 2014, Hubei was the sixth pilot ETS in China to start trading. The system initially covered 138 of the most carbon-intensive companies in the province, accounting for approximately 35% of the province's total carbon emissions. Until now, Hubei has been the most active market among the pilot ETSs in terms of trading.

On 3 January 2017, the Hubei Development and Reform Commission (Hubei DRC) issued its allowance allocation plan for 2016 vintage compliance. The inclusion threshold has been lowered for some sectors and allocation methods have been adjusted using historical carbon intensity rather than grandfathering and stricter benchmarks for several sectors.

In addition, companies covered by both Hubei ETS and the upcoming national ETS will be pre-allocated with a certain amount (equivalent to ten percent of their 2016 initial allocation) of National Emissions Allowances, which can only be used for future trading rather than 2016 compliance.

According to the 2016 compliance notice by Hubei DRC on 6 July 2017, Hubei ETS will continue to run after the National ETS commences, and the valid Hubei allowance surplus from previous years can be traded and used for compliance in Hubei ETS in later years. The Hubei allowance transition to the National ETS will be based on rules to be defined by the National Development and Reform Commission (NDRC).

In December 2017, Hubei was selected to lead the development of the registry for the National ETS.

In January 2018, Hubei DRC announced the allocation plan for 2017 vintage. It expands the coverage, from 236 (2016) to 344 entities, by reducing the threshold for some industrial sectors to 10,000 tons coal equivalent (tce), thus equating the threshold across all covered sectors.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

463.1 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS

BY 2020 (13th Five Year Plan): 19.5% reduction in carbon intensity compared to 2015 levels.

ETS SIZE

CAP

257 $MtCO_2e$ (2017)

EMISSIONS COVERAGE

COVERED	NOT COVERED
35%	65%

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Power and heat supply, iron and steel, non-ferrous metals, petrochemicals, chemicals, textile, cement, glass and other building materials, pulp and paper, ceramics, automobile and equipment manufacturing, food, beverage and medicine producers.

INCLUSION THRESHOLD: Annual energy consumption more than 10,000 tce in any year between 2014 and 2016 for all sectors while in vintage 2016 it was only for the power, steel, non-ferrous, chemicals, petrochemicals, building materials and pulp and paper sectors and a higher level, 60,000 tce, was set for other sectors.

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity and heat consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

344 (2017)

PHASES AND ALLOCATION

TRADING PERIODS

Five years (2013–2017)*

* In the short-term, the existing Chinese regional carbon markets are expected to operate in parallel to the national Chinese carbon market. Over the medium to long-term, they are expected to be integrated into the national market, once it is fully operational.

ALLOCATION

Free allocation of 2017 vintage allowances through benchmarks for power, heat, co-generation and cement (except the entities using outsourced clinker); historical carbon intensity method for glass and other building material, pulp and paper, and ceramics sectors; grandfathering based on previous three years' historic emissions for all other sectors. Ex-post allocation adjustments are possible, especially for those sectors that use benchmarks and historical intensity (first receive half of the total allowance based on previous year's actual emission data or historical emission baseline and then using the actual production data to update allocation). The total cap also includes a new entrants reserve as well as government reserve for potential market adjustment.

COMPLIANCE PERIOD

Due to the late start, compliance for 2013 and 2014 were combined in one phase. A one-year compliance period is in place since 2015 (30 May theoretically while in practice there have been some delays). For vintage 2016, the compliance deadline was postponed for two months to 31 July 2017.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed during the pilot phase, but only for allowances that were traded at least once. Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—Chinese Certified Emission Reduction (CCER)—are limited to ten percent of the annual allocation.

QUALITATIVE LIMIT: CCERs must come from rural biogas or forestry projects in the key counties under the national poverty alleviation plan in urban agglomeration areas of the middle reaches of the Yangtze River (within Hubei) and that were generated between 1 January 2013 and 31 December 2015.

PRICE MANAGEMENT PROVISIONS

Eight percent of the total cap is kept as government reserve for price management. In case of market fluctuations, severe imbalances between supply and demand or liquidity issues, the Hubei DRC—in consultation with an advisory committee consisting of government institutions and other stakeholders—can buy or sell allowances in order to stabilize the market. Specifically, if the allowance price reaches a low or high point six times during a 20-day time span, the Hubei DRC shall take action. Furthermore, the exchange limits day-to-day price fluctuations to between -10% and +10% respectively (between 15 July and 25 December 206 the limit was temporarily adjusted to between -1% and +10% as a response to the decreasing carbon price at that time).

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of CO_2 emissions.

VERIFICATION: Third-party verification is required.

FRAMEWORK: The Hubei DRC has released a guiding document on monitoring and reporting that includes sector-specific guidance for the following sectors: Power, glass, aluminum, calcium carbide, pulp and paper, automobile manufacturing, iron and steel, ferroalloys, ammonia, cement, and petroleum processing.

ENFORCEMENT

Penalties for failing to submit an emissions or verification report on time range from CNY 10,000 (USD 1,480) to CNY 30,000 (USD 4,439). Trade participants that manipulate the market face up to CNY 150,000 (USD 22,195) in fines. Furthermore, companies that fail to surrender enough allowances to match their emissions will be deducted twice the amount of allowances from next year's allocation and are fined one to three times the average market price for every allowance, with a maximum limit of CNY 150,000 (USD 22,195).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Hubei DRC (Competent authority); China Hubei Emission Exchange (Trading platform and registry)

Shanghai (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2017)	LIABLE ENTITIES
156	298

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

Shanghai was the second Chinese region, after Shenzhen, to start its pilot ETS on 26 November 2013. The pilot covers more than half of the city's emissions including: Power, industrial and non-industrial sectors like building, aviation and shipping. Shanghai completed its third compliance period in June 2016 for the 2015 vintage, achieving full compliance for three years in a row. In 2016 Shanghai further expanded its ETS coverage.

Shanghai is one of the most active markets among the pilot systems with regards to the cumulative trade volume and transaction amount.

On 12 January 2017, Shanghai Environmental and Energy Exchange and Shanghai Clearing House (SHCH) jointly launched Over-the-Counter Shanghai Emission Allowance Forward (SHEAF) with Central Counterparty (CCP) clearing, as an innovative financial product that serves a similar purpose to carbon financial derivatives.

In December 2017, Shanghai was selected to lead the development of the trading platform for the national ETS.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

297.7 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS

BY 2020 (13th Five Year Plan): 20.5% reduction in carbon intensity compared to 2015.

ETS SIZE

CAP

156 $MtCO_2e$ (2017)

EMISSIONS COVERAGE

GHG COVERED

CO_2

SECTORS & THRESHOLDS

The following sectors and entities are covered: Airports, aviation, chemical fiber, chemicals, commercial, power and heat, water suppliers, hotels, financial, iron and steel, petrochemicals, ports, shipping, non-ferrou metals, building materials, paper, railways, rubber, and textiles.

INCLUSION THRESHOLDS: For power and industry: 20,000t CO_2/year or 10,000 tons coal equivalent (tce)/year; and those that already participated in the 2013–2015 phase with 10,000 CO_2/year or 5,000 tce/year. For transport: 10,000t CO_2/year or 5,000 tce/year (aviation and ports), 100,000t CO_2/year or 50,000 tce/year (shipping), considering both direct and indirect emissions. For buildings: 10,000 CO_2/year or 5,000 tce/year.

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity and heat consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

298 (2017)

PHASES AND ALLOCATION

TRADING PERIODS

Three years (2013–2015, 2016–2018)*

ALLOCATION

FREE ALLOCATION: Free allocation based on sector-specific benchmarks (power, heat, manufacturers), historic emissions intensity (industry, aviation, car glass, ports, shipping, and water suppliers, generally based on 2014–2016 data) or historic emissions (buildings, commercial sector, industry with complex products or considerable change in emission boundary, and airport, generally based on 2014–2016 data). Ex-post allocation adjustments, e.g., on the basis of production data, are possible.

AUCTION: A smaller share of the annual cap could be auctioned. Shanghai held its allowance auction of 2m tons from the government reserve on 30 June 2017, with floor price of CNY 38.77 (USD 5.74), to increase the market supply. The auction cleared at the floor price and a total of 41,855 tons (2.1% of total auction volume) of allowances were sold.

COMPLIANCE PERIOD

One year (30 June)

* In the short-term, the existing Chinese regional carbon markets are expected to operate in parallel to the national Chinese carbon market. Over the medium to long-term, they are expected to be integrated into the national market, once it is fully operational.

FLEXIBILITY

BANKING AND BORROWING

Within the pilot phase, banking is allowed across compliance periods. For banked allowances from the first trading period (2013–2015), only one third can be used per year between 2016 and 2018 for compliance entities; fully bankable for institutional investors without limit (except for OTC deals after 9 May 2016 with one third of the Shanghai Emissions Allowances (SHEA) to be exchanged per year between 2016 and 2018. Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATVE LIMIT: Domestic project-based carbon offset credits—Chinese Certified Emission Reduction (CCER)—are allowed. The use of CCER credits is limited to 1% of the annual allocation.

QUALITATIVE LIMIT: Credits for reductions that were realized before January 2013 cannot be used for compliance. Credits from hydro projects are not allowed.

PRICE MANAGEMENT PROVISIONS

If prices vary more than 10% in one day, the Shanghai Environment and Energy Exchange can take price stabilization measures to temporarily suspend trading or impose holding limits.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of CO_2 emissions.

VERIFICATION: Third-party verification is required.

FRAMEWORK: The Shanghai Development and Reform Commission (DRC) has released guidelines for monitoring and reporting for the following ten sectors: Iron and steel, electricity and heat, chemicals, non-ferrous metals, non-metallic mineral products, textiles and paper, aviation, shipping, large buildings (hotels, commercial and financial) and transport stations.

ENFORCEMENT

Penalties for failing to submit an emissions report or verification report on time or providing fraudulent information range from CNY 10,000 (USD 1,480) to CNY 50,000 (USD 7,398).

Between CNY 50,000 (USD 7,398)—CNY 100,000 (USD 14,797) can be imposed for non-compliance, besides surrendering the adequate amount of allowances. On top of the financial sanctions, further sanctions may be imposed, e.g., entry into the credit record of the company, publication on the internet, cancelation of ability to access special funds for energy conservation and emissions reduction measures.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Shanghai Development and Reform Commission (DRC) (Competent authority); Shanghai Environment and Energy Exchange (Trading platform); Shanghai Information Center (Registry).

Shenzhen (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2016)	LIABLE ENTITIES
31.45 (excluding buildings, 2015)	824

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

Shenzhen was the first of the Chinese pilot ETSs to start operation on 18 June 2013. In June 2017, Shenzhen finished its fourth compliance period (with a 99% compliance rate). On 18 September 2016, the Shenzhen Development and Reform Commission (DRC) released its working plan for the 2016 vintage, including a list of new companies and the 2016 allocation plan. At the time of writing, Shenzhen had not released allocation plans for the 2017 vintage. The Shenzhen ETS covers a total of 824 entities, including 246 new entrants for the 2016 vintage. These new entrants come from industry sectors, as well as from the public transport and port sectors.

In addition to Shenzhen-based entities, thirteen companies in Baotou, the Inner Mongolia Autonomous Region, have been covered in Shenzhen market since June 2016 and completed compliance for 2016 vintage as of 30 June 2017. However, their participation is on a voluntary basis and coverage for the 2017 vintage is not foreseen.

SECTORS & THRESHOLDS

Power, water, gas, manufacturing sectors, buildings, port and subway sectors, public buses and other non-transport sectors.

INCLUSION THRESHOLDS: 3,000t CO_2e/year for enterprises; 20,000m^2 for public buildings and 10,000m^2 for government buildings.

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity and heat consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

824 (2016)

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

83.45 $MtCO_2e$ (2010)

GHG REDUCTION TARGETS

BY 2020 (13th Five Year Plan): 45% reduction in carbon intensity compared to 2005, to reach 0.81 tCO_2/CNY 10,000 (USD 1,480). Shenzhen has also pledged to peak its GHG emissions by 2022, as one of the first group of cities in China to endorse such peak year target.

ETS SIZE

CAP

31.45 $MtCO_2e$ (excluding buildings, 2015)

EMISSIONS COVERAGE

GHG COVERED

CO_2

PHASES AND ALLOCATION

TRADING PERIODS

Five years (2013–2017)*

ALLOCATION

FREE ALLOCATION: Allowances are largely distributed for free. Benchmarking is applied to the water, power and gas sectors based on sectoral historical carbon intensity; while grandfathering based on the entity's historical carbon intensity is applied to port and subway sectors, public buses and other non-transport sectors. For those using benchmarking and historical carbon intensity, the final number of allowances will be updated based on actual output.

AUCTION: The Interim Measure for the Administration of Carbon Emission Trading of Shenzhen indicated that at least 3% of allowances ought to be auctioned. So far, only one auction has taken place (June 2014).

COMPLIANCE PERIOD

One year (Compliance due 30 June)

* In the short-term, the existing Chinese regional carbon markets are expected to operate in parallel to the national Chinese carbon market. Over the medium to long-term, they are expected to be integrated into the national market, once it is fully operational.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed during the pilot phase. Borrowing is not allowed. Different from other pilots, Shenzhen releases its annual allowances before the compliance date of the previous vintage but doesn't allow them to be used for the purpose for previous vintage compliance.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—Chinese Certified Emission Reduction (CCER)—are allowed. The use of CCER credits is limited to 10% of the annual compliance obligation.

QUALITATIVE LIMIT: Credits from hydro projects are not eligible and there are further geographic restrictions for the use of certain CCERs.

PRICE MANAGEMENT PROVISIONS

In case of market fluctuations, the Shenzhen DRC can sell extra allowances from a reserve at a fixed price. Such allowances can only be used for compliance and cannot be traded. The DRC can also buy back up to 10% of the total allocation.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of CO_2 emissions with a tier approach taking into account the size of the company.

VERIFICATION: Third-party verification is required.

ENFORCEMENT

Institutes providing false information can be fined for the difference between reported and actual emissions at the price three times the average price of the past six months. Penalties for disturbing the market order can cost up to CNY 100,000 (USD 14,797). Companies failing to surrender enough allowances to match their emissions are fined three times the average market price of the past six months. The missing allowances can be withdrawn from the account of the company or deducted from next year's allocation.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Shenzhen DRC (Competent authority); China Emissions Exchange Shenzhen (Trading platform and registry)

Tianjin (Pilot) Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2013)	LIABLE ENTITIES
160–170	109

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

The Tianjin pilot ETS started operation on 26 December 2013 and has finished four compliance years so far. The system covers enterprises from five sectors: Heat and electricity production, iron and steel, petrochemicals, chemicals, as well as oil and gas exploration. These industries account for 50–60% of the city's total emissions.

BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

215 $MtCO_2e$ (2012)

GHG REDUCTION TARGETS

BY 2020 (13th Five Year Plan): 20.5% reduction in carbon intensity compared to 2015 levels.

ETS SIZE

CAP

160–170 $MtCO_2e$

EMISSIONS COVERAGE

COVERED	NOT COVERED
55%	45%

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Heat and electricity production, iron and steel, petrochemicals, chemicals, exploration of oil and gas.

INCLUSION THRESHOLD: 20,000t CO_2/year considering both direct and indirect emissions.

POINT OF REGULATION

Mixed. Both direct emissions from the power sector and indirect emissions from electricity and heat consumption are included in the scheme. Electricity prices are regulated in China, and therefore a scheme based on direct emissions alone would not induce a pass-through of carbon costs via the electricity price, and would not incentivize demand-side management of electricity. The system therefore covers emissions from the power sector upstream and other sectors downstream.

NUMBER OF LIABLE ENTITIES

109 (2017)

PHASES AND ALLOCATION

TRADING PERIODS

Five years (2013–2017) *

ALLOCATION

Mainly free allocation through grandfathering based on 2009–2012 emissions or emissions intensity. Benchmarking for new entrants and expanded capacity.

COMPLIANCE PERIOD

One year (31 May) according to the Interim Measure for the Administration of Carbon Emission Trading of Tianjin; in practice 30 June 2016 for 2015 vintage, 10 July 2015 for 2014 vintage, and 25 July 2014 for 2013 vintage.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed during the pilot phase. Borrowing is not allowed.

OFFSETS AND CREDITS

QUANTITATIVE LIMIT: Domestic project-based carbon offset credits—Chinese Certified Emission Reduction (CCER)—are allowed. The use of CCER credits is limited to 10% of the annual compliance obligation.

QUALITATIVE LIMIT: Credits have to stem from CO_2 reduction projects, excluding hydro and have to be realized after 2013.

PRICE MANAGEMENT PROVISIONS

In case of market fluctuations, the Tianjin Development and Reform Commission (DRC) can buy or sell allowances in order to stabilize the market.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of CO_2 emissions.

VERIFICATION: Third-party verification is required.

ENFORCEMENT

In case of non-compliance, companies are disqualified for preferential financial support and other national supporting policies i.e. on recycling economy, energy-saving and emission reduction for three years. There are no financial penalties for non-compliance.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Tianjin DRC (Competent authority); Tianjin Climate Exchange (Trading platform and registry)

Taiwan, China

under consideration

On 1 July 2015, Taiwan, China enacted the Greenhouse Gas Reduction and Management Act, which not only sets a 50% emissions reduction target for 2050 compared to 2005 GHG levels, but also implements carbon reduction through a five-year control circle. The Act charges the Taiwanese Environmental Protection Administration (TEPA) with the development of appropriate climate change policies to reach this target. An ETS is mentioned as a key option in the law, although no precise timeline is given for its implementation. The Act also outlines options for ETS design elements including: allocation, provisions for offsets, and the considerations that must be taken into account when setting the cap.

Since then, a series of subsidiary regulations have been announced. For example the Regulations Governing Greenhouse Gases Offset Program Management, the Management Regulations Governing Greenhouse Gas Emission Inventories and Registration, and the Greenhouse Gas Accreditation Organizations and Verification Organizations Management Regulations.

TEPA initiated an inter-ministerial consultation process on the climate strategy of Taiwan, China including the potential ETS in November 2016.

On 23 February 2017, the government approved its Climate Change Action Guidelines, which lays out ten general principles on how to achieve its climate mitigation and adaptation targets. The third principle calls for the implementation of a cap-and-trade system. Energy, industry, agriculture and transport ministries were tasked to draft detailed plans on how to achieve the goals laid out in the guidelines. The guidelines also re-confirm its objective to halve the GHG emissions by 2050 set back in 2015. TEPA reiterated the commitment to develop an ETS on 17 March 2017.

Currently, the TEPA is working to reach this goal, including assessing different ETS design options and identifying relevant factors for cap setting and allocation. It has also established mandatory emissions reporting for entities with annual emissions above 25,000 tCO_2e from certain sectors. Mandatory reporting has been ongoing since 2013.

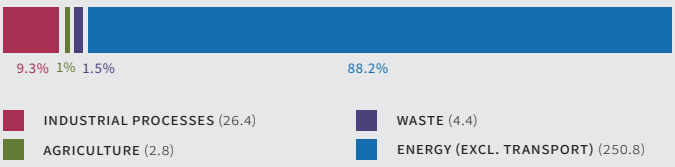
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

284.5 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2013)



GHG REDUCTION TARGETS

BY 2016 TO 2020: Return to 2008 GHG levels (282 $MtCO_2e$). **BY 2025:** Return to the 2000 GHG levels (247 $MtCO_2e$). **BY 2030:** 50% below BAU (214 $MtCO_2e$). **BY 2050:** 50% below 2005 GHG levels (145 $MtCO_2e$).

OTHER INFORMATION

MRV

REPORTING FREQUENCY: Annual reporting of GHGs (CO_2, CH_4, N_2O, SF_6, NF_3, PFCs and HFCs) for entities from certain sectors with annual emissions greater than 25,000 tCO_2e.

VERIFICATION: Third-party verification is required.

FRAMEWORK: As of 2004, Taiwan, China introduced a voluntary GHG reporting and inventory program. This became mandatory in 2013 under the Air Pollution Control Act and is continued under the Greenhouse Gas Reduction and Management Act.

INSTITUTIONS INVOLVED

Taiwanese Environmental Protection Administration (TEPA)

Japan

under consideration

In December 2010, the Ministerial Committee on Climate Change stipulated government directions for the future development of the three main policies against global warming. The government decided to reconsider an ETS, taking into consideration: The burden on domestic industry and associated impacts on employment; the ongoing development of ETS overseas; an evaluation of existing, major climate change policy measures (such as voluntary actions implemented by the industry sector); and progress towards the establishment of a fair and effective international framework where all major emitters participate.

In March 2017, the Long-term Low-carbon Vision was formulated by the Global Environment Committee of the Central Environment Council, which refers to carbon pricing as essential to decarbonize the society. Based on that discussion, an expert committee on carbon pricing was launched in June 2017 to discuss how carbon pricing can help Japan achieve long-term, substantial emissions reductions, as well as solve economic and social issues.

Japanese companies can familiarize themselves with a voluntary cap-and-trade system: the Advanced Technologies Promotion Subsidy Scheme with Emission Reduction Targets (ASSET). In parallel, Japan is implementing the Joint Crediting Mechanism (JCM).

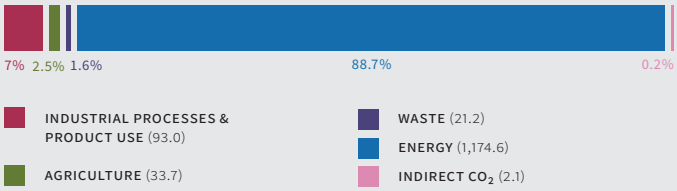
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

1,324.7 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY FY 2020: 3.8% or more reduction from FY 2005 GHG levels. **BY FY 2030:** 26% reduction from FY2013 GHG levels. In addition, the amount of GHG emissions reductions and removals by the JCM is estimated to be 50–100 million tCO_2 (NDC). **BY FY 2050:** 80% reduction (base year not stipulated).

Tokyo Cap-and-Trade Program

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
13.2	1,300

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

Launched in April 2010, the Tokyo Metropolitan Government's Cap-and-Trade Program (Tokyo ETS) is Japan's first mandatory ETS. Under the Tokyo ETS, large offices and factories are required to reduce emissions by 6% or 8% in the first period (FY 2010–2014). Now in its second period, the target has increased to 15% or 17%. In FY2015, emissions were reduced by 26% compared to base-year emissions. The introduction of high efficiency heat sources and light fittings have been key activities in generating emission reductions. Emission reductions have continued alongside increases to gross floor space, indicating a decrease in emissions intensity of the building sector in Tokyo.

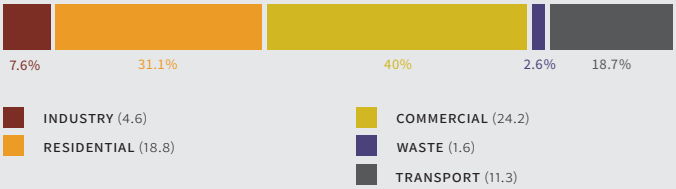
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

65.9 $MtCO_2e$ (2015)*

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: 25% reduction from 2000 GHG levels. **BY 2030:** 30% reduction from 2000 GHG levels.

ETS SIZE

CAP

The absolute cap is set at the facility level that aggregates to a Tokyo-wide cap. This is calculated according to the following formula: Sum of base year emissions of covered facilities × compliance factor × number of years of a compliance period (five years).

Compliance factor: **FIRST PERIOD (FY2010–FY2014):** 8% or 6% reduction below base-year emissions.

SECOND PERIOD (FY2015–FY2019): 17% or 15% reduction below base-year emissions. The higher compliance factors (8% and 17%) apply to office buildings, and district and cooling plant facilities (excluding facilities which use a large amount of district heating and cooling).

The lower compliance factors (6% and 15%) apply among others to office buildings, facilities which are heavy users of district heating and cooling plants, and factories.

Highly energy efficient facilities that have already made significant progress with regards to climate change measures are subject to half or three-quarters of the compliance factor.

EMISSIONS COVERAGE

20%

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Commercial and Industrial Sectors. Building owners are subject to surrender obligations but large tenants, those with a floor space above 5000m² or over 6 million kWh electricity usage per year, can assume obligations jointly or in place of building owners.

INCLUSION THRESHOLDS: Facilities that consume energy more than 1,500kL of crude oil equivalent or more per year.

* The overall emissions figure for Tokyo is higher than the total of the emissions by sector because the former includes all GHGs in Tokyo, whereas the emissions by sector only measures CO_2 emissions.

POINT OF REGULATION

Downstream

NUMBER OF LIABLE ENTITIES

~1,300 facilities

PHASES AND ALLOCATION

TRADING PERIODS

FIRST PERIOD: 1 April 2011 to 30 September 2016 (compliance period and adjustment year) **SECOND PERIOD:** 1 April 2015 to 30 September 2021 (compliance period and adjustment year)

ALLOCATION

Grandfathering based on historical emissions calculated according to the following formula: Base year emissions × (1-compliance factor) × compliance period (5 years).

Base-year emissions for the first compliance period are based on the average emissions of three consecutive years between FY 2002–2007.

Allocation to new entrants is based on past emissions or on emissions intensity standards: Emissions activity (floor area) × emission intensity standard.

COMPLIANCE PERIOD

Five years. **FIRST PERIOD:** FY 2010–2014 **SECOND PERIOD:** FY 2015–2019

Fiscal year runs from 1 April to 31 March.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed between two compliance periods (e.g. banking from first to second compliance period is allowed. Banking from first to third is not). Borrowing is not allowed.

OFFSETS AND CREDITS

Currently credits from four offset types are allowed in the Tokyo ETS.

SMALL AND MID-SIZE FACILITY CREDITS: Total amount of emission reductions achieved by implementing emission reduction measures from non-covered small- and medium-sized facilities in Tokyo since FY2010. Issuance of credits from FY2011. Small and Mid-Size Facility Credits can be used for compliance without limit.

OUTSIDE TOKYO CREDITS: Emission reductions achieved from large facilities outside of the Tokyo area. Large facilities: Energy consumption of 1,500kL of crude oil equivalent or more in a base-year, and with base-year emissions of 150,000t or less. Credits are only issued for the reduction amount that exceeds the compliance factor of 8%. Issuance of credits from FY2015. Outside Tokyo Credits can be used for compliance for up to one-third of facilities' reduction obligations.

RENEWABLE ENERGY CREDITS: Credits from solar (heat, electricity), wind, geothermal, or hydro (under 1,000kW) electricity production are counted at 1.5 times the value of regular credits. Credits from biomass (biomass rate of 95% or more, black liquor is excluded) are converted with the factor 1.

TYPES OF CREDITS: Environmental Value Equivalent, Renewable Energy Certificates and New Energy Electricity, generated under the Renewable

Portfolio Standard Law. Renewable Energy Credits can be used for compliance without limit.

SAITAMA CREDITS (VIA LINKING):

TWO TYPES: 1) Excess Credits of the Saitama Scheme: Emission reductions from facilities with base-year emissions of 150,000 tons or less. Issuance of credits from FY2015. 2) Small and Mid-Size Facility Credits issued by Saitama Prefecture. Issuance of credits from FY2012. Saitama Credits can be used for compliance without limit.

All offsets have to be verified by verification agencies.

MECHANISM FOR SELECTING LOW CARBON ELECTRICITY: From FY2015, TMG has certified low carbon electricity producers with lower than average CO_2 emissions factors. Covered entities that purchase electricity from low carbon suppliers will have their compliance obligation reduced accordingly.

PRICE MANAGEMENT PROVISIONS

In general, TMG does not control carbon prices. However, the supply of credits available for trading may be increased in case of excessive price development.

COMPLIANCE

MRV

REPORTING FREQUENCY: Participants are required to annually submit (fiscal year) their emission reduction plans and emissions reports. Seven GHG gases have to be monitored and reported: CO_2 (non-energy related), CH_4, N_2O, PFCs, HFCs, SF_6 and NF_3. Large tenants, those with a floor space above 5000m² or over 6 million kWh electricity use per year, are required to submit their own emission reduction plan to TMG in collaboration with building owners.

VERIFICATION: These reports also require third-party verification.

FRAMEWORK: These are based on "TMG Monitoring/Reporting Guidelines" and "TMG Verification Guidelines".

OTHER: CO_2 emission factors are fixed during the five year compliance period.

Verified reduction amounts can be used for compliance, but cannot be traded with other facilities except energy-related CO_2. Verification is required only when it is used for compliance.

ENFORCEMENT

In case of non-compliance, the following measures may be taken in two stages: FIRST STAGE: The Governor orders the facility to reduce emissions by the amount of the reduction shortfall multiplied by 1.3.

SECOND STAGE: Any facility that fails to carry out the order will be publicly named and subject to penalties (up to JPY 500,000 [USD 4,460]) and surcharges (1.3 times the shortfall).

OTHER INFORMATION

INSTITUTIONS INVOLVED

Tokyo Metropolitan Government (TMG) Bureau of Environment

LINKAGE WITH OTHER SCHEMES

Linking with the Saitama Prefecture started in April 2011 when the Saitama ETS was launched. Credits from excess emission reductions and Small- and Mid-Size Facility Credits (offsets) are officially eligible for trade between the two jurisdictions. During the first compliance period, 14 credit transfers took place between the Saitama Prefecture and Tokyo (8 cases from Tokyo to Saitama, 6 cases from Saitama to Tokyo).

Target Setting Emissions Trading System in Saitama

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
6.7	~600

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
CO_2 ONLY	FREE ALLOCATION	DOMESTIC OFFSETS

Saitama's ETS was established in April 2011 as part of the Saitama Prefecture Global Warming Strategy Promotion Ordinance. Saitama's ETS is bilaterally linked to Tokyo's. In FY2015, the Saitama ETS had achieved a 27% reduction in emissions below base-year emissions.

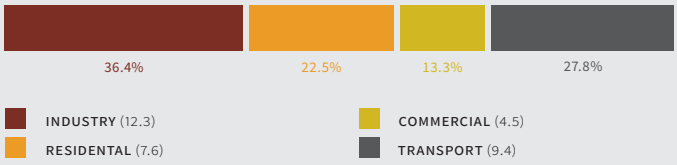
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

37.2 $MtCO_2e$ (FY2015) (demand side)*

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (FY2015)



GHG REDUCTION TARGETS

BY 2020: 21% reduction from 2005 GHG levels (demand side).

ETS SIZE

CAP

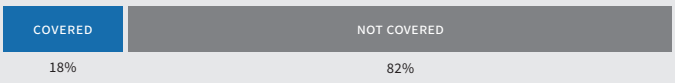
An absolute cap is set at the facility level, which aggregates to a Saitama-wide cap.

This is calculated according to the following formula: Sum of base year emissions of covered facilities × compliance factor × number of years of a compliance period. (First Period: Four years, Second Period: Five years).

COMPLIANCE FACTOR: FIRST PERIOD (FY2011–FY2014): 8% or 6% reduction below base-year emissions.

SECOND PERIOD (FY2015–FY2019): 15% or 13% reduction below base-year emissions.

EMISSIONS COVERAGE



* The overall emissions figure for Saitama is higher than the total of the emissions by sector because the former includes all GHGs in Saitama, whereas the emissions by sector only measures CO_2 emissions.

GHG COVERED

CO_2

SECTORS & THRESHOLDS

Commercial and Industrial Sectors. **INCLUSION THRESHOLDS:** Facilities that consume energy more than 1,500kL of crude oil equivalent or more per year.

POINT OF REGULATION

Downstream

NUMBER OF LIABLE ENTITIES

~600 facilities

PHASES AND ALLOCATION

TRADING PERIODS

FIRST PERIOD: 1 April 2012 to 30 September 2016 (compliance period and adjustment year). **SECOND PERIOD:** 1 April 2015 to 30 September 2021 (compliance period and adjustment year).

ALLOCATION

Grandfathering based on historical emissions is calculated according to the following formula: Base year emissions × (1-compliance factor) × compliance period.

Base year emissions for the first compliance period are based on the average emissions of three consecutive fiscal years between 2002 and 2007.

Allocation to new entrants is based on past emissions or on emissions intensity standards: Emissions activity (floor area) × emission intensity standard.

COMPLIANCE PERIOD

Four or Five years. **FIRST PERIOD:** FY2011–FY2014 **SECOND PERIOD:** FY2015–FY2019 The fiscal year runs from 1 April to 31 March.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed between two consecutive compliance periods (e.g. banking from first to second compliance period is allowed. Banking from first to third is not). Borrowing is not allowed.

OFFSETS AND CREDITS

Currently credits from five offset types are allowed in the Saitama scheme.

SMALL AND MID-SIZE FACILITY CREDITS: Total amount of emissions reductions achieved by implementing emissions reduction measures from non-covered small and medium sized facilities in Saitama since FY2011. Issuance of credits from FY2012. Small and Mid-Size Facility Credits can be used for compliance without limit.

OUTSIDE SAITAMA CREDITS: Emissions reductions achieved from large facilities outside the Saitama Prefecture. Large facilities: energy consumption of 1,500kL of crude oil equivalent or more in a base-year, and with base-year emissions of 150,000 tons or less. Credits only issued for the reduction amount that exceeds the compliance factor. Issuance of credits from FY2015. Outside Saitama Credits can be used for compliance for up to one-third, in the case of offices, or up to half, in the case of factories, for the facilities' reduction targets.

RENEWABLE ENERGY CREDITS: Credits from solar (heat, electricity), wind, geothermal, or hydro (under 1,000kW) electricity production are counted at 1.5 times the value of regular credits. Credits from biomass (biomass rate of 95% or more, black liquor is excluded) are converted with the factor 1. Types of Credits: Environmental Value Equivalent, Renewable Energy Certificates, New Energy Electricity generated under the Renewable Portfolio Standard Law. Renewable Energy Credits can be used for compliance without limit.

FOREST ABSORPTION CREDITS: Credits from forests inside the Saitama Prefecture are counted at 1.5 times the value of regular credits. Others are converted with the factor 1. Forest absorption Credits can be used for compliance without limit.

TOKYO CREDITS (VIA LINKING): TWO TYPES: (1) Excess Credits from Tokyo ETS: Emission reductions from facilities with base-year emissions of 150,000t or less. Issuance of credits from FY2015. **(2)** Small and Mid-Size Facility Credits issued by Tokyo ETS: Issuance of credits from FY2012. Tokyo Credits can be used for compliance without a limit.

All offsets have to be verified by verification agencies.

PRICE MANAGEMENT PROVISIONS

In general, the Saitama Prefectural Government does not control carbon prices. However, the supply of credits available for trading may be increased in case of excessive price evolution.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting. All seven GHGs have to be monitored and reported: CO_2 (non-energy related), CH_4, N_2O, PFCs, HFCs, SF_6 and NF_3.

VERIFICATION: Verification is required only when it is used for compliance.

FRAMEWORK: Participants are required to report their verified emissions based on the Saitama Prefectural Government Monitoring/Reporting Guidelines and the Saitama Prefectural Government Verification Guidelines.

OTHER: Verified reduction amounts can be used for compliance, but cannot be traded with other facilities except for energy-related CO_2.

ENFORCEMENT

None.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Saitama Prefectural Government

LINKAGE WITH OTHER SCHEMES

Linking with Tokyo started in April 2011. Credits from excess emission reductions and Small- and Mid-Size Facility Credits (offsets) are officially eligible for trade between the two jurisdictions. During the first compliance period, 14 credit transfers took place between the Saitama Prefecture and Tokyo (8 cases from Tokyo to Saitama, 6 cases from Saitama to Tokyo).

Korean Emissions Trading System

in force

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
538.5	599

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	FREE ALLOCATION	DOMESTIC & INTERNATIONAL OFFSETS

On 1 January 2015, the Republic of Korea launched its national ETS (KETS), the first nationwide cap-and-trade program in operation in East Asia. The ETS covers approximately 599 of the country's largest emitters, which account for around 68% of national GHG emissions. The KETS covers direct emissions of six Kyoto gases, as well as indirect emissions from electricity consumption. The KETS will play an essential role in meeting Korea's 2030 NDC target of 37% below BAU emissions.

The end of 2017 marked the completion of the first phase of the KETS. The second phase will run from 2018–2020 and will see some key changes. Auctioning will be introduced and benchmark-based free allocation will be expanded from three sectors (cement, oil refining and domestic aviation) to between seven to nine sectors. Following limited trade of allowances in phase one, a market maker will be introduced in an effort to enhance trade activity and market liquidity. Finally, offsets from international credits which are developed by domestic companies will be allowed at a maximum of five percent and there will be an increased number of approved offset project methodologies.

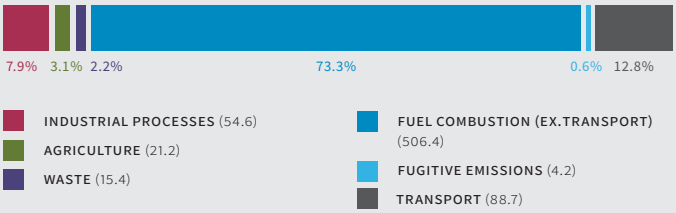
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

690.6 $MtCO_2e$ (2014)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2014)



GHG REDUCTION TARGETS

BY 2020: 30% below BAU. **BY 2030:** 37% below BAU (536 $MtCO_2e$). This represents a 22% reduction below 2012 GHG levels.

ETS SIZE

CAP

PHASE ONE (2015–2017): 1,667 $MtCO_2e$, including a reserve of 89 million tCO_2e for market stabilization measures, early action and new entrants. 2015: 540$MtCO_2e$, 2016: 560 $MtCO_2e$, 2017: 567 (including early reduction and additional allowances) $MtCO_2e$.

PHASE TWO (2018–2020): 2018: 538.5$MtCO_2e$. Caps for 2019 and 2020 will be announced in 2018.

EMISSIONS COVERAGE

GHG COVERED

CO_2, CH_4, N_2O, PFCs, HFCs, SF_6

SECTORS & THRESHOLDS

PHASE ONE (2015–2017): 23 sub-sectors from steel, cement, petro-chemistry, refinery, power, buildings, waste and aviation sectors. **INCLUSION THRESHOLDS:** company > 125,000 tCO_2/year, facility > 25,000 tCO_2/year

POINT OF REGULATION

Downstream

NUMBER OF LIABLE ENTITIES

599 business entities including 5 domestic airlines as of November 2017.

PHASES AND ALLOCATION

TRADING PERIODS

PHASE ONE: Three years (2015–2017) **PHASE TWO:** Three years (2018–2020)
PHASE THREE: Five years (2021–2025)

ALLOCATION

PHASE ONE (2015–2017): 100% free allocation, no auctioning.
Most sectors will receive free allowances based on the average GHG emissions of the base year (2011–2013). Three sectors (grey clinker, oil refinery, aviation) will be allocated free allowances following benchmarks based on previous activity data from the base year (2011–2013). During Phase one, about 5% of total allowances are retained in a reserve for market stabilization measures (14 $MtCO_2e$), early action (41 $MtCO_2e$), and other purposes including new entrants (33 $MtCO_2e$). In addition, any unallocated allowances and withdrawn allowances will be transferred to the reserve.

PHASE TWO (2018–2020): 97% free allowances, 3% auctioned.
PHASE THREE (2021–2025): Less than 90% free allowances, more than 10% auctioned.
Energy-intensive and trade-exposed (EITE) sectors will receive 100% of their allowances for free in all phases. EITE sectors are defined along the following criteria: **(1)** Additional production cost of > 5% and trade intensity of > 10%; or **(2)** Additional production cost of > 30%; or **(3)** Trade intensity of > 30%.

COMPLIANCE PERIOD

One year

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed without any restrictions. Borrowing is allowed only within a single trading phase (maximum of 10% of entity's obligation in 2015. Increased to 20% in 2016 and 2017), but not across phases. In the first compliance year of Phase two (2018), borrowing will be allowed at a maximum of 15% of an entity's obligation. From 2019, the borrowing limit will be affected by how much an entity has borrowed in the past. Specifically, the borrowing limit will be determined by the following: [Borrowing limit of previous year-("borrowing ratio" in previous year × 50%)] /entity's emission volume.

OFFSETS AND CREDITS

PHASE ONE (2015–2017):
QUALITATIVE LIMIT: Only domestic credits from external reduction activities implemented by non-ETS entities—and that meet international standards—may be used for compliance. Domestic CDM credits (CERs), and credits from domestically certified projects (Korean Offset Credits) are allowed in the scheme. These credits must be converted to Korean Credit Units (KCUs) of a specified vintage before being used for compliance. Eligible activities include those eligible under the CDM and Carbon Capture and Storage (CCS). However, only activities implemented after 14 April 2010 are eligible. As of December 2017, 35 domestic and 211 CDM methodologies had been approved. For more, reporting procedures for small offset projects (below 100 tCO_2e) will be standardized and simplified to promote reduction activities by diverse stakeholders.
QUANTITATIVE LIMIT: Up to 10% of each entity's compliance obligation.
PHASE TWO (2018–2020) AND THREE (2021–2025): In Phase two, trades of CERs from international CDM projects developed by domestic companies will be allowed, up to 5% of each entity's emission volume. In Phase three, credits of up to 10% of each entity's compliance obligation with a maximum of 5% coming from international offsets will be allowed.

PRICE MANAGEMENT PROVISIONS

The Allocation Committee may decide to implement market stabilization measures in the following cases: **(1)** The market allowance price of six consecutive months is at least three times higher than the average price of the two previous years. **(2)** The market allowance price of the last month is at least twice the average price of two previous years and the average trading volume of the last month is at least twice the volume of the same month of the two previous years. **(3)** The average market allowance price of a given month is smaller than 40% of the average price of the two previous years. In 2015 and 2016, the price threshold is KRW 10,000 (USD 9). **(4)** When it is difficult to trade allowances due to the imbalance of supply or demand.
The stabilization measures may include: **(1)** Additional allocation from the reserve (up to 25%); **(2)** Establishment of an allowance retention limit: minimum (70%) or maximum (150%) of the allowance of the compliance year; **(3)** An increase or decrease of the borrowing limit (currently up to 20%); **(4)** An increase or decrease of the offsets limit (currently up to 10%); **(5)** Temporary set-up of a price ceiling or price floor.
In 2016, the Allocation Committee increased the borrowing limit from 10% to 20%. Furthermore, an additional nine million allowances were made available from auction at a reserve price of 16,200 KRW (around USD 14). Less than a third of allowances were sold.

COMPLIANCE

MRV

REPORTING FREQUENCY: Annual reporting of emissions must be submitted within three months from the end of a given compliance year (by the end of March).
VERIFICATION: Emissions must be verified by a third-party verifier.
OTHER: Emissions reports are reviewed and certified by the Certification Committee of the Ministry of Environment within five months from the end of a given compliance year (by the end of May).
If the liable entity fails to report emissions correctly, the report will be disqualified.

ENFORCEMENT

The penalty shall not exceed three times the average market price of allowances of the given compliance year or KRW 100,000/ton (USD 89).

OTHER INFORMATION

INSTITUTIONS INVOLVED

In 2016, responsibility for the KETS moved from the Ministry of Environment to the Ministry of Strategy and Finance. On 1 January 2018, responsibility was transferred back to the Ministry of Environment, while the Ministry of Strategy and Finance takes the chair of the Allocation Committee. In 2018, a market maker will also be introduced. An institution that is designed to enhance the stability of the KETS

New Zealand Emissions Trading Scheme

in force

* Sectors represent upstream coverage

EMISSIONS COVERAGE ($MtCO_2e$, 2018)	LIABLE ENTITIES
41.7	2,360

GAS COVERAGE	ALLOCATION	OFFSETS & CREDITS
SEVERAL GASES	FREE ALLOCATION	DOMESTIC OFFSETS

The New Zealand Emissions Trading Scheme (NZ ETS) was launched in 2008, and covers all sectors of the economy, including forestry as a source of both emissions and units. However nitrous oxide and methane emissions from agriculture currently only have reporting obligations and no surrender obligations.

The first statutory review was completed in 2011 and the NZ ETS was amended in 2012. The latest review of the NZ ETS began in late 2015 and concluded in July 2017.

The first stage of this review resulted in a decision to phase out the "one-for-two" transitional measure over three years from the beginning of 2017. All NZ ETS sectors will have full surrender obligations from 2019.

The second stage of the review looked at the overall design and operation of the NZ ETS in the 2020s, with a view to ensuring it could help New Zealand meet its first Nationally Determined Contribution under the Paris Agreement. In July 2017, the Government adopted a package of four in-principle decisions: To introduce auctioning, to develop a different price ceiling measure, to limit the volume of international units once the NZ ETS reopens to international markets, and to coordinate decisions on the supply settings in the NZ ETS over a rolling five-year period. Options for simplified forestry-sector accounting are still under discussion and further policy decisions are expected in 2018.

The NZ ETS was originally designed to be fully linked to international carbon markets under the Kyoto Protocol. However, as of 1 June 2015, international units were no longer accepted for compliance and the NZ ETS became a domestic-only system. As indicated by New Zealand's NDC, reestablishing a link to high-integrity international carbon markets will form part of New Zealand's strategy for meeting its 2030 target.

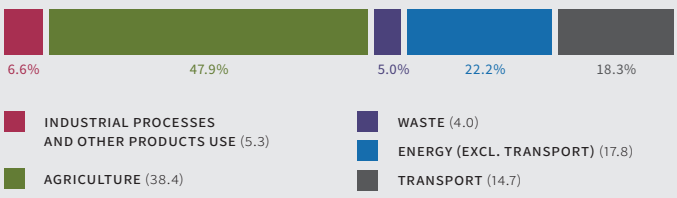
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

80.2 $MtCO_2e$ (2015)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2015)



GHG REDUCTION TARGETS

BY 2020: 5% reduction from 1990 GHG levels (unconditional target).
BY 2030: 30% reduction from 2005 GHG levels (equivalent to 11% reduction from 1990 GHG levels) (NDC) **BY 2050:** 50% reduction from 1990 GHG levels.

ETS SIZE

CAP

The NZ ETS was originally designed to operate within the international cap on developed country emissions provided by the Kyoto Protocol and has therefore operated without a specific domestic cap. This accommodated carbon sequestration from forestry activities and a full link to the international Kyoto Protocol carbon markets. As allowance supply is now restricted to New Zealand Units (NZUs), and future access to international units is will be subject to quantitative limits, the NZ ETS is expected to have its own fixed cap in the future.

NZUs are issued either as free allocation to Emissions Intensive Trade Exposed (EITE) activities or for domestic removal activities (e.g. forestry). This means that as long as NZU prices remain below the fixed price option level (NZD 25/NZU [USD 18]), the annual unit supply is equivalent to the quantity of free allowances and removal units issued. Another source of unit supply currently is the substantial amount of banked NZUs in the market, which is expected to reduce over coming years due to the removal of the one-for-two transitional measure. (See Allocation).

The NZ ETS legislation includes provisions to introduce auctioning of NZUs within an overall limit that also takes into account free allocation volumes. This would cap the amount of allowances (it will not limit the volume of NZUs representing removals from forestry or other removal activities). In future this will combine with a quantity limit on international units to provide the NZ ETS with an overall cap on emissions.

EMISSIONS COVERAGE

Coverage with surrender obligations. Emissions coverage with reporting obligations: ~98%

GHG COVERED

CO_2, CH_4, N_2O, SF_6, HFCs and PFCs

SECTORS & THRESHOLDS

Sectors were gradually phased-in over time. **2008:** Forestry (mandatory: deforesting pre-1990 forest land, voluntary: Post-1989 forest land).

2010: Stationary energy (various thresholds), industrial processing (various thresholds) and liquid fossil fuels (various thresholds).
2013: Waste (except for small and remote landfills) and bulk imports of synthetic GHGs (various thresholds). Synthetic GHGs not in the NZ ETS are subject to an equivalent levy.
Methane and nitrous oxide emissions from agriculture must be reported, but there are no surrender obligations for these emissions. The New Zealand Government is currently setting up a Climate Change Commission and it is expected that, when established in 2019, this Commission will provide a recommendation on whether these agricultural emissions should be subject to surrender obligations.

POINT OF REGULATION

The point of obligation is generally placed upstream.
Some large businesses that purchase fossil fuels directly from mandatory NZ ETS participants can choose to opt into the NZ ETS rather than have the costs passed down from their suppliers.

NUMBER OF LIABLE ENTITIES

2,360 entities registered, of which 2,290 have surrender obligations (as of June 2017): 206 entities with mandatory reporting and surrender obligations. 2,084 entities registered as voluntary participants with reporting and surrender obligations, mostly for forestry activities. 70 entities with mandatory reporting without surrender obligations; mostly for agricultural activities.

PHASES AND ALLOCATION

TRADING PERIODS

For most sectors the NZ ETS has year-on-year allocations and surrender obligations.
For post-1989 forestry participants, annual reporting of emissions and removals is optional, with five-year mandatory reporting periods. As a result, unit entitlement transfers and surrender obligations for these participants correspond to when they choose to report their emissions.

ALLOCATION

EMISSIONS INTENSIVE AND TRADE EXPOSED (EITE) ACTIVITIES: Intensity-based allocation for 26 eligible activities: 90% free allocation for highly emissions-intensive and trade exposed activities (1,600 tCO_2e/NZD 1 million of revenue [USD 711,000); 60% free allocation for moderately emissions-intensive and trade exposed activities (800 tCO_2e/NZD 1 million of revenue [USD 711,000]).
Under the one-for-two transitional measure, free allocation volumes to EITE activities were halved to reflect the 50% compliance obligation. In line with the phase out of the transitional measure, allocations for EITE activities have increased from 1 January 2017, with full allocations applying from 1 January 2019 (see Price Management Provisions).
POST-1989 FORESTRY SECTOR AND OTHER REMOVAL ACTIVITIES: See Offsets and Credits. In the year to June 2017, 5.5 million NZUs were allocated to industrial participants, and 9.5 million NZUs were granted for removal activities, compared to a total of 22.4 million units surrendered in this period.
FORESTRY AND FISHERIES SECTORS: Owners of pre-1990 forest land received a one-off free allocation of NZUs to partially compensate for the impact of the introduction of the NZ ETS on land use flexibility. Fishing quota owners were also compensated for rising fuel costs with a one-off free allocation.
In 2012, the NZ ETS legislation was amended to allow the introduction of auctioning of NZUs within an overall cap on non-forestry sectors. Based on the latest NZ ETS review, in July 2017 an in-principle decision was taken to develop and introduce an auctioning mechanism. The mechanism is planned to be developed by 2020.

COMPLIANCE PERIOD

One year for most sectors.
Participants registered for post-1989 forestry have mandatory five year compliance periods; however they may choose to report emissions and removals more frequently.

FLEXIBILITY

BANKING AND BORROWING

Banking is allowed except for those units that were purchased under the fixed price option (see Price Management Provisions).
Borrowing is not allowed.

OFFSETS AND CREDITS

QUALITATIVE LIMIT: As of 1 June 2015, international units are not eligible for surrender in the NZ ETS.
NZUs are granted to participants that voluntarily register in the scheme for removal activities.
FORESTRY REMOVAL ACTIVITIES: participants are entitled to receive one NZU per ton of removal for registered post-1989 forest land. If the forest is harvested or deforested, units must be surrendered to account for the emissions, and if the participant chooses to deregister from the scheme, NZUs equivalent to the number received must be returned.
OTHER REMOVAL ACTIVITIES: participants are entitled to receive one NZU per ton of removal from recognized industrial processes, e.g. embedding GHGs in certain products, exporting some products or destroying bulk synthetic GHGs. However, entitlements were reduced by half in line with the one-for-two transitional measure. This is set to increase to full entitlements by 1 January 2019 concurrent with the phase-out of the one-for-two measure (see Price Management Provisions).
In the year to June 2017, 9.5 million NZUs were transferred to participants for removal activities (forestry removal activities—7.7 million, and other removal activities—1.8 million).
Since January 2013, pre-1990 forest landowners have the option to offset deforestation on their land by planting an equivalent new forest elsewhere in New Zealand (under given conditions).

PRICE MANAGEMENT PROVISIONS

Transitional measures were implemented in 2009 to help firms adjust to the carbon cost. These included: (a) one-for-two surrender obligation for non-forestry sectors (one allowance could be surrendered for every two tons of emissions); and (b) a NZD 25 fixed price option (USD 18), which acts as a price ceiling.
These measures were assessed in the recent NZ ETS review. As a result, the one-for-two measure is being phased out over the three years from 2017. The one-for-two measure, effectively a 50% surrender obligation,

has been increased to 67% from 1 January 2017, to 83% from 1 January 2018 and will increase to full surrender obligations from 1 January 2019. Allocations and entitlements for EITE activities and other removal activities will increase concurrently.

The current fixed price option will remain in place until a new price ceiling measure is developed and introduced.

COMPLIANCE

MRV

REPORTING FREQUENCY: Most sectors are required to report annually.

VERIFICATION: Self-reporting supplemented by a programme of second- and third-party audits run by the regulator (approach is consistent with NZ income tax auditing procedures). Participants must seek third party verification if they apply for the use of a unique emissions factor.

OTHER: Post-1989 forestry participants are required to report emissions at the end of each five year mandatory emissions reporting period, with the option to report annually as well.

ENFORCEMENT

An entity that fails to surrender emission units when required to, are still required to surrender the units and pay a penalty of NZD 30 for each unit (USD 21) that was not surrendered by the due date. In certain circumstances the penalty may be reduced.

Entities can be fined up to NZD 24,000 (USD 17,000) on conviction for failure to collect emissions data or other required information, calculate emissions and/or removals, keep records, register as a participant, submit an emissions return when required, or notify the administering agency or provide information when required to do so.

Entities can also be fined up to NZD 50,000 (USD 35,500) on conviction for knowingly altering, falsifying or providing incomplete or misleading information about any obligations under the scheme, including emissions return. This penalty and/or imprisonment of up to five years also apply to entities that deliberately lie about obligations under the NZ ETS to gain financial benefit or avoid financial loss.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry for the Environment; the Environmental Protection Authority; the Ministry for Primary Industries; the NZ Customs Service and the New Zealand Transport Agency.

LINKS WITH OTHER SYSTEMS

Until 1 June 2015, the NZ ETS was indirectly linked to other systems (e.g. the EU ETS) via the international Kyoto Protocol Flexible Mechanisms. Since then, the NZ ETS has been a domestic-only system.

The recent review of the NZ ETS resulted in a range of in-principle decisions that will make the NZ ETS more similar to emissions trading schemes in other countries, which will make it more compatible for international linking in the future.

Although the NZ ETS is currently domestic-only, it remains connected to the International Transaction Log (ITL), including for voluntary cancellation of Kyoto Protocol units. New Zealand also participates in the Registry System Administrators (RSA) Forum and working groups, and follows accounting rules from the Kyoto Protocol for accounting.

Thailand

under consideration

The 12th National Economic and Development Plan (2017–2021) of Thailand calls for several mitigation measures, including the development of a domestic carbon market. The National Climate Change Master Plan (2015–2050) also refers to carbon markets as a potential mechanism to reduce GHG emissions in the private sector. In addition, the importance of carbon markets has also been emphasized in Thailand's NDC.

From 2013–2016, the Thailand Greenhouse Gas Management Organization (Public Organization) (TGO) developed an MRV system for the Thailand Voluntary Emissions Trading Scheme (Thailand V-ETS). In 2013, MRV general guidelines for the Thailand V-ETS were developed. In October 2014, the Thailand V-ETS started its pilot phase, which ended in 2017, in order to test the MRV system, develop sector-specific MRV guidelines, as well as to set a cap and allocate allowances for covered factories during the pilot phase. The second phase (2018–2020) will test the registry and trading platform. At the same time, TGO is working on an ETS implementation roadmap.

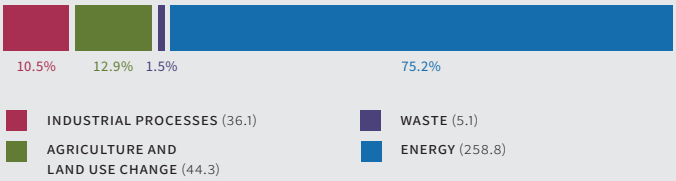
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

344.4 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2013)



GHG REDUCTION TARGETS

BY 2020: In its Nationally Appropriate Mitigation Action (2014), Thailand committed to a voluntary 7% compared to BAU in the energy and transport sectors. The reduction target can be up to 20% with international support. **BY 2030:** 20% reduction compared to BAU with a 25% reduction contingent on adequate and enhanced access to technology development and transfer, financial resources and capacity building support through a balanced and ambitious global agreement under the UNFCCC (NDC).

Vietnam

under consideration

Vietnam's Green Growth Strategy (2012) pursues the objective of a low-carbon economy and invokes the introduction of market-based instruments. Several measures lay the groundwork for implementing National Appropriate Mitigation Actions (NAMAs) in the waste, steel, cement, chemical fertilizer, wind power and biogas sectors. As part of its activities under the PMR, Vietnam is focusing on the steel and waste sectors. The planned MRV system and crediting NAMA will provide the experience for the implementation of a sector-based cap-and-trade program in the steel sector, which could start in 2020. Vietnam is also considering the use of market-based instruments for the waste sector starting in 2020.

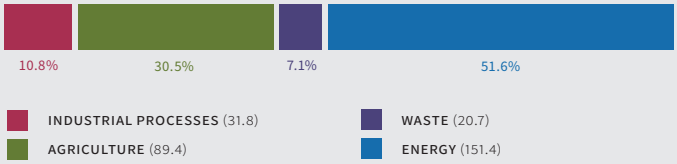
BACKGROUND INFORMATION

OVERALL GHG EMISSIONS (EXCL. LULUCF)

293.3 $MtCO_2e$ (2013)

OVERALL GHG EMISSIONS BY SECTOR

$MtCO_2e$ (2013)



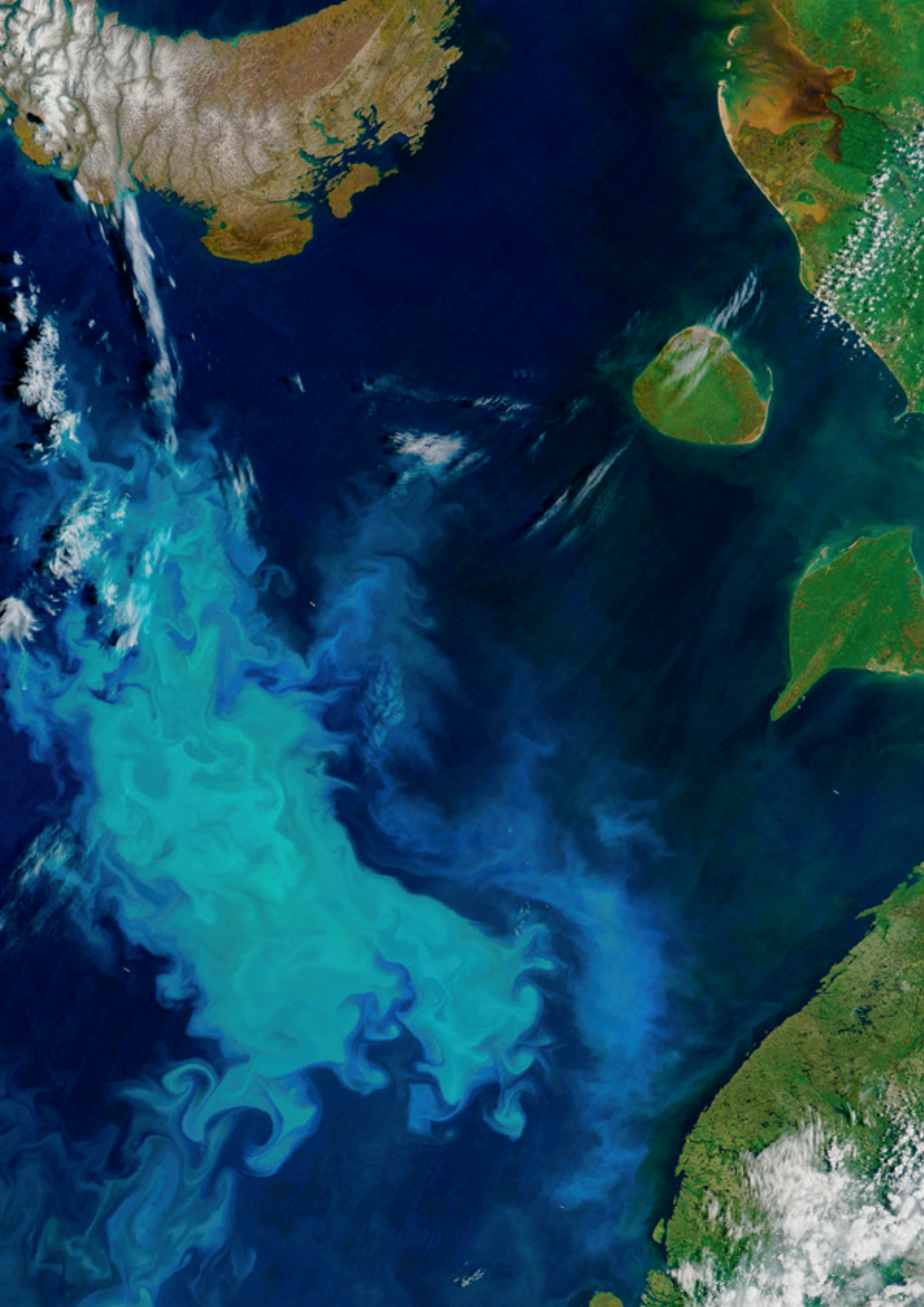
GHG REDUCTION TARGETS

BY 2030: 8% below BAU and 25% conditional on international support (NDC) including 20% reduction in 2010 GHG (intensity) levels and 30% conditional on international support.

OTHER INFORMATION

INSTITUTIONS INVOLVED

Ministry of Natural Resources and Environment of Viet Nam



About ICAP

Introducing the International Carbon Action Partnership

In 2007, ICAP was founded as an international government forum to bring together policymakers from all levels of government that have or are interested in introducing an ETS. It provides a unique platform for governments to discuss the latest research and practical experiences with emissions trading. Since its formation, ICAP has established itself as an ETS knowledge hub and its membership has grown to include 31 members and four observers.

Objectives

- Share best practices and learn from each other's experience of ETSs
- Help policymakers recognize ETS design compatibility issues and opportunities for the establishment of an ETS at an early stage
- Facilitate the future linking of trading programs
- Highlight the key role of Cap-and-Trade as an effective climate policy response
- Build and strengthen partnerships amongst governments

ICAP Training Courses at a Glance

18 courses since 2009 on ETS design and implementation
Over 437 participants from 44 countries
229 speakers from 31 countries

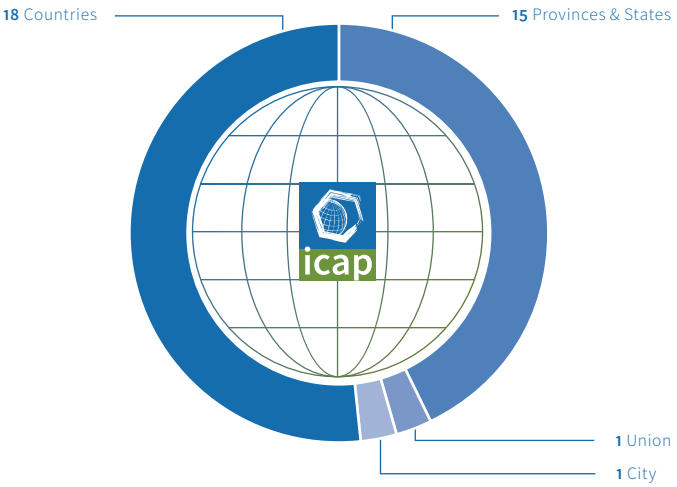
ICAP Knowledge Products

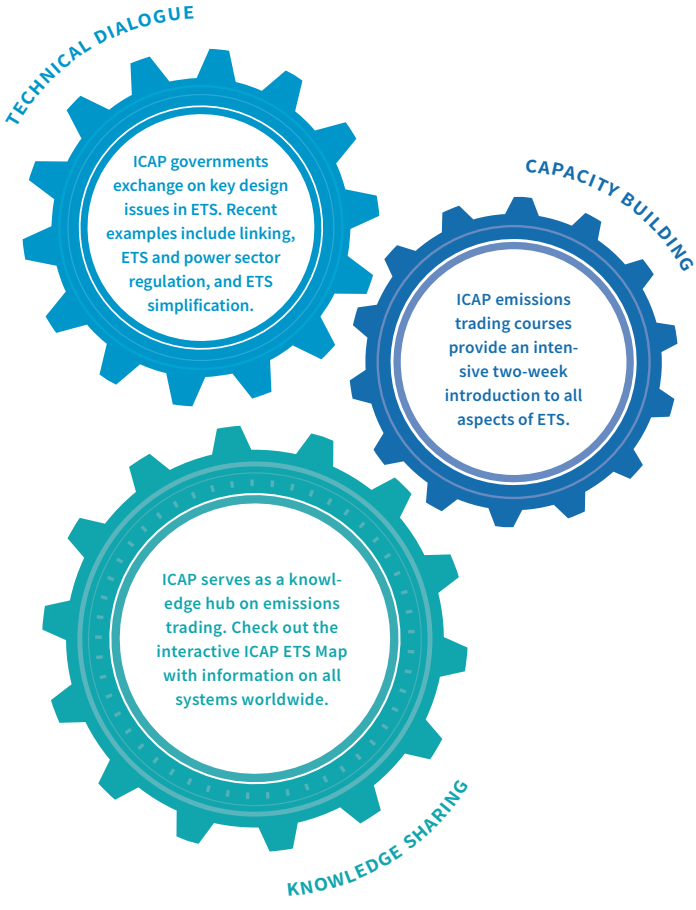
Quarterly newsletter in six languages
The interactive ICAP ETS Map
ICAP/PMR ETS Handbook in five languages
ICAP annual report "Emissions Trading Worldwide: Status Report"
Upcoming: ICAP Guide to linking

Members (as of February 2018)
Arizona, Australia, British Columbia, California, Denmark, the European Commission, France, Germany, Greece, Ireland, Italy, Maine, Manitoba, Maryland, Massachusetts, Netherlands, New Jersey, New Mexico, New York, New Zealand, Norway, Ontario, Oregon, Portugal, Québec, Spain, Switzerland, the Tokyo Metropolitan Government, Vermont, the United Kingdom and the state of Washington.

Observers
Japan, Kazakhstan, the Republic of Korea and Ukraine.

One of the strengths of ICAP is its broad and diverse membership





www.icapcarbonaction.com

Celebrating Ten Years of ICAP

ICAP Members and Observers at the Lisbon Ten-Year Anniversary

On 1 September 2017, ICAP together with the Portuguese Ministry for Environment convened a high-level political dialogue on emissions trading to celebrate a decade of ICAP. A symposium involving political leaders from carbon pricing jurisdictions worldwide saw lively discussion on emerging forms of carbon market cooperation and the role of ETS in the transition to a low-carbon economy. The gathering in Lisbon also provided an opportunity to celebrate ICAP's achievements in fostering an international community of ETS policymakers since its founding in the same location ten years ago. Barbara Hendricks, German Federal Environment Minister says:

"As one of the initiators of ICAP, we are glad to see how the partnership has developed into the key forum for exchange on emissions trading worldwide. With ETSs worldwide, including the EU ETS, undertaking bold reform, carbon pricing looks set to fulfil its promise in cost efficiently delivering ambitious emissions cuts for the post-Paris era."

The celebrations were opened by João Pedro Matos Fernandes, the Minister of Environment of Portugal. High-level political representatives from Germany, Japan, and Mexico, as well as California and New York State subsequently shared insights on key accomplishments and challenges with emissions trading in their jurisdictions. Following the Ministerial presentations, the event continued with a diverse set of panels comprising eminent carbon market experts and practitioners.

Joint Statement on Climate Change and Carbon Markets

As part of the celebrations, high-level government officials from 26 national and subnational governments, including EU Member States, Mexico, the Republic of Korea, California and Tokyo, endorsed a joint statement on strengthening climate action and carbon market cooperation. In the lead up to COP23, it sent a strong signal that all levels of government—cities, states, provinces and countries—were willing to work together to provide climate leadership.

The statement stressed the importance of emissions trading as a key tool for decarbonization. Signatories committed to work to ensure their systems are effectively reducing emissions and sending an appropriate long-term carbon pricing signal. They also reaffirmed their commitment to ICAP's role as a forum for discussions on ETS design issues and to intensify cooperation with aspirant ETS jurisdictions to encourage the development of new carbon markets around the world.

ICAP's work ensures the transmission of best practices in ETS design and operation across different jurisdictions and can lay the groundwork for future cooperation and linking efforts.

From left to right:
ICAP Co-Chair **Marc Allessie**, Director of the Dutch Emissions Authority, the Netherlands;
Rodolfo Lacy Tamayo, Vice-Minister of Planning and Environmental Policy, Mexico;
Yasuo Takahashi, Vice-Minister for Global Environmental Affairs, Japan;
Rita Schwarzelühr-Sutter, Parliamentary State Secretary, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany;
Carlos Martins, Secretary of State Ministry of Environment, Portugal;
ICAP Co-Chair **Jean-Yves Benoit**, Director of the Carbon Market, Ministry of Sustainable Development, Environment and Fight Against Climate Change, Québec

List of Acronyms

AB	Assembly Bill
AFOLU	Agriculture, Forestry and other Land Use
APCR	Allowance Price Containment Reserve
ASSET	Advanced Technologies Promotion Subsidies Scheme with Emissions Reduction Targets
BAU	Business as Usual
BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
BVRio	Rio de Janeiro Green Stock Exchange
CAAC	Civil Aviation Administration of China
CAD	Canadian Dollar
CARB	California Air Resources Board
CCER	Chinese Certified Emission Reduction
CCP	Central Counterparty
CCR	Cost Containment Reserve
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CH4	Methane
CHF	Swiss Franc
CNY	Chinese Yuan Renminbi
CO_2	Carbon Dioxide
CONAFOR	National Forestry Commission of Mexico
CORSIA	Carbon Offsetting and Reduction Scheme
CSRC	China Security Regulatory Commission
DEQ	Oregon Department of Environmental Quality
DRC	Development and Reform Commission
EBRD	European Bank for Reconstruction and Development
EC-LEDS	Enhanced Capacities for Low Emissions Development Strategies
ECR	Emissions Containment Reserve
EEA	European Economic Area
EITE	Energy-Intensive and Trade-Exposed
ENVI	Committee on Environment, Public Health and Food Safety
ETS	Emissions Trading System or Emissions Trading Scheme
EU	European Union
EUR	Euro
FARC	Fuerzas Armadas Revolucionarias de Colombia (Revolutionary Armed Forces of Colombia)
FFCER	Fujian Forestry Certified Emission Reduction
FY	Fiscal Year
FYP	Five Year Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Agency)
GLCC	General Climate Change Law
Grupo BMV	Mexican Stock Exchange
GVCes	Centro de Estudos em Sustentabilidade da Fundação Getúlio Vargas (Center for Sustainability Studies)
HFC	Hydrofluorocarbon
HFC-23	Fluoroform
ICAO	International Civil Aviation Organization
ICAP	International Carbon Action Partnership
INDC	Intended Nationally Determined Contribution
ISO	International Organization for Standardization
ITL	International Transaction Log
ITMO	Internationally Transferred Mitigation Outcomes
JCM	Joint Crediting Mechanism
JI	Joint Implementation
KAU	Korean Allowance Units
KAZ ETS	Kazakhstan Emission Trading Scheme
KAU2015	Korean Allowance Units of the 2015 Vintage
KCUs	Korean Credit Units
KCUs2015	Korean Credit Units of the 2015 Vintage
KETS	Korean Emissions Trading Scheme
KL	Kiloliter
KOC	Korean Offset Credits
KP	Kyoto Protocol
KRW	South Korean Won
KRX	Korea Exchange
KW	Kilowatt
LAO	Legislative Affairs Office of the State Council

LCC	Low Carbon City
LDCs	Least Developed Countries
LRF	Linear reduction factor
LULUCF	Land Use, Land-Use Change and Forestry
MassDEP	Massachusetts' Department of Environmental Protection's
MfE	New Zealand Ministry for the Environment
MIT	Massachusetts Institute of Technology
MMC	Mine Methane Capture
MOU	Memorandum of Understanding
MRV	Monitoring, Reporting and Verification
MSR	Market Stability Reserve
M	Million
$MtCO_2e$	Million Metric Tons of Carbon Dioxide Equivalent
MW	Megawatt
N_2O	Nitrous Oxide
NO_x	Nitrogen Oxide
NAMA	Nationally Appropriate Mitigation Actions
NCCP	National Climate Change Policy (Colombia)
NDC	Nationally Determined Contribution
NDRC	National Development Reform Commission
NER	New Entrants Reserve
NF_3	Nitrogen Trifluoride
NZ	New Zealand
NZD	New Zealand Dollar
NZUs	New Zealand Units
PCC	Pacific Coast Collaborative
PNMC	Brazil National Climate Change Policy
PFCs	Perfluorocarbon
PMR	Partnership for Market Readiness
QC	Québec
RBOB	Reformulated Blendstock for Oxygenate Blending
RENE	Mexico National Emissions Register
RFF	Resources for the Future
RGGI	Regional Greenhouse Gas Initiative
RSA	Registry System Administrators
SEMARNAT	Ministry of Environment and Natural Resources of Mexico
SENER	Ministry of Energy of Mexico
SF_6	Sulfur Fluoride
SHEAF	Shanghai Emission Allowance Forward
SHCH	Shanghai Clearing House
SHCP	Ministry of Finance of Mexico
SOE	State Owned Enterprise
tce	Ton of Coal Equivalent
tCO_2	Ton of Carbon Dioxide
tCO_2e	Ton of Carbon Dioxide Equivalent
TEPA	Taiwanese Environmental Protection Administration
TGO	Thailand Greenhouse Gas Management Organization
TMG	Tokyo Metropolitan Government
TMS	Target Management Scheme
Ton	Metric ton unless otherwise noted
T-VER	Thailand Voluntary Emission Reduction Program
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	US Dollar
US EPA	US Environment Protection Agency
V-ETS	Thailand Voluntary Emission Trading Scheme
WCI	Western Climate Initiative

Disclaimer and Notes

Disclaimer

This report was prepared by the ICAP Secretariat. For the purpose of this report, emissions trading systems (ETS) include mandatory cap-and-trade systems for GHGs. Systems that regulate other gases (e.g., other air pollutants) or trade other units (e.g., energy-efficiency certificates), other market-based instruments (e.g., carbon taxes, baseline and crediting systems) and voluntary programs do not fall under the scope of this report.

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The data used in this report reflects the global state of play at the time of writing in January 2018. Although the information contained in the report was assembled with the utmost care, updated and/or additional information may have been released by the time of printing, ICAP cannot be held liable for the timeliness, correctness, or completeness of the information provided. For any corrections, additions or other comments on the content of this report, including relevant citations, please contact the ICAP Secretariat at info@icapcarbonaction.com.

Notes on methods and sources

General notes

1. The report draws on a range of sources, including official ETS information and statements from governments and public authorities, data submitted to the UNFCCC, or where available, other official reporting and information provided by ICAP members and observers, contributing authors or in-country/native experts from our network. Information on emitting sectors is based on self-reporting by the respective jurisdictions; therefore categories are not necessarily consistent across jurisdictions.
2. Data in the report represents the actual situation as of 25 January 2018
3. Where 2018 data is not yet available, we use the most recent available data.
4. We use metric tons throughout the report, unless otherwise indicated.
5. Where information on emissions caps was not available, cap estimates based on the relative coverage of a jurisdiction's overall GHG emissions were used.
6. Currencies are converted to US dollars at the annual average exchange rates for 2017 published by Oanda (https://www.oanda.com).
7. Jurisdictions' shares of global GDP and world population are calculated based on the most recent annual data available at the time of writing. If not indicated otherwise, this data is for 2016. The number of people living in jurisdictions that are running an ETS and the cumulative GDP of the respective economies are calculated as a percentage of world population and global GDP. Figures have been retrieved from various sources (links available upon request, info@icapcarbonaction.com).

Notes on infographics

For the "Emissions Trading Worldwide" and the "Major Reforms" graphic, we draw on data contained in the factsheets, the online version of the ICAP ETS Map (https://icapcarbonaction.com/en/ets-map), as well as news articles from the ICAP secretariat. For infographics involving quantitative data the following sources were used and calculations performed:

Tripling the Share

1. Whenever available, we use official cap data. When this data is unavailable or when systems operate without a cap, we use estimates of emissions covered by sectors.
2. In the case of the EU ETS, we exclude emissions covered under the aviation sector cap due to a lack of reliable data. In light of international developments of a global market-based regulation for aircraft emissions, the EU adjusted its treatment of the aviation sector, not applying the previously set cap (see the EU ETS Factsheet for details). Excluding the aviation sector of the EU ETS thus leads to a more conservative estimate of the total global emissions covered by an ETS.
3. There are two cases where existing systems regulate the same emissions. In those cases, we performed calculations to avoid double-counting:
   a. MA-RGGI: The newly established system in Massachusetts covers emissions from the electricity sector, just as RGGI does, thus it does not increase the total covered emissions.
   b. China-Chinese Pilots: Both the Chinese pilots and the China national ETS cover the power sector. In order to calculate the total emissions covered by an ETS in China, we have estimated the degree of power sector overlap between the national system and the pilots, and adjusted accordingly. For provincial power sector data we relied on: Qu, Shen, Sai Liang, and Ming Xu. "CO_2 Emissions Embodied in Interprovincial Electricity Transmissions in China" Environmental Science & Technology 51, no. 18 (2017): 10893-10902.
   The study aggregates official power generation statistics and combines them with emission intensities for 2013 data yielding province-level power sector emission estimates. It indicates that in 2013, ~1/6 of Chinese power sector emissions came from provinces that now have a pilot system covering the power sector. Assuming this share has remained constant since, we adjusted the estimated total coverage of the Chinese national ETS (3.3Gt CO_2e—power sector only), meaning we assume that the Chinese national ETS has brought an additional 5/6 * 3.3Gt = 2.75 Gt CO_2e under ETS regulation in China.
4. To ensure visibility of every additional carbon market in the graph, we display new systems with a minimum size when first introduced. The overall size of the bar, representing the total emissions covered in each year, is unchanged.
5. Data on global emissions refers to CO2e excluding LULUCF; 2017 data is calculated based on figures for 2016, assuming 2% growth. Data has been retrieved from: Olivier, Schure and Peter (2017): Trends in Global CO2 and Total Greenhouse Gas Emissions, 2017 Report. PBL Netherlands Environmental Assessment Agency, The Hague (http://www.pbl.nl/en/publications/trends-in-global-co2-and-total-greenhouse-gas-emissions-2017-report)
   The assumption of 2% growth in global emissions in 2017 is based on the best estimate of CO_2 emissions by the Global Carbon Budget Project (http://www.globalcarbonproject.org/carbonbudget/17/files/International_FutureEarth_GCPBudget2017.pdf).
6. Percentages of global emissions covered are rounded to the nearest full percentage. They are slightly above 5% in 2005 and slightly below 15% in 2018.

From Local to Supranational

1. This graphic illustrates the world of emission trading from two perspectives: operating systems and implementing jurisdictions.
2. Operating systems are defined as ETSs with a single cap applying across the whole system. Thus, we count RGGI and the EU ETS as one system each, while we treat

California, Québec and Ontario as three distinct systems as they have separate caps and ETS regulations that are linked through bi-lateral agreements. This gives a total of 21 currently operating systems.

3. The second perspective is that of implementing jurisdictions and their respective governance level. While the EU ETS covers 31 countries (EU 28 plus Liechtenstein, Norway, Iceland), it has one single legal basis at EU level, the EU ETS Directive, and is thus counted as one jurisdiction for the purpose of this graphic. Membership of the EU ETS is tied to membership of the European Economic Area, with decisions on the EU ETS ultimately made by the European tripartite institutions. At the country level, five national governments (China, Kazakhstan, Republic of Korea, New Zealand and Switzerland) operate a national ETS. Sub-national jurisdictions at the state/province and municipal levels make up the remainder. The RGGI states are counted as nine separate jurisdictions because the legal basis for the system remains with each individual state. Massachusetts is both part of RGGI and also operates an additional parallel statewide system.
4. The category of cities is based on the jurisdictional level, the geographical characteristics of the jurisdiction (primarily an urban metropolitan area), and the self-described definition of each system by the respective governing body. We thereby categorize the cap-and-trade systems of Tokyo, Saitama, Beijing, Tianjin, Shanghai, Chongqing and Shenzhen as city-level systems.

Different Shapes of Cap-and-Trade

1. Cap trajectory: The rate of decline in the cap is calculated for the latest available pair of successive years (e.g. 2017 to 2018). The difference between the first and second year's amount of allowances is expressed as a percentage reduction compared to the first year's cap. The data denotes annual caps and is thus not a direct measure of allowances released in this year, given that this can also be affected by vintage years, reserves and other instruments. The New Zealand ETS does not feature a system-specific cap, but is rather aligned to international targets under the UNFCCC, making it incomparable in this metric.
2. Coverage: The figures for coverage indicate the percentage of the respective economy's total emissions that is covered by the ETS. The data is retrieved from the factsheets published in this report.
3. Carbon Price: For the EU ETS, the carbon price is the average of all 2017 auctions at the European Energy Exchange converted to USD. For RGGI and WCI, the clearing prices of all auctions conducted in 2017 are averaged and converted to USD, with conversion to price per metric ton in the case of RGGI (where short tons are the standard unit). For the Korean and New Zealand systems, prices are based on average end-of-day trading prices on secondary-market exchanges in 2017 and converted to USD.
4. Share of allowances not provided freely: This figure indicates the proportion of allowances that must be acquired at auction or elsewhere.
5. California's present a difficult boundary case as they simultaneously feature characteristics of free allowances for utilities at the receiving side and characteristics of regularly auctioned allowances seen from the distributing side. Since our prime interest with this metric is illustrating for what share of allowances a carbon price has to be paid (rather than merely existing as an opportunity cost), we treat consignment allowances as if they were not provided freely. We thereby take into consideration that most utilities cannot simply use the consignment allowances for their own compliance and revenue usage is mandated to benefit rate-payers.
6. The New Zealand ETS has so far not had an auctioning mechanism. However, this is not equivalent with a free provision of all allowances—most supply comes from sources such as domestic forestry removals or privately held banked units. For New Zealand this metric is calculated as the proportion of freely allocated allowances for Emissions Intensive and Trade Exposed (EITE) activities in 2015 compared to the total system-wide compliance obligation for that year.
7. WCI jurisdictions (California, Québec and Ontario) are represented as a single linked system. Values for each indicator are thereby calculated as weighted averages.

Carbon Market Connections

1. The graphic depicts the current state of connection and cooperation between selected systems both in operation and under consideration.
2. While the graphic follows geographical conditions to some extent, the focus lies on depicting the network of cooperation. Hence, systems are arranged based mainly on their interaction with other systems.
3. We distinguish between four different states of interaction: Existing links (systems are already connected), planned links (negotiations on linking have been concluded, policy now needs to be ratified to become operational), memoranda of understanding (an MoU has been signed between the respective jurisdictions but linking negotiations have either not yet started or concluded), talks (the possibility of linking or other forms of carbon market cooperation is officially discussed between the respective jurisdictions).
4. Bubble sizes approximately indicate the size of carbon markets, being the total emissions coverage. To enhance graphical readability, the bubble sizes are not directly in proportion: small systems tend to be larger than proportional while larger systems tend to be smaller. The "Tripling the Share" graphic as well as the factsheets are better sources of market size information.

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In the first year since the entry into force of the Paris Agreement, emissions trading worldwide has once again taken a significant step forward. The culmination of several years of hard work, 2017 has seen not only the emergence of two new ETSs but also the completion of major reviews, reforms and new legislation in four of the pioneering systems. In early 2018, there are 21 systems in force covering almost 15% of global emissions. The ICAP Status Report 2018 provides a comprehensive snapshot of the latest developments in ETS around the world, with detailed factsheets on the policy settings of each system combined with in-depth articles from policymakers and carbon market experts.